I. DEWATERING OF TRENCHES: Pipe trenches shall be kept free from water during excavation, fine grading, pipe laying and jointing, and pipe encasement operations in an adequate and acceptable manner. Where the trench bottom is mucky or otherwise unstable because of the presence of ground water, and in all cases where the static ground water elevation is above the bottom of any trench or bell hole excavation, such ground water shall be lowered by means of well point and pumps or by other means acceptable to the Engineer, to the extent necessary to keep the trench free from water and the trench bottom stable at all times when work within the trench is in progress. The disposal of waste water from trench dewatering operations shall be subject to the approval of the Engineer at all times; such waste water shall be conducted to existing drainage ditches, channels, or drains. Surface water shall be diverted to prevent it from entering trenches.

J. CUTTING CONCRETE PAVEMENT AND WALKS: Pipe lines constructed under paved roadways may be constructed by open cut trenching except at specific locations designated on the Plans where they shall be placed by boring, or a combination of boring and jacking. Brick pavement, concrete pavement and all types of concrete base pavement, may be removed or cut only where, in the manner, and to the extent specified herein or authorized by the Engineer. Cuts shall be no larger than necessary to provide adequate working space for proper installation of pipe and pipe line appurtenances. The cutting of pavements along each side of trenches and at structures shall saw cut. The saw cut shall be full depth of the pavement. Concrete pavement and walks shall be placed to existing joints.

1. Concrete pavement, brick and concrete base pavement over trenches excavated for pipe lines shall be removed to a width not less than twelve four (24) inches wider than the width of the trench at the pavement subgrade, which trench width shall not exceed the minimum permissible trench width for the size and type of pipe which is to be installed in the trench by more than twelve (12) inches. The trench width at the trench bottom shall not be greater than at the top and no under-cutting will be permitted. A shoulder not less than twelve (12) inches in width at any point shall be left between the cut edge of the pavement and the top edge of the trench. Pavement cuts shall be made to and between straight lines that, unless otherwise required, shall be parallel to the centerline of the trench.
2. Where the line of trench parallels the length of concrete walks and the trench location is all or partially under the walk, then the entire walk shall be removed and replaced. Crossings not more than eight (8) feet in length shall be accomplished by tunneling where the line of trench crosses concrete walks, curbs or gutters with approval of the engineer. If necessary to remove concrete curbs, gutters or walks, they shall be replaced to and between existing joints.

K. UNPAVED ROAD CROSSINGS: Unpaved roads, driveways or streets may be crossed by trenching unless otherwise noted on the Plans. The Contractor shall install suitable barricades and lights at open trenches and take any precautions necessary to protect the public from damage and as required by the Owner. The Contractor will be financially responsible for any damage or suits arising from said crossings and shall save and hold harmless the Owner and the Engineer from any claims arising from this construction. The surface shall be replaced to permit prompt opening to traffic. The Contractor shall arrange his work to insure that streets, driveways, and roads be closed no longer than necessary for construction operations. Surfacing of unpaved streets, alleys, driveways and other traveled ways shall match existing surface depth and type of surface material.

L. EARTH EXCAVATION BELOW PIPE SUBGRADE: Pipe trenches shall be excavated below pipe subgrade elevations as shown on the Plans to provide for the installation of pipe bedding material as specified hereinafter.

M. PIPE CLEARANCE IN ROCK: Where rock is encountered in excavating and where it is necessary to place pipe in rock excavation, the rock shall be removed to provide a minimum clearance, for the size of the pipe being laid as set forth in the following table:

....

Size of Pipe	Below Pipe	At Side of Pipe
24" and smaller	6"	4"
24" to 36”	9"	6"
42” and larger	12”	6”

1. The clearance figures given in the above table are minimum clearances from the closest projection of the rock to the outside edge of the pipe, and are not average figures. All material removed from the trench in order to provide the above-specified clearance shall be replaced below and at the sides of the pipe with approved backfill material. All replacement materials specified shall be furnished and installed by and at the expense of the Contractor.

N. TRENCH BOTTOM STABILIZATION: Trench bottoms which become soft, mucky, or otherwise unstable during construction operations shall be stabilized, by and at the expense of the Contractor, with one or more layers of crushed rock or other suitable material, where and as necessary to provide a firm and stable base for granular pipe bedding material. Not more than half-inch depth of mud or muck shall be allowed to remain on the stabilized trench bottom when the granular fill pipe foundation material is installed.

O. ARTIFICIAL FOUNDATIONS IN TRENCHES: Whenever so ordered by the Engineer, the Contractor shall excavate to such depth below grade as the Engineer may direct and the trench bottom shall be brought to grade with such material as the Engineer may order installed. All timber, concrete foundations, wooden inverts, pipes, posts, stringers, and/or saddles, made necessary by quicksand or other treacherous soil, shall be installed as directed by the Engineer. Compensation for extra excavation, timber, concrete, or other foundations, except where provided by Contract unit prices, shall be made in subsidiary to other bid items in the Contract.

3.10 SHEETING AND SHORING

A. TRENCH BRACING AND SHEETING: Except where trench banks are cut on a stable slope to prevent caving or sliding, trenches shall be properly and substantially braced, and sheeted if and where necessary, to prevent caving or sliding and to provide adequate protection to workmen and to the pipe line during and after the construction thereof. Sheeting shall not be pulled until after the initial backfill is complete and then the space left from the sheeting shall be filled immediately and the backfill re-compacted.

1. Fill voids with approved backfill material while shoring and bracing, and as sheeting is removed.
2. Where sheeting is left in place, such sheeting shall not be braced against the pipe, but shall be supported by stakes driven into the trench bottom on each side of the pipe and with the tops of the stakes supported by cross braces above the top of the pipe or by other means, approved by the Engineer, which will not result in the application of concentrated loads or horizontal thrusts on the pipe. Cross braces installed above the pipe for the purpose of supporting sheeting in the bottom of the trench may be removed after the specified pipe embedment has been completed beyond the point of cross brace removal.
3. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
5. 4.Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade including, where applicable, sub-drainage, damp proofing, waterproofing and perimeter installation.
   2. Surveying locations of underground utilities for Record Documents.
   3. Testing and inspecting underground utilities.
   4. Removing concrete formwork.
   5. Removing trash and debris.
   6. Removing temporary shoring, bracing and sheeting.
   7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Backfill placed within building areas and in areas to be paved should consist of approved materials, which are free of organic matter and debris. The procedures and recommendations in the Geotechnical Engineering Report and in this specification shall be used. The Geotechnical Engineering Report shall govern if discrepancies exist.

C. Place backfill on subgrades free of mud, frost, snow or ice.

D. Materials within 24 inches of the building floor slab and any granular leveling should be a select, low volume change materiall.

   1. Materials within 8” below the Low Volume Change layer shall be evaluated for moisture content. If the content is inadequate, the 8” layer shall be removed and re-compacted in a maximum of 8” (loose thickness) lifts with adequate moisture conditioning and compaction.

B. Structural fill materials (LVC) should be free of organic matter and be compacted to a minimum of 95 percent of the maximum dry density within 0% and +4% of the optimum moisture content as determined by Standard Proctor ASTM D 698.
   1. Structural Fill should extend a minimum of ten (10) feet outside of the building line to the north, east and south and five (5) feet outside of the building line to the west. The top of slopes should also be a minimum of ten (10) feet outside of the building line.

C. Fill should be placed in no greater than eight (8) inch loose lift thickness (6” compacted thickness) in mass fill areas and as needed to obtain proper compaction in utility trenches and behind walls.

D. The 24” LVC layer beneath the building slab (or 6” LVC layer beneath the 12” aggregate base material in the mechanical room area, see below) can consist of the following:
   1. Low Swell Potential soils (LL,45, PI<25) that are compacted to at least 95 percent of the maximum dry density as determined by ASTM D 698 and a moisture content of 0% to +4% of optimum. The moisture content of the subgrade soils shall be maintained within this range until completion of the building floor slabs and/or placement of the new pavement sections. Rutted subgrade should be repaired prior to placement of base rock to avoid a potential water trap and subsequent subgrade heave.

   2. Within the mechanical room floor slab that houses the boilers, a minimum of 12” of crushed limestone aggregate shall be placed below the building floor slab and leveling course. This 12” layer shall be placed in 6” lifts and compacted to a minimum of 95% of the material’s maximum dry density as determined by ASTM 698.
      a. The 12” aggregate shall be substituted for 18” of the low volume change material (select fill). Therefore, there is an additional 6” of low volume change material below the 12” layer for a total of 18” low volume change materials. This is different from the 24” LVC layer to be constructed in the other areas of the building.
      b. This area consists of the Mechanical Room of the building.

c. The layer shall extend a minimum of 5’ beyond the building footprint.
d. Crushed limestone shall be KDOT AB-3.

3.12 TRENCH BACKFILLING

A. TRENCH BACKFILL: The kinds of backfill materials to be used and the methods of placing and compaction shall conform to the requirements shown on the Plans. Employ placement method that does not disturb or damage foundation perimeter drainage and utilities in trench.

1. After each pipe has been graded, aligned and placed in final position on the bedding material, and shoved home, sufficient pipe embedment material shall be deposited and compacted under and around each side of the pipe and back of the bell or end thereof to firmly hold and maintain the pipe in proper position and alignment during subsequent pipe jointing, embedment and backfilling operations.
2. Pipe embedment material, in each case, shall be deposited in the trench in such manner that it is scattered along the sides of the pipe and not dropped in compacted masses. In addition, such material shall be deposited, and compacted where required, uniformly and simultaneously on each side of the pipe in order to prevent lateral displacement of the pipe.
3. Drainage maintenance: Backfilling of trenches for pipe installed beneath and/or across roadways, driveways, walks and other traffic ways adjacent to drainage ditches and water courses shall not be done prior to the completion of backfilling to the original ground surface of the trench on the upstream side of such trafficway in order to prevent the impounding of water at any point after the pipe has been laid, and all necessary bridges and other temporary structures required to maintain traffic across such unfilled trenches shall be constructed and maintained. Backfilling shall be done in such a manner that water will not accumulate in unfilled or partially filled trenches. All material deposited in roadway ditches or other water courses crossed by the line of trench shall be removed immediately after backfilling is completed and the section, grades and contours of such ditches or water courses restored to their original condition, in order that surface drainage will be obstructed no longer than necessary.
4. Protection of trench backfill in drainage courses: Where trenches are constructed in or across roadway ditches or other watercourses, the backfill shall be protected from surface erosion by adequate means.
5. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
6. Backfill trenches excavated under footings and within 18 inches of bottom of footings; fill with concrete to elevation of bottom of footings.
7. Place and compact initial backfill of subbase material, free of particles larger than 2 inches, to a height of 12 inches over the utility pipe or conduit.
8. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
9. Coordinate backfilling with utilities testing.
10. Place and compact final backfill of satisfactory soil material to final subgrade.
11. Install warning tape directly above utilities, 12 inches (min.) - 30 inches (max.) below finished grade.

B. Embankment or fill: When pipe is to be installed in embankment or fill, the embankment shall be constructed in accordance with APWA section 2102.6 and shall be built up to a plane at least 18 inches above the top of the pipe prior to the excavation of the sewer trench.

C. BACKFILL MATERIALS AND PLACEMENT

1. Granular Fill: Granular material for pipe bedding and initial backfill or replacement of rock or unsuitable foundation material removed from trench bottoms shall consist of crushed

limestone or pea gravel and shall be free from clay, and other materials which would cause the materials to crack or cake. When tested with square mesh laboratory sieves, the fill material shall meet the requirements as specified below.

3.

Cleaned & Washed Crushed Limestone with following characteristics:

Retained on 3/4 inch sieve	0%
Retained on ½ inch sieve	15% to 35%
Retained on 3/8 inch sieve	40% to 70%
Retained on No. 4 sieve	90% to 100%
Deleterious Substances, maximum	5%

a. All granular fill material beneath the pipe shall be compacted no more than necessary, in order to insure a slightly yielding support for the pipe placed thereon. Such material shall be loosely poured or scattered into the trench, to a maximum depth of twelve (12) inches at any point, before spreading or leveling. When deposited in the trench, granular fill material beneath the pipe shall be spread and graded to provide a uniform and continuous support for the installed pipe at all points between bell holes or pipe joints, except that it will be permissible to disturb or otherwise damage the finished subgrade surface by the withdrawal of pipe slings or other lifting tackle.
b. All granular fill material above the bottom of the pipe shall be placed in not to exceed six (6) inch layers and compacted by adequate tamping, vibration, slicing with a shovel, rodding, or by a combination thereof. All backfill compaction equipment, and the results obtained thereby, shall be subject at all times to the approval of the Engineer.

2. Embedment: Embedment shall be as specified in the plans. This material shall be granular, sand or gravel or select backfill as specified in this specification or in the plans.

   a. Embedment for pipes with Pipe Stiffness (PS) of 100 or less. This category includes all PVC pipe except schedule 40 and HDPE pipe. Embedment shall consist of specified material to a point 6 inches above the top of pipe. A 6" layer of select backfill shall be used on top of the specified material to a point 12" above the top of the pipe Care shall be taken to insure that embedment material is worked in around the haunches of the pipe. Embedment material shall be compacted as specified for Type A compaction.
   b. Embedment for pipes with Pipe Stiffness (PS) over 100. This category includes PVC pipe meeting the requirements of ASTM 2665 (Schedule 40), ductile iron pipe, reinforced concrete pipe and corrugated steel pipe. The Embedment shall consist of specified material to the springline of the pipe. Select backfill shall be used from the springline to 12" above the top of the pipe. Care shall be taken to insure that embedment material is worked in around the haunches of the pipe. Embedment material shall be compacted as specified for Type A compaction.
   c. All embedment material shall be placed in not to exceed eight (8) inch layers (loose measurement) and compacted compacted to 95% (ninety percent) maximum density as determined by ASTM Designation D698 by means of suitable equipment or by tamping with mechanical tampers or hand tampers.
   d. Granular fill may be substituted for all or part of the embedment.

3. Final Backfill
   a. All final backfill under building or paved areas shall be select backfill.
   b. The top portion of backfill beneath established sodded areas shall be finished with not less than six (6) inches of topsoil.
   c. Backfill trenches to contours and elevations with unfrozen fill materials.
   d. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

e. Do not leave more than 50 feet of trench open at end of working day.
f. Place fill material in continuous layers and compact in accordance with COMPACTION SECTION.
g. Protect open trench to prevent danger to the public.

D. UNSUITABLE BACKFILL MATERIAL: No material shall be used for trench backfill which contains rocks or clogs greater than three (3) inches in any dimension, frozen material, debris, junk, or organic material. Such material shall be removed from the backfill and deposited at the direction of the Engineer.

E. DISPOSAL OF EXCESS EXCAVATED MATERIALS: Except as otherwise permitted, all excess excavated materials shall be disposed of away from the work and at a site approved by the Engineer.
1. Broken concrete and other coarse debris resulting from pavement or sidewalk removal, excavated rock in excess of the amount permitted to be and actually installed in trench backfill, junk and debris encountered in excavation work, and other similar waste materials shall be disposed of away from the site of the work and at a site approved by the Engineer.
2. The disposal of waste and excess excavated materials, including all hauling, handling, and spoil bank leveling and surfacing shall be a subsidiary obligation of the Contractor and the full cost thereof shall be considered as being included in and fully covered by other items in the contract.

F. PROTECTION OF TREES AND SHRUBBERY: No trees shall be removed except where their removal is shown on the Plans or is authorized by the Engineer. Main tree roots shall not be cut except where they fall within the area to be occupied by the pipe. Excavation shall be done by hand where necessary to prevent injury to roots or trees. Trees that are left standing shall be adequately protected from permanent damage by reason of construction operations. Trimming of standing trees where required shall be as directed by the Engineer. All shrubbery outside of the construction limits, which is damaged or removed by the Contractor, shall be replaced under the direction of and to the satisfaction of the Owner, by and at the expense of the Contractor.

G. INTERRUPTION OF TRAFFIC: Interruption to through traffic on streets and roads will be kept to a very minimum and provisions shall be made to permit local traffic to serve residences in the vicinity of the work at all times.

H. REMOVAL AND REINSTALLATION OF ITEMS: Street signs, street stop signs, mail boxes and other existing items noted on the Plans or found within construction limits shall without damage be removed, stored, and reinstalled in a condition comparable to pre-existing condition prior to construction. No separate payment will be made for those items but shall be considered subsidiary to other pay items in the Proposal.

3.13 APPROVAL OF SUBGRADE

A. Notify Geotechnical Engineer when excavations have reached required subgrade.

B. If Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof roll subgrade with a tandem-axle dump truck (with geotechnical engineer present) to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.
1. Tandem-axle truck shall be a minimum of 20 tons gross weight.
2. Proof rolling limits to extend a lateral distance of at least 3’ outside of pavement and backs of curbs.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect. In areas where reconstruction or reworking of the subgrade is required due to unstable conditions, unsuitable soils, or as indicated on the drawings, the Contractor shall undercut the area to a stable and firm strata and backfill as directed by the Architect or the Geotechnical Engineer. Backfill shall be accomplished in not more than 6-inch lifts (compacted) with soil meeting the requirements of satisfactory material. All material beneath floor slabs and leveling course, within the top 24 inches of the subgrade must be low volume change material (see Section 3.11 Backfill for additional information). The contractor must meet the following density and moisture requirements:
1. Satisfactory soils:
   a. Compacted to at least 95% but not more than 100% of standard proctor maximum Density.(ASTM D 698)
   b. Moisture content is 0% to +4% above optimum. (ASTM D 698)
2. Fill material beneath Low Volume Change Zone (extending at least 10’ horizontally beyond the building footprint and 2' beyond pavement edge or backs of curbs):
   a. Lifts not exceeding 9” in loose lift thickness, compacted to at least 95% of standard proctor maximum density. (ASTM D 698)
   b. Moisture content is 0% to +4% above optimum. (ASTM D 698)
3. Low Volume Change Zone (PI less than 20, LL less than 45).
   a. Lifts not exceeding 9” in loose thickness compacted to at least 95% of standard proctor maximum density.
   b. Moisture Content: 0% to 4% above optimum. (ASTM D 698)

4. Paved Areas: Upper 8 inches of exposed subgrade and all additional fill.
   a. 0 to +4% above optimum moisture content (ASTM D-698).

F. Excavation in the building pad area shall allow for the placement of low volume change material. All subgrade materials within 8 inches of the bottom of the low volume change material must be evaluated for moisture content and stability. All soils that do not meet the specified moisture content above shall be re-worked and compacted to 95 percent standard density and moisture contents as identified above.

G. If the soils do not have to be reworked or replaced, the top 8-inches of soil shall be reworked and compacted to 95 percent standard density and at least 0 percent to plus 4 percent of optimum moisture content.

3.13 SOIL FILL

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

B. Plow, scarify, bench or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. Prior to placing fill, the existing grade shall be inspected by the geotechnical engineer. All materials within 8 inches of the bottom of the low volume change material must be evaluated for moisture content and stability. If the soils are outside of moisture content range as identified in previous section, the soils shall be reworked and replaced in not to exceed 8-inch lifts between 95 to 100 percent standard density and at moisture content as noted in previous section. If the soils do not have to be reworked or replaced, the top 8-inches of soil shall be reworked and compacted to 95 percent standard density and at moisture content identified in previous section.

D. Place and compact fill material as defined in Section 3.16 “Compaction of Backfills and Fills”.

E. Fill placed within building areas and in areas to be paved should consist of approved materials, which are free of organic matter and debris. The procedures and recommendations in the Geotechnical Engineering Report and in this specification shall be used.

3.14 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to the requirements in the Geotechnical Engineering Report.
   1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

3.15 COMPACTION OF UTILITY TRENCHES

A. Prior to the placement of either structure backfill or trench backfill, a Standard Proctor Curve as determined by AASHTO T 99 (ASTM D 698) shall be obtained for each type of backfill material to be used.

   1. Proctor curves shall be obtained from soil samples selected by a certified testing laboratory from materials excavated by the Contractor.

   2. All costs associated with the selection of soil samples and performing the necessary tests to obtain the Proctor curves shall be paid by the Owner.

   3. Selection of the correct Proctor curve for a particular backfill material shall also be done by the Contractor’s certified testing laboratory.

   4. During backfill operations, soil density tests shall be taken by the Geotechnical Engineer or his representative. When results indicate that compaction does not meet the requirements of these Specifications, the material shall be removed and replaced or re-compacted as necessary to meet the specified requirements at no additional expense to the Owner. Additional tests shall be performed on re-compacted area to insure compliance with the requirements.

B. Compacted backfill material shall be placed in layers and compacted by means of suitable equipment or by tamping with mechanical tampers or hand tampers.

   1. Place and densify embedment material by shovel slicing or vibrating and prepare embedment material so that the pipe will be true to line and grade after installation.

   2. After each pipe has been brought to grade, aligned, and placed in final position, deposit and densify by shovel slicing sufficient bedding material under the pipe haunches and on each side of the pipe to hold the pipe in proper position during subsequent pipe jointing, bedding, and backfilling operations. Place bedding material uniformly and simultaneously on each side of the pipe to prevent lateral displacement.

C. Compacted backfill within two (2) feet of water valve boxes, wyes, and riser pipes shall be hand tamped. Compacted backfill within five (5) feet of sanitary sewer manholes and storm sewer structures shall be hand tamped. Ditch plugs at the pipe outlet and at interval points constructed to the limits specified herein shall be compacted to Type A compaction as specified in this section.

D. All hand placed backfill shall be deposited and spread with hand tools in uniform layers not more than eight (8) inches in thickness on each side of the pipe and for the full width of the trench where above the pipe.

E. TYPE A COMPACTION: Each layer shall be compacted to a density equal to or greater than 95% (ninety-five percent) maximum density. Each successive layer shall contain only the amount of material which will insure proper compaction, but in no case shall any layer be greater than eight (8) inches (loose measurement). The moisture content of the soil to be used for backfill shall be uniform and shall be within plus or minus two percentage points of optimum moisture for the soil.

1. Type A Compaction shall be use under all pavements, sidewalks, curb and gutter, stairs, railings, and structures or buildings or as designated on the plans.

2. The contractor shall certify that 95% (ninety-five percent) compaction has been achieved. Results of tests performed shall be submitted to the Engineer.

3. Testing frequency shall be at each compacted initial and final backfill layer at least one test for each 150 feet or less of trench length, but no fewer than two tests per layer.

   a. Additional testing shall be taken at the recommendation of the engineer or in areas where compaction of trench initial or final backfill is in question.

4. Where applicable, Type A compaction shall begin and end a minimum of 1’ behind the back of curb or edge of pavement on street or pavement crossings.

5. The maximum density of the soil shall be determined by ASTM designation: D698. The test to determine the maximum density of the soils (Standard Proctor) shall be performed by an approved testing laboratory without cost to the Owner.

6. Backfill shall be composed of selected excavated material or approved borrow material.

7. Flowable Fill: A controlled low-strength material (flowable fill) may be substituted for Type A compaction. The materials used shall be the following in the approximate quantities per cubic yard:

Cement	100 lbs./Type 1
Water	370 lbs.
Fine Aggregate	3,400 lbs., 100% smaller than half inch; 0 to 10% smaller than No. 200 sieve.

   a. These proportions may be field adjusted to provide a fill that readily flows around the pipe. The fill shall be placed on both sides of the pipe simultaneously so that both sides are kept approximately equal. The pipe shall be secured in place against floatation and movement prior to placement of the fill to secure. The fill shall be placed to the bottom of the pavement to be placed over the trench.

F. TYPE B COMPACTION: Type B Compaction shall be used in all other areas not requiring Type A compaction as stated in this specification or as designated in the plans.

1. Type B Compaction shall be placed in layers and compacted by means of suitable equipment or by tamping with mechanical tampers or hand tampers. Each layer shall be compacted to a density equal to or greater than 90% (ninety percent) maximum density. Each successive

layer shall contain only the amount of material which will insure proper compaction, but in no case shall any layer be greater than eight (8) inches (loose measurement). The moisture content of the soil to be used for backfill shall be uniform and shall be within plus or minus two percentage points of optimum moisture for the soil.

2. The Contractor shall certify that 90% (ninety percent) compaction has been achieved. Results of tests performed shall be submitted to the Engineer.

3. Testing frequency shall be at each compacted initial and final backfill layer at least one test for each 500 feet or less of trench length, but no fewer than one test per layer.

   a. Additional testing shall be taken at the recommendation of the engineer or in areas where compaction of trench initial or final backfill is in question.

3.16 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place fill and backfill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

a. Materials compacted within the CORPS Critical Zone shall not be compacted by hand tamping or backhoe compaction methods.

B. Compacted fill should consist of inorganic low to moderate plasticity silty clays with liquid limits less than 45 and a plasticity index of less than 20.

C. The upper eight inches (8") below the LVC layer shall be moisture conditioned and compacted prior to LVC layer placement.

D. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

E. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
   1. Under structures, building slabs, steps, and pavements, use the procedures and recommendations in the Geotechnical Engineering Report and as follows:

Subgrade Material	Density Requirements	Moisture Requirements
Satisfactory soils	95 – 100 percent (ASTM D-698)	0 to +4 percent
Subgrade Preparation	95 – 100 percent (ASTM D-698)	0 to +4 percent
Low volume change	95 – 100 percent (ASTM D-698)	0 to +4 percent

3.17 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot (3-m) straightedge.

3.18 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing as stated in section 1.5 QUALITY ASSURANCE.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2,500 sq. ft. or less of building slab and 5,000 sq. ft. or less of pavement areas, but in no case fewer than three tests.
2. Trench Backfill:At each compacted initial and final backfill layer at least one test for each 50 linear feet or less of trench length, but no fewer than two tests.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained.

3.19 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace soil material to depth as directed by Geotechnical Engineer: reshape and re-compact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.
1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 312000

SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes construction dewatering.

B. Related Sections:
1. Division 31 Section "Earth Moving" for excavating, backfilling, site grading, and for site utilities.
2. Division 31 Section "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.
3. Division 33 Section "Subdrainage" for permanent foundation wall, underfloor, and footing drainage.

1.3 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

1. Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
3. Prevent surface water from entering excavations by grading, dikes, or other means.
4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
5. Remove dewatering system when no longer required for construction.

1.4 SUBMITTALS

A. Shop Drawings: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.

1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
2. Include a written plan for dewatering operations including control procedures to be adopted if dewatering problems arise.

B. Delegated-Design Submittal: For dewatering system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer that has specialized in design of dewatering systems and dewatering work.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Architect no fewer than two (2) days in advance of proposed interruption of utility.
2. Do not proceed with interruption of utility without Architect's written permission.

B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.

1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
2. The geotechnical report is included in the Project Manual.

C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Provide temporary grading to facilitate dewatering and control of surface water.

D. Monitor dewatering systems continuously.

E. Promptly repair damages to adjacent facilities caused by dewatering.

F. Protect and maintain temporary erosion and sedimentation controls, which are specified in the project drawings during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.

E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

F. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.

1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

3.3 FIELD QUALITY CONTROL

A. Observation Wells: Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated; additional observation wells may be required by authorities having jurisdiction.

1. Observe and record daily elevation of ground water and piezometric water levels in observation wells.
2. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
3. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.

B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

END OF SECTION 312319

SECTION 31 3116 - TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Soil treatment with termiticide.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of termite control product.

1. Include the EPA-Registered Label for termiticide products.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For termite control products, from manufacturer.

C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

D. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

B. Regulatory Requirements: Formulate and apply termiticides and termiticide devices according to the EPA-Registered Label.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

B. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.7 WARRANTY

A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Five years from date of Final Completion.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT

A. Termiticide: Provide an EPA-Registered termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. BASF Corporation, Agricultural Products; Termidor.
   b. Bayer Environmental Science; Premise 75.
   c. FMC Corporation, Agricultural Products Group; Dragnet FT.
   d. Syngenta; Demon TC.

2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five years against infestation of subterranean termites.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label requirements, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.3 APPLICATION, GENERAL

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.4 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.

1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
2. Foundations: Adjacent soil, including soil along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.

B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

D. Post warning signs in areas of application.

E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION 31 3116

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes temporary excavation support and protection systems.

B. Related Sections:
   1. Division 01 Section "Temporary Facilities and Controls" for temporary utilities and support facilities.
   2. Division 31 Section "Dewatering" for dewatering system for excavations.

1.3 PERFORMANCE REQUIREMENTS

A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls, exposed utility conduits, piping, ductbanks and of resisting soil and hydrostatic pressure and superimposed and construction loads.

   1. Delegated Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
   2. Prevent surface water from entering excavations by grading, dikes, or other means.
   3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
   4. Monitor vibrations, settlements, and movements.

1.4 SUBMITTALS

A. Shop Drawings: For excavation support and protection system.
   1. The contractor shall coordinate with the individual utility companies for the acceptance of design of support systems for exposed utilities prior to beginning construction.
      a. Utility Contacts are as follows:
         1) Westar Energy: Wayne Kliewer (785) 575-1693
         2) Kansas Gas Services: Dawn Hecker (785) 431-4251
         3) AT&T: Keith Gatzemeyer (785) 276-5377
         4) City of Topeka Water: Jeff Hunt (785) 368-3842
         5) City of Topeka Sewers: Dennis Dunbar (785) 368-4344
         6) Fiber Optic – State of Kansas: Rick Willoughby (785) 296-6069
         7) Fiber Optic – Centurylink: Kyle Tostenson (318) 417-2768

B. Delegated-Design Submittal: For excavation support and protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Coordinate first paragraph below with qualification requirements in Division 01 Section "Quality Requirements."Qualification Data: For qualified [**land surveyor**] [**and**] [**professional engineer**].

1.5 QUALITY ASSURANCE

A. Pre-installation Conference: The Contractor shall arrange a pre-installation conference with the Architect & Owner prior to beginning construction to review all aspects of the excavation and intended support systems for the excavated sidewalls and suspended utilities due to excavation.

1. Review methods and procedures related to excavation support and protection system including, but not limited to, the following:

    a. Geotechnical report.
    b. Existing utilities and subsurface conditions.
    c. Proposed excavations.
    d. Proposed equipment.
    e. Monitoring of excavation support and protection system.
    f. Working area location and stability.
    g. Coordination with waterproofing.
    h. Abandonment or removal of excavation support and protection system.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of utility.
2. Do not proceed with interruption of utility without Architect's written permission.

B. Project-Site Information: A geotechnical report has been prepared for this Project and is included in the project manual for informational purposes only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from the data.

1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.
2. The geotechnical report is included in the Project Manual.

C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Architect if changes in

elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that are either new or in serviceable condition.

B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.

C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.

1. Corners: Site-fabricated mechanical interlock or Roll-formed corner shape with continuous interlock

D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application.

E. Shotcrete: Comply with Division 03 Section "Shotcrete" for shotcrete materials and mixes, reinforcement, and shotcrete application.

F. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.

G. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

H. Tiebacks: Steel bars, ASTM A 722/A 722M.

I. Tiebacks: Steel strand, ASTM A 416/A 416M.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.

D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.

E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 SOLDIER PILES AND LAGGING

A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.3 SHEET PILING

A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation.

3.4 TIEBACKS

A. Tiebacks: Drill, install, grout, and tension tiebacks. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.

1. Test loading shall be observed by a qualified professional engineer responsible for design of excavation support and protection system.
2. Maintain tiebacks in place until permanent construction is able to withstand lateral soil and hydrostatic pressures.

3.5 BRACING

A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.

1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Architect.
2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.

1. Remove excavation support and protection systems to a minimum depth of 96 inches below overlaying construction and abandon remainder.
2. Fill voids immediately with approved backfill compacted to density specified in Division 31 Section "Earth Moving."
3. Repair or replace, as approved by Architect, adjacent work damaged or displaced by removing excavation support and protection systems.

B. Leave excavation support and protection systems permanently in place.

END OF SECTION 315000

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Geotechnical Engineering Report: "Geotechnical Engineering Report, Proposed Children's Palace Addition", GeoSource Proj. No. D14G1378, November 26, 2014.

C. Kansas Department of Transportation (KDOT) "Standard Specifications for State Road and Bridge Construction", latest edition.

1.2 SUMMARY

A. This Section includes the following:

1. Hot-mix asphalt paving.
2. Pavement-marking paint.

B. Related Sections include the following:

1. Division 31 Section "Earth Moving" for subbase and base courses.

1.3 DEFINITIONS

A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

B. KDOT: Kansas Department of Transportation.

1.4 SYSTEM DESCRIPTION

A. Provide hot-mix asphalt paving materials, workmanship, and other applicable requirements in accordance with KDOT "Standard Specifications for State Road and Bridge Construction", latest edition .

1. Standard Specification: Division 1200, Asphalt Materials, of KDOT Standard Specifications.
2. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

B. Job-Mix Designs: For each job mix proposed for the Work.

C. Qualification Data: For manufacturer.

D. Material Test Reports: For each paving material.

E. Material Certificates: For each paving material, signed by manufacturers.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.

B. Regulatory Requirements: Comply with standards of KDOT for asphalt paving work.

C. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Prime and Tack Coats: Minimum surface temperature of 60 deg F.
2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials, 50 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Aggregates for asphaltic concrete shall conform to the requirements specified in KDOT Section 1100, Aggregates, Subsection 1103, Aggregates for Hot Mix Asphalt (HMA).

C. Mineral Filler: Limestone dust, Portland cement, or other inert material complying with AASHTO M 17 (ASTM D 242).

2.2 ASPHALT MATERIALS

A. Asphalt Cement/Binder: AASHTO MP 1-93, PG 64-22 for surface course mix, PG 64-22 for base course mix, unless otherwise specified.

B. Prime Coat: Cutback asphalt type; Comply with KDOT Standard Specification Section 1200, “Asphalt Material”, Subsection 1204, “Cutback Asphalt”.
   1. Grades may vary may vary for surface and temperature conditions.

C. Tack Coat: Emulsified asphalt, Comply with KDOT Standard Specification Section 1200, “Asphalt Material”, Subsection 1204, “Emulsified Asphalt”.
   1. Grades may vary may vary for surface and temperature conditions.

D. Water: Potable.

2.3 AUXILIARY MATERIALS

A. Pavement-Marking Paint: Alkyd-resin type, lead and chromate free, ready mixed, complying with FS TT-P-115, Type II.

   1. Color: White for parking stripes. Yellow for Accessible Aisles and no-parking areas.

2.4 MIXES

A. Hot-Mix Asphalt:
   1. Surface Course: Class A Commercial Grade SM-12.5A, by KDOT “Standard Specifications for State Road and Bridge Construction”, latest edition., except as amended:
      a. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
   2. Surface Course: SR-12.5A, by KDOT “Standard Specifications for State Road and Bridge Construction”, latest edition., except as amended:
      a. Provide mixes with a history of satisfactory performance in geographical area where Project is located.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

B. Proof-roll subgrade using a fully loaded, tandem axle dump truck (minimum gross weight of 20 tons) to locate areas that are unstable or that require further compaction.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

B. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure for 72 hours minimum.

1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
2. Protect primed substrate from damage until ready to receive paving.

C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd..

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.3 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Total Pavement thickness shall match existing pavement thickness. Existing pavement thickness to be determined by the Contractor.

2. Place hot-mix asphalt base course in lifts not to exceed 3”. Total number of courses as necessary to meet existing total pavement thickness minus 2” (surface course).
3. Place 2” hot-mix asphalt surface course in single lift.
4. Spread mix at minimum temperature of 260 deg F.
5. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.
6. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints as described in AI MS-22, "Construction of Hot Mix Asphalt Pavements."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.5 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 96 percent of reference laboratory density according to AASHTO T 245, but not less than 94 percent nor greater than 100 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm. Continue rolling until roller marks are eliminated and course has attained maximum density.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch.
2. Surface Course: 1/8 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.7 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow paving to age for 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Contractor shall engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.

2. Perform Compaction testing according to KDOT Specifications Section 603 (603.05) or by pre-approved method. At the Engineer's discretion, one test may be taken daily, but no less that 1 test for each pavement thickness called out in the plans.

3. At the Engineer's discretion, one core may be cut and tested daily for conformance with thickness and/or density requirements. Additional tests, at the contractor's expense, may be necessary to determine limits of areas of deficiency. Equipment to cut cores shall be capable of cutting the mixture without shattering the edges or otherwise disturbing the core. The contractor shall, when necessary, furnish and apply cold water ice, or other cooling substance to the surface of the pavement to prevent the samples for shattering or disintegrating.

B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

E. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

END OF SECTION 321216

SECTION 321313 – CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Geotechnical Engineering Report: "Geotechnical Engineering Report, Proposed Kansas Energy and Service Center", GeoSource Proj. No. D14G1399, December 31, 2015.

C. Kansas Department of Transportation (KDOT) "Standard Specifications for State Road and Bridge Construction", latest edition.

1.2 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:

1. Commercial Driveways and roadways.
2. Commercial Curbs and gutters.
3. Commercial Walkways.

B. All concrete pavement, curbs & gutters and sidewalks that are to be constructed within the City right of way shall follow the City of Topeka Standard Technical Specifications for concrete materials and construction requirements.

C. Furnish materials, workmanship, and other requirements in accordance with KDOT standards and specifications except as revised by these plans and specifications.

D. Related Sections include the following:

1. Division 31 Section "Earth Moving" for subgrade preparation, grading, and subbase course.
2. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants within concrete pavement and at isolation joints of concrete pavement with adjacent construction.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, expansive hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

D. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:

1. Cementitious materials and aggregates.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Curing compounds.
5. Bonding agent or adhesive.
6. Joint fillers.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed pavement work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer must be certified according to the National Ready Mix Concrete Association's Plant Certification Program.

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

1. Testing Agency shall be provided by the Owner.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.

E. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixes.

G. Codes and Standards: Comply with local governing regulations if more stringent that requirements herein specified.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
   1. Utilize flagmen, barricades, warning signs and warning lights as required.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

   1. Use flexible or curved forms for curves of a radius 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

C. Plain Steel Wire: ASTM A 82, as drawn.

D. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

E. Tie Bars: ASTM A 615, Grade 40, deformed.

F. Hook Bolts: ASTM A 307, Grade A , internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

G. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement bars, welded wire fabric, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:

   1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.3 CONCRETE MATERIALS

A. General: Use the same brand and type of cementitious material from the same manufacturer throughout the Project.

B. Cementitious Materials:
   1. Portland Cement: ASTM C 150, Type I/II.

2. Class F Fly Ash: ASTM C618
3. Grade 120 Ground Granulated Bast Furnace Slag: ASTM C989

C. Aggregate: All aggregates shall conform to the requirements of subsection 1102 of the "Standard Specifications for the State Road and Bridge Construction", Kansas Department of Transportation, latest edition, except where otherwise provided by these specifications.

D. Course Aggregate: ASTM C 33, uniformly graded from a single source, as follows:
1. CPA-3, as defined by Subsection 1102 of the "Standard Specifications for State Road and Bridge Construction", Kansas Department of Transportation, 2007 edition.
2. Maximum Aggregate Size: ½ inch nominal.
3. Aggregate for pavement (excluding sidewalks, trails or ramps) shall be entirely granite, quartzite or trap rock easily field identifiable in concrete.
4. Aggregates for sidewalks, trails or ramps shall consist of washed crushed stone having clean, hard, durable, uncoated particles.

E. Fine Aggregate: FA-A, as defined by Subsection 1102 of the "Standard Specifications for the State Road and Bridge Construction", Kansas Department of Transportation, 2007 edition.
1. Do not use fine or coarse aggregates containing substances that cause spalling.
2. Aggregate shall consist of sand having clean, hard, durable, uncoated grains.

F. Water: Potable water meeting ASTM C 94.

2.4 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

2.5 CURING MATERIALS

A. A liquid membrane-forming curing compound shall be used for all applications, unless otherwise specified by the Engineer. The compound shall conform to the requirements for Type 2, white Pigmented Compound as specified in AASHTO M 148 and to the requirements of ASTM C 309.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. All newly placed concrete shall be cured immediately after finishing for a minimum of 7 days unless otherwise specified or approved by the Engineer. Formed surfaces shall be cured if forms are removed prior to 5 days after concrete placement.

2.6 AGGREGATE BASE COURSE

A. Aggregate Base Course shall consist of KDOT AB-3 in accordance with Division 1100, Section 1104 "Aggregates for Aggregate Base Construction" of the KDOT "Standard Specifications for the State Road and Bridge Construction", latest edition, or approved equal.

B. Aggregate Base shall be constructed in accordance with KDOT Division 300, Section 305 "Aggregate Base and Aggregate Shoulders" of the KDOT "Standard Specifications for the State Road and Bridge Construction", latest edition.

C. Aggregate Base thickness to meet the specified minimum thickness indicated on the plans and in the Geotechnical Report.

D. Aggregate Base shall extend 1 foot outside of the back of curb or 1' outside of the edge of concrete pavement.

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751 and AASHTO M 213, non-extruding and resilient filler.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.8 CONCRETE MIXES

A. Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the trial batch method.

   1. Do not use Owner's field quality-control testing agency as the independent testing agency.

C. Proportion mixes to provide concrete with the following properties:

   1. Compressive Strength (28 Days): 4000 psi.
   2. Flexural Strength (28 Days): 600 psi.
   3. Maximum Water-Cementitious Materials Ratio: 0.44.
   4. Slump Range: 1 inch - 3 inches.

D. Cementitious Materials:
   1. Pavements (not including sidewalks, trails or ramps): 600 lbs consisting of either of the following:
      a. A minimum of 450 lbs of Type I/II Portland Cement combined with Grade 120 Ground Granulated Blast Furnace Slag at a minimum of 25% of the combined total cementitious weight.
      b. A minimum of 450 lbs of Type I/II Portland Cement combined with Class F Flyash at a maximum of 25% of the combined total cementitious weight.
   2. Pavements (sidewalks, trails or ramps): 600 lbs consisting of either of the following:

a. Type I/II Portland Cement (6.4 sacks)

E. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus or minus 1.5 percent:
1. Air Content: 6.5 percent.

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94.

PART 3 - EXECUTION

3.1 PREPARATION

A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.4 JOINTS

A. General: Construct construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. General: All joints in concrete pavement shall be sealed with hot applied sealant.

C. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour, unless pavement terminates at isolation joints.

1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
2. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
3. Provide tie bars at sides of pavement strips where indicated.
4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

D. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at ends of curb returns and changes in curb direction.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

E. Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

F. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:

1. Space joints at fifteen (15') feet maximum or as noted on the plan set.

2. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to the following radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.

   a. Radius: 1/4 inch.

3. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

G. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to the following radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

1. Radius: 1/4 inch.

3.5 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.

D. Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery, at Project site, or during placement.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

H. Install reinforcement as per one of the following methods:
1. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
   a. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.
2. Set welded wire fabric or fabricated bar mats on bar supports as specified in this section or concrete blocks of required height.

I. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading dry-shake surface treatments.

J. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

K. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.

   1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.

L. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

M. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

   1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
   2. Do not use frozen materials or materials containing ice or snow.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

N. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows when hot-weather conditions exist:

   1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Cover reinforcement steel with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
   3. Fog-spray forms, reinforcement steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 CONCRETE FINISHING

A. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots, and fill low spots. Re-float surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and follow recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.8 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 6 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

B. Aggregate Base
1. Elevation: No Plus Allowed, Minus ½ inch
2. Thickness: Plus ½ inch, No Minus Allowed

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Contractor shall coordinate with the Owner's qualified testing and inspection agency for sampling of materials, performance of tests, and submittal of test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.

B. Testing Services: Testing shall be performed according to the following requirements:

1. Sampling Fresh Concrete: Representative samples of fresh concrete shall be obtained according to ASTM C 172, except modified for slump to comply with ASTM C 94.
2. Slump: ASTM C 143; one test at point of placement for each compressive-strength test, but not less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
3. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test, but not less than one test for each day's pour of each type of air-entrained concrete.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each set of compressive-strength specimens.
5. Compression Test Specimens: ASTM C 31/C 31M; one set of four standard cylinders for each compressive-strength test, unless otherwise indicated. Cylinders shall be molded and stored for laboratory-cured test specimens unless field-cured test specimens are required.
6. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd.. One specimen shall be tested at 7 days and two specimens at 28 days; one specimen shall be retained in reserve for later testing if required.
7. When frequency of testing will provide fewer than five compressive-strength tests for a given class of concrete, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
8. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive compressive-strength testing if adequate evidence of satisfactory strength is provided.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, current operations shall be evaluated and corrective procedures shall be provided for protecting and curing in-place concrete.
10. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive compressive-strength test results equal or exceed specified compressive strength and no individual compressive-strength test result falls below specified compressive strength by more than 500 psi.

C. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in pavement, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as the sole basis for approval or rejection.

E. Additional Tests: Testing agency shall make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3.10 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.

B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 321373 – CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Kansas Department of Transportation (KDOT) "Standard Specifications for State Road and Bridge Construction", latest edition.

1.2 SUMMARY

A. This Section includes the following:

1. Expansion and contraction joints within portland cement concrete pavement.

B. All joints formed by sawing will be sealed with an approved joint sealant compound.

C. Surface joints formed by tooling do not need to be sealed.

D. Furnish materials, workmanship, and other applicable requirements in accordance with KDOT standards and specifications except as revised by these plans and specifications.

E. Related Sections include the following:
1. Division 32 Section "Concrete Paving" for constructing joints in concrete paving.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.

C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than that allowed by joint sealant manufacturer for application indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint sealant manufacturer based on testing and field experience.

B. Colors of Exposed Joint Sealants: Match Architect's samples or as selected by Architect from manufacturer’s full range for this characteristic.

C. Joint Filler: For expansion joints, filler shall be non-extruding and resilient filler conforming to AASHTO M 213 and ASTM Designation D1751.

2.2 COLD-APPLIED JOINT SEALANTS

A. Sealing Materials: Cold type joint sealants shall conform to the requirements of ASTM D 1850. Sealant shall consist of a cold applied formulation that is self-priming and compatible with Portland cement concrete. Acetic acid cure sealants are not acceptable.

2.3 SILICONE JOINT SEALANTS

A. Silicone joint sealant shall be self-priming and compatible with portland cement concrete.
1. Silicone joint sealant shall be prequalified prior to use. The joint sealant shall be either Type I (non-self leveling) or Type II (Self leveling). Joint sealants shall be a one-part cold applied silicone formulation that is self priming to and compatible with Portland cement concrete. Acetic acid cure sealants are not acceptable. Type II sealants shall be self leveling within the joint and shall provide a satisfactory surface configuration without tooling. The silicone sealants shall comply with the following applicable test requirements:

PROPERTY		TYPE I	TYPE II
(1)	Skin development time, minutes	120 max.	120 max.
(2)	Cure-through	Pass	Pass
(3)	Extrusion rate, grams/minute	90-250	200-600
(4)	Non-volatile content, %	90 min.	90 min.
(5)	Bond to concrete, @ 0° F, 5 cycles		
	100% (one-hundred percent) extension	pass	pass
(6)	Compression set	pass	pass
(7)	Elongation, %	600 min.	1000 min.

2.4 HOT TYPE JOINT SEALANTS

A. The sealant shall meet all applicable requirements of ASTM 3405. Sealant shall be applied with a pressure applicator.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's written installation instructions applicable to products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of backer materials.
2. Do not stretch, twist, puncture, or tear backer materials.
3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

D. Install sealants by proven techniques to comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Provide joint configuration to comply with joint sealant manufacturer's written instructions, unless otherwise indicated.

F. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 321373

SECTION 32 9200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Seeding.

B. Related Sections:

1. Division 31 Section "Site Clearing" for topsoil stripping and stockpiling.
2. Division 31 Section "Earth Moving" for excavation, filling and backfilling, and rough grading.
3. Division 32 Section “Plants” for exterior planting.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

D. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

E. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

F. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

G. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

H. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass. Include identification of source and name and elephone number of supplier.

C. Qualification Data: For qualified landscape Installer.

D. Product Certificates: For soil amendments and fertilizers from manufacturer.

E. Material Test Reports: For existing native surface topsoil, existing in-place surface soil, and imported or manufactured topsoil.

F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf and prairie meadows during a calendar year. Submit before expiration of required initial maintenance periods.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful native turf and prairie meadow establishment.

1. Experience: Three (3) years' experience in native turf and prairie meadow installation in addition to requirements in Division 01 Section "Quality Requirements."
2. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.7 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.

1. Spring Planting: May 15th-June 15th.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.8 MAINTENANCE SERVICE

A. Initial Turf and Meadow Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf/grass stands are established but for not less than the following periods:

1. Seeded Turf: 90 days from date of planting completion.

a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, new-crop seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America.

B. Seed Species: State-certified seed of grass species as follows.

1. Seeded Lawn Areas (seed blend)

a. Seeded lawn areas shall consist of a blend of 90% Turf-type Tall Fescue and 10% Kentucky Bluegrass. The blend may consist of any of the varieties in the following Schedule, or approved equal.

b. All Turf-Type Fescues shall have a minimum 70% average endophyte level.

c. Architect to have final approval of all seed blends and mixes.

Name	Min. Pct. Germ.	Min. Pct. Pure Seed	Max. Pct. Weed Seed
Coyote Turf-Type Tall Fescue	85	98.85	0
Falcon II Turf-Type Tall Fescue	85	98.85	0
Jaguar 3 Turf-Type Tall Fescue	85	98.85	0
Rembrandt Turf-Type Tall Fescue	85	98.85	0
Millennium Turf-Type Tall Fescue	85	98.85	0
Midnight Kentucky Bluegrass	85	95	0
Moonlight Kentucky Bluegrass	85	95	0
Fairfax Kentucky Bluegrass	85	95	0

2. Contractor shall furnish certification showing origin of all seed and pure live seed (PLS) purity times percent germination. Each bag of seed shall be tagged and sealed by the seed dealer in accordance

with the State Department of Agriculture or other local certification authority within the state of origin. The label shall indicate analysis of seed and date of analysis, which shall not be more than nine (9) months prior to delivery date. Seed may be premixed by the seed dealer and appropriate data indicated on the bag label for each variety.

2.2 FERTILIZERS

1. Do not fertilize native prairie meadow areas.

2. Turf areas may be fertilized with a controlled release, nitrogen-only fertilizer at a rate of 0.25-0.75 pounds of actual nitrogen per 1,000 square feet. Apply fertilizer in June during active growing period of grass.

2.3 TOPSOIL

A. ASTM D 5268, pH 5.5-7.0, 4 percent organic material minimum, free of stones 1 inch and larger in any dimension, and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

2.4 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley. 65% of mulch by weight shall be 10 inches or longer. Combine mulch with colloidal tackifier.

2.5 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long. Use on slopes greater than 4:1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches (150 mm). Soil clumps or clods shall not be larger than 3 inches (75 mm) in diameter. Remove stones larger than1-1/2 inches (38 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Spread planting soil to a minimum depth of 6 inches (150 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil.

C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

D. Limit fine grading to areas to be promptly planted.

E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

G. Seedbeds should be permitted to settle or should be firmed by rolling before seeding.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

C. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate 2 lb/1000 sq. ft. (0.9 kg/92.9 sq. m) for turf areas.

C. Rake seed lightly into top 1/2 inch (12 mm) of soil, roll lightly, and water with fine spray. Wet seeded turf areas thoroughly and keep moist, but not saturated, at all times until grass is up.

D. Protect seeded areas with slopes exceeding 4:1 with erosion-control blankets installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with slopes not exceeding 4:1 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous blanket 1-1/2 inches (38 mm) in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

F. Protect seeded areas from hot, dry weather or drying winds by applying peat mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch (4.8 mm) and roll surface smooth.

3.6 TURF MAINTENANCE

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 2 inches (100 mm).

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch (25 mm) per week unless rainfall precipitation is adequate.

C. Mowing: Mow as needed while grass is establishing in order to control the growth of weeds.

D. Fertilizing: Fertilize at rates and times stated above after grass establishment and when actively growing.

3.7 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches (125 by 125 mm).

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.8 Watering: Install and maintain temporary piping, hoses, and meadow-watering equipment to convey water from sources and to keep meadow uniformly moist.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.

2. Water meadow with fine spray at a minimum rate of 1/2 inch (13 mm) per week for four weeks after planting unless rainfall precipitation is adequate.

3.9 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 32 9200

SECTION 32 9300 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Shrubs, groundcovers and perennials.
2. Fertilizer and mulch.
3. Soil amendments.
4. Initial maintenance of landscape materials.

B. Related Sections:

1. Division 32 Section "Turf and Grasses" for turf (lawn) planting.

C. Do not make Plant Substitutions without the consent of the Architect.

1.3 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.

D. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

E. Finish Grade: Elevation of finished surface of planting soil.

F. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

G. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

H. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

I. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

J. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

K. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

L. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

M. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

N. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
3. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than fifty (50) plants are required, include a minimum of three (3) photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:

1. Weed Control Barrier: 12 by 12 inches.
2. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.

C. Qualification Data: For qualified landscape Installer.

D. Planting Schedule: Indicating anticipated planting dates for exterior plants.

E. Maintenance Instructions: Provide typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for one full year. Submit prior to expiration of required maintenance period(s).

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of exterior plants.

1. Installer's Field Supervision: Require Installer to maintain an experienced, full-time supervisor on Project site when planting is in progress.

B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

D. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

E. Plant Material Observation: Architect retains right to observe plant material both at place of growth and at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality.

1. Architect further retains the right for:

   a. Observation of shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

   b. Observation of plant material after installation for conformance with Construction Documents and Specifications and to reject plants not installed in conformance with Drawings and Specifications.

   c. Observation of plant material at end of warranty period.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable. Use all means necessary to protect all materials from deterioration before and during delivery, and while stored on site. Protect the installed work and materials of all other trades.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, and soil amendments with appropriate certificates.

C. Deliver exterior plants freshly dug.

D. Do not prune shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling. Plants with damaged or broken root balls or containers shall be rejected.

E. Handle planting stock by root ball.

F. Deliver plants after preparations for planting have been completed, and install immediately. Contractor shall be responsible to coordinate with Architect when planting preparations are complete. Architect shall be notified 72 hours in advance when trees shall be delivered for final approval of product. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist. All plant material shall be installed within five (5) calendar days of being delivered to Project site. It shall be Contractor's responsibility to coordinate delivery of plant material with all other site construction in order to ensure plant material does not remain unplanted.

1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
2. Do not remove container-grown stock from containers before time of planting.
3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

G. Replacements: In the event of damage or rejection, immediately make all repairs and replacements necessary to the approval of the Architect. Owner shall be reimbursed for plant material cost.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Architect no fewer than two (2) days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Architect's written permission.

C. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting (Shrubs): February 15-May 31.
2. Fall Planting (Shrubs): September 15-December 15.
3. Spring Planting (Warm Season Grasses): May 15-June 15.

D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Planting shall not occur during times of severe drought or when ground is frozen. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

E. Coordination with Turf Areas (Lawns): Plant shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.8 WARRANTY

A. Special Warranty: Warrant the following exterior plants, for the warranty period indicated, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, or incidents that are beyond Contractor’s control.
   a. Warranty period for Shrubs: One year from date of Final Completion.
   b. Remove dead plants immediately. Replace immediately unless required to plant in the succeeding planting season.
   c. Replace plants that are more than 25 percent dead or in an unhealthy condition at the end of the warranty period.
   d. A limit of one replacement of each plant will be required, except for losses or replacements due to failure to comply with requirements.
   e. Warranty lawns through specified lawn maintenance period, and until final acceptance.
   f. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.9 MAINTENANCE SERVICE

A. Shrubs: Maintain until acceptance of Substantial Completion. Maintain by pruning, cultivating, watering, weeding, fertilizing, tightening and repairing stakes and guy supports (if staked), and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease. Restore or replace damaged tree wrappings (if wrapped).

1. Maintenance Period: Three (3) months from date of Final Completion.

2. Maintenance Period for Seeded Lawns: Three (3) months from date of Final Completion, or if not considered acceptable at that time, continue maintenance the following spring until acceptable lawn is established.

3. Maintenance Period for Seeded Areas: Three (3) months from date of Final Completion, or if not considered acceptable at that time, continue maintenance the following spring until acceptable stand of grass is established.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label each shrub variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.2 EVERGREEN SHRUBS

A. Form and Size: Normal-quality, well-balanced, evergreen shrubs, or type, height, spread, and shape required, complying with ANSI Z60.1.

1. Provide container-grown Evergreen Shrubs

2.3 PERENNIALS

A. Provide healthy, disease-free plants of species and variety shown or listed, complying with ANSI Z60.1.

1. Provide perennial plugs or container-grown perennials.

2.4 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7.0, a minimum of 15 percent organic material content; free of stones 1 inch (25mm) or larger in any dimension and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

    a. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches (100 mm) deep; do not obtain from agricultural land, bogs or marshes.

2.5 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch (13-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

    1. Organic Matter Content: 50 to 60 percent of dry weight.
    2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

2.6 FERTILIZERS

1. Provide fertilizer only to correct deficiencies as determined by soil test. Do not fertilize native turf areas or areas to be seeded with native grass/wildflower mix.

B. Planting Tablets: Planting areas shall be fertilized with a controlled release formulation of plant fertilizer in a table size no less than 7 grams. Material to be Gro-Power 12-8-8 CRF or equal.

2.7 MULCHES

A. Cypress Mulch:
    1. Premium Cypress mulch
    2. No recycled content
    3. Color: Readily available, natural color.

2.8 WEED-CONTROL BARRIERS

A. Composite Fabric: Dewitt Pro 5 Weed barrier or approved equal. Install weed barrier fabric only in tree planting areas to the outer extents of the tree pit. Do not install barrier fabric in shrub, perennial, grass or wildflower beds.

2.9 MISCELLANEOUS PRODUCTS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

B. Burlap: Non-synthetic, biodegradable.

C. Mycorrhizal Fungi: Mycorrhizal inoculant containing endomycorrhizal and ectomycorrhizal fungi in a tablet size no less than 7 grams. Material shall be Gro-Life or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. For ALL PLANTING BEDS, mix existing soil with Cotton Burr Compost at the rate of 1/2 cu. Ft. bag for 25 sq. feet and rototill to a depth of 4”. Then place plants and plant.

D. Lay out individual shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

E. Lay out plants at locations directed by Architect. Stake locations of individual shrubs and outline areas for multiple plantings.

F. Apply antidesiccant to shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

G. Wrap shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.3 PLANTING AREA ESTABLISHMENT

A. Loosen subgrade of planting areas to a minimum depth of 4 inches (100 mm.) Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

   a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
   b. Mix lime with dry soil before mixing fertilizer.

2. Spread planting soil to a depth required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

   a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 EXCAVATION FOR SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle to a maximum depth of twelve inches (12”). Excavations with vertical sides are not acceptable. Root ball should protrude 2”-4” above grade. For root balls taller than 12”, further excavate center of planting pit to ensure root ball sits 2”-4” above grade, according to Drawings. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate approximately five times as wide as ball diameter for balled and burlapped stock.
2. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
3. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
4. Maintain supervision of excavations during working hours.

5. Keep excavations covered or otherwise protected when unattended by Installer's personnel.

B. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
   1. Hardpan Layer: Drill 6-inch- (150-mm-) diameter holes, 24 inches (600 mm) apart, into free-draining strata or to a depth of 10 feet (3 m), whichever is less, and backfill with free-draining material.

C. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

D. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 SHRUB PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped stock plumb and in center of planting pit or trench with top of root ball 2"-4" above adjacent finish grades.
   1. Use planting soil for backfill.
   2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
   3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
   4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
   5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Set container grown stock plumb and in center of planting pit or trench with root flare 1 inch (25 mm) above adjacent finish grades.
   1. Use planting soil for backfill.
   2. Carefully remove root ball from container without damaging root ball or plant.
   3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
   4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
   5. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 SHRUB PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape shrubs according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

C. Do not apply pruning paint to wounds.

3.7 GROUND COVER AND PERENNIAL PLANTING

A. Set out and space ground cover and plants other than trees and shrubs as indicated on Drawings, in even rows with triangular spacing.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.8 PLANTING AREA MULCHING

A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 6 inches (150 mm) and secure seams with galvanized pins.

B. Mulch backfilled surfaces of planting areas and other areas indicated.
   1. Premium Cypress Mulch in Planting Areas: Apply 4-inch (100-mm) average thickness of premium cypress mulch over entire surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches (75 mm) of trunks or stems.

3.9 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, adjusting and repairing tree-stabilization devices (if staked), resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.10 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

3.11 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 32 9300

SECTION 334100 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Kansas Department of Transportation (KDOT) “Standard Specifications for State Road and Bridge Construction”, latest edition.

C. Geotechnical Engineering Report: “Geotechnical Engineering Report, Proposed Kansas Energy and Service Center”, GeoSource Proj. No. D14G1399, December 31, 2015.

1.2 SUMMARY

A. This Section includes gravity-flow, non-pressure storm drainage outside the building, with the following components:

1. Cleanouts.
2. Precast concrete manholes.
3. Stormwater Inlets

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For manholes and catch basins. Include plans, elevations, sections, details, and manhole frames and covers and catch basin frames and grates.

C. Field quality-control test reports. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 PE PIPE AND FITTINGS

A. Corrugated High Density Polyethylene (HDPE) Drainage Pipe and Fittings NPS 10 and Smaller: AASHTO M 252M, Type S, with smooth waterway for coupling joints.

1. Soiltight Couplings: AASHTO M 252M, corrugated, matching tube and fittings.

B. Corrugated HDPE Pipe and Fittings NPS 12 and Larger: AASHTO M 294M, Type S, with smooth waterway for coupling joints.

1. Soiltight Couplings: AASHTO M 294M, corrugated, matching pipe and fittings.

C. Corrugated High Density Polyethylene (HDPE) Perforated Drainage Pipe and Fittings (Underdrain), NPS 4: AASHTO M 252, Perforation Class II.
1. Pipe under roadway shall have a minimum pipe stiffness value of 100 psi @ 5% deflection.
2. Perforations located in the outside valleys of the corrugations, circular or slotted and evenly spaced around the circumference and length of the pipe
3. Water inlet area not less than 0.945 in^2/ft.
4. Soiltight Couplings: AASHTO M 252, corrugated matching tube and fittings.

D. Pipe shall have integral wall bell and spigot joint with gaskets conforming to ASTM F477. Natural Rubber gaskets will not be accepted.

2.3 REINFORCED CONCRETE PIPE AND FITTINGS

A. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76, Class III, Wall “B” or “C” or the latest revision thereof.
1. The end joints shall be either bell and spigot or tongue and groove. For all pipe both ends of the pipe shall be concentric with the base of the pipe and they shall be smooth, true and free from spalls and other defects and shall be formed in such a manner to insure accuracy and roundness between pipe and manhole. The connectors clamped to pipes and grouted into manhole walls must be used as rigid connections.
   a. Gaskets: ASTM C 443, rubber

2.4 ALUMINIZED STEEL (CORRUGATED METAL)

A. Type 2 Corrugated Steel Pipe and fittings: AASHTO M 36. US Standard Gage for corrugated steel pipe shall be in accordance with the Standard Detail Drawings. Joints shall be either Hugger-type or Bell and Spigot.

1. Bell and Spigot Joints. Shall conform to “CONTECH Quick Stab Joint”, or equal 18” through 48” diameter.
2. Hugger-type Joints. Shall conform to “CONTECH HUGGER Band”, or equal for pipes sizes 15” and larger.

2.5 PVC PIPE AND FITTINGS

A. PVC Sewer Pipe and Fittings: According to the following:
1. The pipe shall be made of PVC plastic having a cell classification of 12454-B or 12454-C as defined in ASTM D 1784.

2. Push-on joints shall conform to ASTM D 3212 and gaskets to ASTM F 477. Solvent cements for joining pipe and socket-type fittings shall conform to ASTM D 2564.
3. PVC Sewer Pipe and Fittings, 4 in. and 6 in: ASTM D 2665 (Schedule 40 wall thickness)
4. PVC Sewer Pipe and Fittings, 8" throuth 15": ASTM D 3034, SDR 35.
5. PVC Sewer Pipe and Fittings, 18" and Larger: ASTM F 679, PS-46.
6. Perforated PVC Sewer Pipe (Underdrain), 4 in.: AASHTO M278
   a. Pipe under roadway shall have a minimum pipe stiffness value of 100 psi at 5% deflection.

2.6 CLEANOUTS

A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.

1. Available Manufacturers:

   a. Josam Company.
   b. MIFAB Manufacturing Inc.
   c. Smith, Jay R. Mfg. Co.
   d. Wade Div.; Tyler Pipe.
   e. Watts Industries, Inc.
   f. Watts Industries, Inc.; Enpoco, Inc. Div.
   g. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

2. Top-Loading Classification: Medium duty.
3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

B. PVC Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.
1. Available Manufacturers:

   a. Canplas Inc.
   b. IPS Corporation.
   c. NDS Inc.
   d. Plastic Oddities, Inc.
   e. Sioux Chief Manufacturing Company, Inc.
   f. Zurn Light Commercial Specialty Plumbing Products; Zurn Plumbing Products Group.

2.7 MANHOLES

A. Standard Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.

1. Diameter: 48 inches minimum, unless otherwise indicated.
2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
3. Base Section: 8-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
4. Riser Sections: 4-inch minimum thickness, and of length to provide depth indicated.

5. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
6. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
7. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.

   a. Cast-In Resilient Connectors Type cast into manhole wall at the manufacturing facility. The connection is completed by inserting end of pipe through connector. Connector shall be A-Lok or approved equal.
   b. For connection to an existing structure only: Type clamped around end of pipe and grouted into opening in manhole wall. Connector shall be G3 Boot System featuring component packaging as manufactured by A-LOK Products, Inc. or approved equal. Non-shrink grout must be used.

8. Steps: Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.

   a. Cast Iron Steps shall be Vestal Manufacturing No. 918-P, Clay & Bailey No. 2115, Neenah No. R-1981-1 or equal.
   b. Copolymer Polypropylene Plastic Step, PS1-PF or PS2-PF Manufactured by M.A. Ind., Inc. or approved equal.

9. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.
10. Grade Rings: Reinforced-concrete rings, 3- to 6-inch total thickness, to match diameter of manhole frame and cover.
11. Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch-minimum width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."

    a. Material: ASTM A 48, Class 35B gray iron, unless otherwise indicated.

2.8 STORMWATER INLETS

A. Standard Precast Concrete Catch Basins: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.

   1. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
   2. Top Section: Eccentric-cone type unless flat-slab-top type is indicated.
   3. Joint Sealant: ASTM C 990, bitumen or butyl rubber.

B. Frames and Grates: ASTM A 36, Grade 60-40-18, Steel coated with bitumastic Black Solution (Coal Tar based) as manufactured by Koppers or approved equal.

2.9 CONCRETE

A. General: Cast-in-place concrete according to ACI 318/318R, ACI 350R, and the following:

   1. Cement: ASTM C 150, Type II.
   2. Fine Aggregate: ASTM C 33, sand.
   3. Coarse Aggregate: ASTM C 33, crushed gravel.
   4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water-cementitious ratio.

C. Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water-cementitious ratio.

1. Include channels and benches in manholes.

a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to one-half of pipe diameter. Form curved channels with smooth, uniform radius and slope.

1) Invert Slope: 2 percent through manhole (min.) or as indicated on drawings.

b. Benches: Concrete, sloped to drain into channel.

1) Slope: 4 percent.

2. Include channels in storm sewer inlets.

a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.

1) Invert Slope: 2 percent through inlet (min.) or as indicated on drawings.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 minimum, with 0.58 maximum water-cementitious ratio.

1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.

E. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

2.10 ENGINEERED PVC SURFACE DRAINAGE PRODUCTS

A. General: PVC surface drainage inlets shall include the drain basin type as indicated on the contract drawings and referenced within these specifications. The cast iron grates for each of these fittings are to be considered an integral part of the surface drainage inlet and shall be furnished by the same manufacturer. The surface drainage inlets shall be as manufactured by Nyloplast, a division of Advanced Drainage Systems, Inc. or prior approved equal.

B. Materials

1. The drain basins required fir this contract shall be manufactured from PVC pipe stock, utilizing a thermo-molding process to reform the pipe stock to the specified configuration. The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. This joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The pipe bell spigot shall be joined to the main body of the drain basin. The pipe stock used to manufacture the main body and pipe stubs of the surface drainage inlets shall meet the mechanical property requirements for fabricated

fittings as described by ASTM D3034, Standard for Sewer PVC Pipe and Fittings; ASTM F1336, Standard for PVC Gasketed Sewer Fittings.

2. The grates furnished for all surface drainage inlets shall be ductile iron grates for sizes 8”, 10”, 12”, 15”, 18”, 24” and 30” (12” and 15” frames are cast iron) shall be made specifically for each basin so as to provide a round bottom flange that closely matches the diameter of the surface drainage inlet. Grates for drain basins shall be capable of supporting H-25 wheel loading for heavy-duty traffic or H-10 loading for pedestrian traffic. 12” and 15” grates will be hinged to the frame using pins. Metal used in the manufacturing of the castings shall conform to ASTM A536 grade 70-50-05 for ductile iron and ASTM A-48-83 class 30B for 12” and 15” cast iron frames. Grates shall be provided painted black.

C. Installation

1. The specified PVC surface drainage inlet shall be installed using conventional flexible pipe backfill materials and procedures. The backfill material shall be crushed limestone or other granular material meeting the requirements of class 1 or 2 material as defined in ASTM D2321. The surface drainage inlets shall be bedded and backfilled uniformly in accordance with ASTM D2321. The drain basin body will be cut at the time of the final grade so as to maintain a one piece, leak proof structure. No brick, stone or concrete block will be used to set the grte to the final grade height. For H-25 Load rated installations, an 8” to 10” thick concrete ring will be poured under the grate and frame as recommended by details provided by the manufacturer.

2.11 PIPE OUTLETS

A. Head Walls: Cast-in-place reinforced concrete, with apron and tapered sides.

B. End Sections: Unless shown otherwise, provide standard end sections follows:

1. Match connecting pipe material for pipe size indicated.
2. Provide Riprap at each end section in accordance to plans.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving".

1. Backfilling Prior to Approvals: Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this section prior to all required inspections, tests and approvals. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost to the Owner.

B. General: This section covers excavation, trenching, backfilling and grading incidental to the construction of sewers, pipelines and structures shown on the Drawings and described in these Specifications. Unless specifically shown or designated otherwise, all excavation shall be by open cut. The Contractor shall assume full responsibility for satisfactory performance of the work and for the safety of the work, working personnel and the general public.

1. Excavation: **Reference Section "312000 "Earth Moving", the CORPS Excavation Plan and the Geotechnical Report for excavation within the CORPS Critical zone for the levee.**

a. Structure Excavation: Excavation for structures shall be to lines and grades shown on the Drawings. Extend excavation for formed structures sufficiently to permit construction and inspection of forms, and for installation of drain tile or other below-grade work. The excavation shall be maintained in a condition suitable for placing reinforcing steel and concrete by such dewatering of adjacent and underlying soil as may be required. Dewatering equipment and methods shall be approved by the Engineer. Approved dewatering equipment may be used within the structure provided that any openings in walls or floors shall subsequently be closed watertight, using methods and procedures approved in advance by the Engineer. Excavation shall be shored and braced to protect adjacent structures or installations from damage. Before placing any concrete, excavation shall be inspected and approved by the Engineer.

b. Structure Subgrade: A normal foundation under structures will be undisturbed soil. If over excavation occurs or is required, the subgrade may be brought back to grade using approved material from excavation or borrow sources, uniformly compacted as specified for "Type A" compaction. Unless over-excavation of structure subgrade is authorized by Engineer, the corrective action shall be at Contractor expense. Alternatives to the above corrective method are:

1) Using the bedding material specified in Paragraph h.
2) Increasing the thickness of the concrete base.

c. Trench Excavation: Trench excavation shall be to the lines and grades indicated on the drawings. Banks shall be vertical from bottom of the trench to at least 6 inches above the top of the pipe. Above that point, trench wall may be sloped as required for safety and shall conform to all pertinent OSHA Regulations. Trenches shall be excavated as near as is practical to the widths shown on the applicable Standard Sewer Detail sheet of the Drawings. The bottom of the trench shall be undisturbed soil smoothed to the satisfaction of the Engineer by backhoe bucket or hand shovel, or both, prior to placement of bedding material. Dewatering, when required, shall be subsidiary to other bid items.

d. Rock Excavation: Trench width used in computing rock excavation shall be the width shown on the applicable Standard Sewer Detail sheet of the Drawings. Rock excvation shall include the excavation of all sedimentary, igneous and metamorphic rock which is naturally in place and is firm, rigid and unweathered and all boulders or other detached stone with a volume of 2 cubic yards or more. Rock encountered in two or more ledges with interlying strata of soil, clay, gravel or shale not more than 12 inches in thickness between each ledge will be classified as solid rock from the top of the top ledge to the bottom of the bottom ledge of rock. Rock shall be excavated to a depth of not less than 4 inches below the bottom of structures or of sewer pipe and 12 inches below the bottom of finished subgrade for pavement construction.

e. Sheeting and Bracing: Sheeting and bracing shall be provided in all trenches where required and shall conform to all pertinent OSHA Regulations. Sheeting may be wood or metal. Wherever, because of unstable trench conditions, it is necessary to drive sheeting below the centerline of pipe, it shall be driven to a depth of 2 feet (minimum) below the flowline of the pipe. After the trench has been backfilled up to a level 1 foot above the pipe, sheeting may be removed and the space left because of such removal shall be filled immediately and the backfill re-compacted. Wood sheeting which has been driven to below the centerline of the pipe shall be left in place below a level of 1 foot above the top of the pipe. Trench boxes or shields may be used instead of sheeting and bracing.

f. Control of Ground Water and Surface Water: Where ground water or surface water is encountered, trenches shall be dewatered as necessary to permit the construction to be carried on in a satisfactory manner. Portions of sewers where all joints have been completed may be used for draining trenches, provided such drainage is free from debris. Drainage may be collected in temporary sumps and then pumped into natural drainage channels as approved by the Engineer. Surface water shall be prevented from entering trenches. Where approved by the Engineer, and approved in writing by the property owner, existing drainage channels may be temporarily diverted. After completion of the construction, the temporary channels and original channels shall be returned to their original condition unless otherwise approved by the property owner. It shall be the contractor’s responsibility to obtain the permission of the property owner, in writing, for the temporary channels.

g. Stabilizing Trench Bottoms and Structure Subgrade: Wet or unstable trench bottoms and structure subgrade shall be stabilized by excavating to additional depth as directed by the Engineer and replacing the unsatisfactory soil with crushed limestone with angular shapes for high interlocking capability graded as follows. Field conditions shall be the determining factor for individual or combined use of these materials. The upper 2 inches of any stabilized area shall consist of specification bedding material. In sewer trenches, the minimum depth of bedding material shall be 4 inches under the pipe.

1) 4 inch to 8 inch primary crusher run.
2) 3 inch to 4 inch crusher run.
3) 1 ½ inch poorly graded.
4) ¾ inch poorly graded.
5) Specification bedding material.

h. Bedding Material and Placement: Bedding material shall be placed and compacted as specified for “Type A” compaction. Trenches shall be excavated to a depth not less than 4 inches below the bottom of the pipe and the pipe shall be laid on a bed of crushed limestone having the follow characteristics unless otherwise shown on the plans:

1) Retained on ¾ inch sieve: 0%.
2) Retained on ½ inch sieve: 24% to 35%.
3) Retained on 3/8 inch sieve: 40% to 60%.
4) Retained on No. 4 sieve: 90% to 100%.
5) Deleterious Substances, maximum: 5%.

2. Backfill: **Reference Section “312000 “Earth Moving”, the CORPS Excavation Plan and the Geotechnical Report for backfilling within the CORPS Critical zone for the levee.**

a. General: Prior to the placement of either structure backfill or trench backfill, a Standard Proctor Curve as determined by AASHTO T 99 (ASTM D 698) shall be obtained for each type of backfill material to be used. Proctor curves shall be obtained from soil samples selected by a certified testing laboratory from materials excavated by the Contractor. All costs associated with the selection of soil samples and performing the necessary tests to obtain the Proctor curves shall be paid by the Contractor. Selection of the correct Proctor curve for a particular backfill material shall also be done by the Contractor's certified testing laboratory. During backfill operations, soil density tests shall be taken by the Engineer or his representative. When results indicate that compaction does not meet the requirements of these Specifications, the material shall be removed and replaced or re-compacted as necessary to meet the specified requirements at no additional expense to the Owner. Additional tests shall be performed on re-compacted area to insure compliance with the requirements.

b. Recommendations for Compaction Equipment: Most manufacturers of compaction equipment provide information for the use of their equipment. For compaction of cohesive soils such as clay or clay-silt mixes, the recommended equipment includes rammers which shear and knead the soil and sheepsfoot rollers, either towed or backhoe mounted static types or self-propelled static or vibratory, which shear, blend and bond the soil. These recommendations also indicate that the thickness of the soil layer being compacted should not exceed the capabilities of the compacting force of the equipment being used. Proper thickness allows full and uniform densification of each layer and is directly proportional to the number of passes required to achieve the desired result. Steel wheeled smooth rollers, either static or vibratory or vibratory smooth plates are not normally recommended for use on cohesive soils but are highly recommended for consolidating granular soils. When compacting a mixture of cohesive and granular soils, equipment designed for the predominant soil type should be used.

c. Basis for Acceptance of Compaction: Normally the nuclear densimeter test shall be the basis for acceptance of compacted backfill. However, when backfill materials consist of a mixture of different soil types or contain a substantial amount of rock chips, the nuclear densimeter may give erroneous results. Therefore, the test results may be tempered by the judgement of the Engineer's representative after observing the compaction effort. The decision to accept or reject compacted backfill may be influenced by the thickness of lift, type of compaction equipment, number of passes of compaction equipment, depth of penetration of steel probe into the compacted material or successful proof rolling with a fully loaded tandem axle dump truck.

d. Backfill Around Structures: Backfill around structures with approved material after completion of below grade construction and removal and cleanup of all forms, lumber and trash. Each layer shall be placed and compacted as specified for Type A compaction and shall include emphasis on the area adjacent to the structure walls.

e. Trench Backfill: Backfill trenches only after pipelines, joints, wyes and bedding have been inspected and approved. Backfill with approved material from excavation or supplementary borrow areas, free from rocks or clods larger than 3 inches in any dimension.

1) Initial Backfill for Pipes with Pipe Stiffness (PS) of 100 or less. This category includes PVC pipe meeting the requirements of ASTM D 3034 SDR 35 and ASTM F 679 PS 46. Initial backfill shall consist of specified bedding material to a point 6 inches above the top of the pipe. Care shall be taken to insure that bedding material is worked in around the haunches of the pipe. Bedding material shall be compacted as specified for Type A compaction.

2) Initial Backfill for Pipes with Pipe Stiffness (PS) over 100. This category includes PVC pipe meeting the requirements of ASTM D 2665 (Schedule 40), ductile iron pipe, vitrified clay pipe, reinforced concrete pipe and corrugated steel pipe. For pipe up to and including 12 inches in diameter, the initial backfill shall consist of specified bedding material to the top of the pipe. For pipe over 12 inches in diameter, initial backfill shall consist of specified bedding material to the springline of the pipe. Care shall be taken to insure that bedding material is worked in around the haunches of

the pipe. Bedding material shall be compacted as specified for Type A compaction.

3) Backfill from Springline to One Foot Over Top of Pipe: This applies to all types of pipe regardless of where the top of bedding material is located. Selected backfill material shall be placed on both sides of the pipe equally to the full width of the trench in loose layers not to exceed 6 inches thick. Each layer shall be compacted as specified for Type A compaction. Continue to place and compact subsequent layers until the pipe is covered to a depth of at least one foot. All material to this depth shall be compacted as specified for Type A compaction.

4) Backfill for the Remainder of the Trench: After selected backfill and compaction to 1 foot above the top of pipe, the remaining backfill shall be composed of selected excavated materials free from large clods, rocks, frozen materials, debris or junk or of approved supplementary borrow material. Backfill material shall be deposited and compacted as detailed for the required type of compaction.

3. Compaction: **Reference Section "312000 "Earth Moving", the CORPS Excavation Plan and the Geotechnical Report for compaction within the CORPS Critical zone for the levee.**

a. Type A Compaction: Type A compaction shall be used under all paved areas proposed or future paved areas, except sidewalks and under utility tunnel crossings. Type A compaction shall also be used where sewers intersect stream beds and at other locations designated on the Project Drawings, around structures, and to a level not less than 1 foot above the top of sewer pipes, as specified elsewhere in this section. Backfill shall be composed of selected excavated material or approved supplementary borrow material. Backfill material shall be deposited in loose layers not more than 6 inches thick, and compacted to at least 95 percent of maximum density in accordance with AASHTO T 99 (Standard Proctor).

b. Type B Compaction: In areas where Type A compaction is not specified, approved backfill material shall be placed in the trench in loose layers not more than 10 inches thick and compacted to a density equal to or greater than that of the material in the adjacent trench wall.

4. Unsuitable Backfill Material: No material shall be used for structure backfill or trench backfill which contains rocks or clods larger than 3 inches in any dimension, frozen material, debris, junk or organic material. Such material shall be removed from the backfill material and disposed of as directed by the Engineer. Removal and disposal of unsuitable material is subsidiary to other bid items.
5. Supplementary Borrow Material: Furnished by Contractor at his expense.
6. Blasting: Prohibited.
7. Clean-Up: Clean-up is considered an integral part of the work. The working area shall be promptly restored to a condition equal to or better than that prevailing before construction. The Engineer may, at his discretion, withhold payment for otherwise completed items of work in areas in which clean-up is not completed, unless the Contractor submits, in writing, acceptable reasons why clean-up is incomplete, and provides an acceptable schedule for completion.

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Clear interior of piping and manholes of dirt and superfluous material as work progresses.

F. Familiarization: Prior to all work of this section, become thoroughly familiar with the site, the site conditions and all portions of the work falling within this section. No extra will be allowed for rock excavation.

G. Install gravity-flow piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.

1. Install piping pitched down in direction of flow, as indicated on the plans.

H. Removal of Water
1. Furnish and operate sufficient pumps and appliances and provide all materials, labor, etc., required to prevent interference with any work by water, ice or snow. Damage of any kind resulting from insufficient pumping facilities or similar lack of proper conduct of the work shall be made good by the Contractor at his own expense.
2. No structure or pipe shall be laid in water and no water shall be allowed to run into or over any concrete work or pipe, or into or through any pipe, unless by special permission in writing.

I. Pipe Handling & Cutting
1. Care shall be used in handling all pipe to prevent damage to pipe ends. Particular care shall be taken not to injure any pipe coatings. No other pipe or material of any kind shall be placed inside of any pipe or fitting, except as specifically indicated.
    a. Damaged pipe or pipe damaged in laying shall be replaced at the expense of the Contractor.
    b. Cutting shall be done in neat and workmanlike manner by a method which will not damage the pipe. All cutting shall be done by means of a mechanical cutter.

J. Provide the necessary mason's lines and supports or laser equipment to insure installation of the pipe to line and grade, as shown on the drawings. Facilities for lowering the pipe into the trench shall be such that neither the pipe nor the trench will be damaged or disturbed.

K. The Engineer may, at his option, inspect all pipe before it is laid and reject any section that is damaged by handling or is found to be defective to a degree which will materially affect the function and service of the pipe.

L. The laying of the pipe in the finished trench shall be started at the lowest point and laid upgrade. When bell and spigot pipe is used, the bell shall be laid upgrade, with the spigots that fit within the bells laid in the direction of flow. If tongue and groove pipe is used, the groove shall be laid upgrade, with the tongue that fits inside the groove laid in the direction of flow. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.

M. The pipe shall be firmly and accurately set to the line and grade so that the invert will be smooth and uniform in slope.

N. Granular Bedding: Pipe shall be laid in compacted granular bedding as shown and as indicated in the plans or specified herein.
   1. Granular Bedding: Clean, well-graded crushed stone, chat, sand or gravel. Maximum particle size of one inch (1") diameter.
   2. Granular bedding shall be placed and compacted simultaneously on each side of pipe using particular care to obtain uniform bedding throughout the length of pipe without causing displacement of or damage to joints.
   3. When bell and spigot pipes are used, spaces for the pipe bells shall be dug in the pipe bedding to accommodate the bells. These spaces shall be deep enough to insure that the bells do not bear the load of the pipe; they shall not be excessively wide in relation to longitudinal direction of the trench. When the pipes are laid, the barrel of each section of pipe shall be in contact with the bedding throughout its full length, exclusive of the bell, to support the entire load of the pipe.
   4. Pipe shall not be laid on frozen ground under embedment.

O. Pipe which is not true in alignment or which has shown any settlement after laying shall be taken up and re-laid without extra compensation

3.3 PIPE JOINT CONSTRUCTION

A. Where specific joint construction is not indicated, follow piping manufacturer's written instructions.

B. Join gravity-flow, non-pressure drainage piping according to the following:
   1. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-gasket joints.
   2. Join dissimilar pipe materials with non-pressure-type flexible couplings.

C. PVC Sewer Pipe and Fittings: As follows:

   1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
   2. Install according to ASTM D 2321.

D. Concrete Pipe and Fittings: Install according to ACPA's "Concrete Pipe Installation Manual." Use the following seals:

   1. Round Pipe and Fittings: ASTM C 443, rubber gaskets.

   2. All joints shall be sealed with an approved plastic compound. In sealing pipe joints with plastic joint compound, trowel grade compound shall be applied to the mating surfaces of both the tongue and groove, or to the entire interior surface of the bell and the upper portion of the spigot. Rope or tape type and trowel grade plastic compound shall be applied in accordance with the manufacturer's recommendations. The joints shall be forced together with excess compound extruding both inside and outside the joint. Excess compound shall be removed from the interior surface where accessible

E. System Piping Joints: Make joints using system manufacturer's couplings, unless otherwise indicated.

F. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

G. Connection to Existing Drainage Structures
   1. Where the drawings call for connections to existing or extension of structures, these connections shall be watertight and so made that a smooth uniform flowline will be obtained throughout the drainage system. Method to be approved.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

   1. Use light-duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
   2. Use medium-duty, top-loading classification cleanouts in paved foot-traffic areas.
   3. Use heavy-duty, top-loading classification cleanouts in vehicle-traffic service areas.
   4. Use extra-heavy-duty, top-loading classification cleanouts in roads.

B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 24 by 24 by 7-1/2 inches deep. Set with tops 1 inch above surrounding grade.

C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.5 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants according to ASTM C 891.

C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 1 inch above finished surface elsewhere, unless otherwise indicated.

3.6 STORM DRAINAGE INLET AND OUTLET INSTALLATION

A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.

B. Construct riprap of broken stone, as indicated.

C. Install outlets that spill onto grade, anchored with concrete, where indicated.

D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

E. Construct energy dissipators at outlets, as indicated.

3.7 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

3.8 INLET INSTALLATION

A. Set frames and grates to elevations indicated.

3.9 CONNECTIONS

A. Connect non-pressure, gravity-flow drainage piping to building's storm building drains specified in Division 15 Section "Storm Drainage Piping."

B. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

3.10 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate report for each system inspection.
2. Defects requiring correction include the following:

    a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    c. Crushed, broken, cracked, or otherwise damaged piping.
    d. Infiltration: Water leakage into piping.
    e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Air Tests: Test storm drainage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

    a. Option: Test plastic gravity sewer piping according to ASTM F 1417.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

E. Regulatory Requirements: Comply with requirements of applicable codes, regulations and authorities having jurisdiction.

F. Maintenance
1. If at any time before 12 months after the completion and acceptance of the work, there shall be any settlement of trenches requiring repairs to be made in any roadway, parking area or property along the line of the work, or should any defect appear in the work due to neglect, carelessness or improper construction on the part of the Contractor, the Engineer will notify the Contractor to make such repairs and remedy any defects. The Contractor shall, within 5 days after such notice, begin and carry out such repairs at no additional cost to the Owner.

END OF SECTION 334100

SECTION 334600 - SUBDRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Perforated-wall pipe and fittings.
2. Drainage panels.
3. Geotextile filter fabrics.

1.3 SUBMITTALS

A. Product Data:
1. Drainage panels, including rated capacities.
2. Geotextile filter fabrics.

PART 2 - PRODUCTS

2.1 PERFORATED-WALL AND UNDER FLOOR PIPES AND FITTINGS

A. Perforated PE Pipe and Fittings:
1. NPS 6 and Smaller: ASTM F 405 or AASHTO M 252, Type CP; corrugated, for coupled joints.
2. Couplings: Manufacturer's standard, band type.

2.2 DRAINAGE PANELS

A. Molded-Sheet Drainage Panels: Prefabricated geocomposite, 36 to 60 inches wide with drainage core faced with geotextile filter fabric.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Mel-Drain; W.R. Meadows, Inc. or comparable product by one of the following:
a. American Wick Drain.
b. W.R. Meadows; Inc.
c. Greenstreak.
d. JDR Enterprises, Inc.
e. Midwest Diversified Technologies Incorporated.
2. Drainage Core: Three-dimensional, nonbiodegradable, molded PP.
a. Minimum Compressive Strength: 18,000 lbf/sq. ft. when tested according to ASTM D 1621.
b. Minimum In-Plane Flow Rate: 7 gpm/ft. of unit width at hydraulic gradient of 1.0 and compressive stress of 25 psig when tested according to ASTM D 4716.
3. Filter Fabric: Nonwoven needle-punched geotextile, manufactured for subsurface drainage, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with the following properties determined according to AASHTO M 288:
a. Survivability: Class 1.
b. Apparent Opening Size: No. 40 sieve, maximum.
c. Permittivity: 0.5 per second, minimum.

2.3 SOIL MATERIALS

A. Soil materials are specified in Division 31 Section "Earth Moving."

2.4 GEOTEXTILE FILTER FABRICS

A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D 4491.

B. Structure Type: Nonwoven, needle-punched continuous filament.
   1. Survivability: AASHTO M 288 Class 2.
   2. Styles: Flat and sock.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.

B. Verify that drainage panels installed as part of foundation wall waterproofing is properly positioned to drain into subdrainage system.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.3 FOUNDATION DRAINAGE INSTALLATION

A. Place impervious fill material on subgrade adjacent to bottom of footing after concrete footing forms have been removed. Place and compact impervious fill to dimensions indicated, but not less than 6 inches deep and 12 inches wide.

B. Lay flat-style geotextile filter fabric in trench and overlap trench sides.

C. Place supporting layer of drainage course over compacted subgrade and geotextile filter fabric, to compacted depth of not less than 4 inches .

D. Encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections with adhesive or tape.

E. Install drainage piping as indicated in Part 3 "Piping Installation" Article for foundation subdrainage.

F. Add drainage course to width of at least 6 inches on side away from wall and to top of pipe to perform tests.

G. After satisfactory testing, cover drainage piping to width of at least 6 inches on side away from footing and above top of pipe to within 12 inches of finish grade.

H. Install drainage course and wrap top of drainage course with flat-style geotextile filter fabric.

I. Place layer of flat-style geotextile filter fabric over top of drainage course, overlapping edges at least 4 inches .

J. Install drainage panels on foundation walls as follows:
1. Coordinate placement with other drainage materials.
2. Lay perforated drainage pipe at base of footing. Install as indicated in Part 3 "Piping Installation" Article.
3. Separate 4 inches of fabric at beginning of roll and cut away 4 inches of core. Wrap fabric around end of remaining core.
4. Attach panels to wall beginning at subdrainage pipe. Place and secure molded-sheet drainage panels, with geotextile facing away from wall.

K. Place backfill material over compacted drainage course. Place material in loose-depth layers not exceeding 6 inches . Thoroughly compact each layer. Final backfill to finish elevations and slope away from building.

3.4 UMDER FLOOR DRAINAGE INSTALLATION

A. Excavate subgrade fill to allow installation of underfloor drain lines in drainage course.

B. Encase pipe in sock-style geotextile filter fabric. Before installing pipe connect sock sections with adhesive or tape.

C. Install drainage piping as indicated in Part 3. “Piping Installation“, Article for Underfloor subdrainage.

D. Add drainage course to a width of 4 inch on sides of excavation and to the top of pipe to perform tests.

E. After satisfactory testing, cover drainage piping to bottom of floor slab above.

3.5 PIPING INSTALLATION

A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
1. Foundation Subdrainage: Install piping level and with a minimum cover of 36 inches unless otherwise indicated.
2. Underfloor Subdrainage: Install piping to slope as indicated, with a minimum 4 inch bottom and side coverage.
3. Lay perforated pipe with perforations down.
4. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.

B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.

C. Install thermoplastic piping according to ASTM D 2321.

3.6 PIPE JOINT CONSTRUCTION

A. Join perforated PE pipe and fittings with couplings according to ASTM D 3212 with loose banded, coupled, or push-on joints.

B. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

3.7 CONNECTIONS

A. Comply with requirements for piping specified in Division 33 Section "Storm Utility Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect low elevations of subdrainage system to building's solid-wall-piping storm drainage system.

C. Where required, connect low elevations of foundation subdrainage to stormwater sump pumps. Comply with requirements for sump pumps specified in Division 22 Section "Sump Pumps."

3.8 CLEANING

A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 334600

GEOTECHNICAL ENGINEERING REPORT

Proposed Kansas Energy and Service Center
SW 7th Street and SW Van Buren Street
Topeka, Kansas

Project No. D14G1399

December 31, 2014

Prepared for:

Kansas Department of Administration
HTK Architects, PA

Prepared by:

GEOSOURCE

Your Source for Geotechnical and Materials Engineering

GEOSOURCE
Your Source for Geotechnical and Materials Engineering

December 31, 2014

Ms. Ramona A. Flower
State of Kansas
Office of Facilities & Procurement Management
800 SW Jackson Street, Suite 600
Topeka, Kansas 66612-1216

Subject: **Geotechnical Engineering Report**
Proposed Kansas Energy and Service Center
SW 7th Street and SW Van Buren Street
Topeka, Kansas
Project No. D14G1399

Dear Ms. Flower:

We have completed the subsurface exploration and geotechnical engineering evaluation for the above referenced project. The purpose of the exploration was to obtain information on the subsurface conditions within the building site and, based on this information to provide geotechnical engineering recommendations for design and construction of foundations for the proposed structures.

In summary, the borings encountered existing fill and naturally deposited soils underlain by shale and limestone bedrock that continued to the depths explored. The existing fill was quite variable and contained some rubble. Because of this, we have recommended that the proposed building be supported on drilled pier foundations that extend through the fill to the underlying limestone bedrock.

This report completes our current scope of services for this project. The enclosed report describes our exploration procedures and presents the results of the testing and evaluation along with design and construction recommendations for this project. We appreciate the opportunity to work with you on this project and are prepared to provide the recommended construction services.

Respectfully submitted,

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GeoSource

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GEOTECHNICAL ENGINEERING REPORT
PROPOSED ENERGY AND SERVICE CENTER
SW 7TH STREET AND SW VAN BUREN STREET
TOPEKA, KANSAS

Project No. D14G1399
December 31, 2014

INTRODUCTION

GeoSource has completed the subsurface exploration and geotechnical engineering evaluation of the site for the proposed Kansas Energy and Service Center building, which is located southeast of the intersection of SW 7th Street and SW Van Buren Street in Topeka, Kansas. Our services for this project were provided in general accordance with our November 26, 2014 proposal. The exploration work was authorized on December 4, 2014 with the issuance of Purchase Order No. 17300-0000017324 by the Kansas Department of Administration.

PROJECT DESCRIPTION

We understand that the proposed building will be a two story, steel frame structure, with metal stud infill walls and brick veneer or stone panel exterior facing. The new building will have overall plan dimensions of approximately 120 by 160 feet. Maximum column loads for the new building were estimated by the Structural Engineer to be less than 260 kips. The finished floor elevation of the new building has tentatively been set at elevation 928.76 feet, USGS datum. The floor for the service base on the east side of the building will be stepped to follow the grade of the existing alley. The floor slab elevation at the northeast corner of the building will be at elevation 925.54 feet, the floor slab elevation at the southeast corner will be at 928.76 feet, and the intermediate floor slab elevation will be at 927.04 feet. The bottom of the elevator pit has tentatively been set at elevation 924.76 feet. At this proposed floor elevation up to 6 feet of new fill will be required to establish grades for the proposed building area.

Light duty parking lots are planned for the areas on the north and south sides of the new building. The parking lots will provide space for about 40 automobiles and other light personnel vehicles.

Drives will connect the parking lots to SW 7th Street and/or to the existing alley. No other specific information was provided regarding the design life of the pavement section.

A new utility tunnel will extend from the proposed Energy and Service Center building to the Kansas Statehouse along SW Van Buren Street. The plan and profile drawing of the tunnel that was provided to GeoSource indicated that the bottom of the tunnel will extend to about elevation 912 ± feet at the proposed building site and will be at about elevation 915 ± feet at the Statehouse parking garage. The tunnel will have a height of about 8 ± feet and will be constructed of reinforced concrete.

The scope of the exploration and engineering evaluation for this study, as well as the conclusions and recommendations in this report, were based on our understanding of the project as described above. If pertinent details of the project have changed or otherwise differ from our descriptions, we must be notified and engaged to review the changes and modify our recommendations, if needed.

DRILLING AND SAMPLING PROCEDURES

The field work for this project was performed between December 17 and 19 of 2014. A total of sixteen exploratory test borings were drilled for this project. Figure 1 in the Appendix shows the approximate locations of the borings with reference to the proposed building lines and other site features. The boring locations were established by GeoSource personnel. Distances from the existing city streets and other reference features to the boring locations were measured using a calibrated wheel. Right angles for locating the borings were estimated. The ground surface elevations shown on the boring logs are approximate and were determined using an engineer's level and rod. The elevations were referenced to the rim of the existing storm water manhole (SWMH), located on the west side of SW Van Buren Street about 165 feet south of SW 7th Street. The elevation of the manhole was given as 924.49 feet, USGS datum, on the site plan that was provided to GeoSource. The locations and elevations of the borings should be considered accurate only to the degree implied by the methods used to make these measurements.

The borings were performed with a truck-mounted, rotary drill rig using 4-inch diameter flight augers to advance the boreholes. Representative samples of the overburden soils and bedrock units were obtained at selected intervals using the Shelby tube and split-barrel sampling procedures as outlined in ASTM Specifications D-1587 and D-1586, respectively. The Shelby tube sampling procedure utilizes a thin-walled, steel tube with a sharp cutting edge that is pushed hydraulically into the bottom of the boring to obtain relatively undisturbed samples of cohesive or moderately cohesive soils. The samples were sealed and returned to our laboratory for further examination, classification and testing.

The split-barrel sampling procedure utilizes a standard 2-inch O.D. split-barrel sampler that is driven into the bottom of the boring with an automatic hammer. The number of blows required to advance the sampler the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Resistance Value (N). These "N" values are indicated on the boring logs at their depth of occurrence and provide an indication of the consistency of clays and the relative hardness of weathered bedrock units. A higher efficiency is achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. This higher efficiency has an appreciable effect on the Standard Penetration Resistance Values (N). The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

Borings B-2 and B-4 were continued below the point of auger refusal through use of NQ3-diamond bit coring procedures. This diameter core barrel provides a sample having a diameter that is slightly smaller than 2 inches. Descriptions of the rock core are presented on the respective boring logs in addition to recovery and Rock Quality Designation (RQD) for the core recovered. Recovery is defined as the length of core obtained expressed as a percentage of the total length cored. Rock Quality Designation is defined as the total length of core pieces, 4 inches or greater in length, expressed as a percentage of the total length cored. Rock Quality Designation provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.

Boring logs are included in the Appendix of this report and present such data as soil and bedrock descriptions, consistency and relative hardness evaluations, depths, sampling intervals and observed groundwater conditions. Conditions encountered in each of the borings were monitored and recorded by the drill crew. Field logs were prepared by the drill crew that included visual classification of the materials encountered during drilling, as well as drilling characteristics. Our final boring logs represent the geotechnical engineer's interpretation of the field logs combined with laboratory observation and testing of the samples. Stratification boundaries indicated on the boring logs were based on observations during our field work, an extrapolation of information obtained by examining samples from the borings and comparisons of soils and/or bedrock types with similar engineering characteristics. Locations of these boundaries are approximate, and the transitions between soil and bedrock types may be more gradational in nature rather than clearly defined.

LABORATORY TESTING PROGRAM

The laboratory testing program consisted of performing water content, dry unit weight and unconfined compression tests on representative portions of undisturbed samples obtained with the Shelby tube sampler. A calibrated hand penetrometer was used to determine the approximate unconfined compressive strength of samples that were deformed or otherwise unsuitable for unconfined compression testing. The hand penetrometer has been correlated with unconfined compression tests, and provides a better estimate of the consistency and strength than visual observation alone. Moisture content determinations were also performed on samples obtained using the split-barrel sampler. The results of the laboratory tests are presented on the respective boring logs.

Atterberg Limits tests were conducted on representative samples of the onsite soils. These tests provide information on the plasticity of the soil, which is a basis for soil classification and for estimating the potential of subgrade soils to change volume with variations in moisture content. Results of these tests are also indicated on the respective boring logs.

In addition, unconfined compression tests were performed on selected rock cores to evaluate the compressive strength of the bedrock units encountered in the borings. The results of the unconfined compression tests are shown on the respective boring logs in the Appendix of this report. The unconfined compressive strengths are in psi (pounds per square inch).

As part of the testing program, the soil samples were classified by a geotechnical engineer using visual and manual procedures outlined in ASTM D-2487 and D-2488. The descriptions of the soils indicated on the boring logs are in accordance with the enclosed General Notes and the Unified Soil Classification System. Estimated group symbols according to the Unified Soil Classification System are shown on the boring logs. A brief description of this classification system is included in the Appendix of this report.

The bedrock units encountered in the borings were described in accordance with the enclosed General Notes for Bedrock on the basis of visual classification of disturbed auger cuttings and drilling characteristics. Core samples may reveal other rock types.

SITE CONDITIONS

The proposed building site is located southeast of the intersection of SW 7th Street and SW Van Buren Street in Topeka, Kansas. The site was bounded on the north by SW 7th Street, on the west by SW Van Buren Street and on the east by an existing alley. At the time the borings were performed, the site was a paved parking lot. Historical photographs indicated that the site was previously occupied by a power plant and several other buildings in the past. The borings encountered undocumented clay fill, most of which contained variable amounts of bricks, cinders, gravel and other miscellaneous construction debris from the former buildings. Auger refusal was encountered on rubble at boring locations B-8 and B-15, suggesting that buried foundations or basement walls and slabs or large concrete or limestone fragments are buried beneath portions of the proposed building site. At Boring B-2, a strong fuel odor was detected in the undocumented fill encountered between depths of about 5 to 10.3 feet.

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SUBSURFACE CONDITIONS

The following presents a general summary of the major strata encountered during our subsurface exploration and includes a discussion of the results of field and laboratory tests conducted. Specific subsurface conditions encountered at the boring locations are presented on the individual boring logs in the Appendix of this report. Figure 2 in the Appendix shows a Generalized Subsurface Profile, based on the information obtained from the borings. The stratification lines shown on the boring logs and profile represent the approximate boundaries between soil and bedrock types; in-situ, the transition between materials may be more gradational in nature rather than clearly defined.

All of the borings were drilled in paved areas and encountered about 3 to 5 inches of asphaltic concrete pavement at the surface. Borings B-10 through B-13 were drilled on SW Van Buren Street along the alignment of the proposed utility tunnel and encountered brick pavers below the asphalt pavement.

The pavement section was underlain by undocumented fill that continued to depths of about 5.5 to 14.3 feet below the existing ground surface at the boring locations. The upper 2-½ to 3 feet of the fill was generally comprised of medium stiff to very stiff, light brown lean clay (CL), with a trace of fine sand. Laboratory tests performed on samples of this lean clay fill indicated moisture contents in the range of 13.4 to 25.6 percent, with dry densities of 102 to 115 pcf and unconfined compressive strengths of 1,450 to 5,990 psf. Atterberg Limits performed on this material indicated Liquid Limits in the range of 34 to 39, with Plasticity Indices of 15 to 20.

Beneath the upper fill layer, the borings encountered moderate to high plasticity fill that contained variable amounts of brick, cinders, gravel and other miscellaneous construction debris. No significant amounts of wood, trash or other unsuitable materials were encountered at the boring locations. As previously discussed, fuel contaminated soils were encountered in Boring B-2 below a depth of about 5 feet. In addition, significant amounts of rubble, including large size debris were encountered in Borings B-7, B-8 and B-15. Buried obstructions within the rubble fill were encountered in Borings B-8 and B-15. These obstructions could be buried foundation or large size

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fragments of concrete or limestone. Laboratory tests performed on samples of the undocumented fill indicated moisture contents in the range of 11.4 to 55.7 percent, with dry densities of 97 to 106 pcf and unconfined compressive strengths of 1,420 to 5,300 psf. Standard Penetration Tests performed in the existing fill yielded "N" values ranging from 4 to 76 blows for one foot of penetration or less.

The undocumented fill was underlain by naturally deposited clay soils at 9 of the 16 boring locations. The natural clay soils were deposited by glacial ice that covered northeast Kansas in the Pleistocene Period. The glacial soils were visually classified as stiff to very stiff, lean clays (CL) and fat clays (CH). Laboratory tests performed on samples of the natural clay soils indicated moisture contents in the range of 17.1 to 28.0 percent, with dry densities of 102 to 107 pcf and unconfined compressive strengths of 2,050 to 4,440 psf. Soil colors varied from brown to light brown to reddish brown, with light gray and rust mottling. Standard Penetration Tests performed in the natural clay soils yielded "N" values in the range of 7 to 12 blows for one foot of penetration or less.

The undocumented fill and naturally deposited glacial clay soils were underlain by interbedded layers of shale and limestone bedrock that are part of the Topeka Limestone Formation of the Pennsylvanian Age Shawnee Group. The bedrock was encountered in the borings at depths ranging from about 10.3 to 14.3 feet across the proposed building site. The uppermost bedrock unit encountered was the weathered remnants of the Turner Creek Shale Member. The Turner Creek Shale is typically 2 to 5 feet thick and consists of weathered, olive tan to gray brown, clayey to silty shale. The Turner Creek Shale was underlain by the Sheldon Limestone Member. The Sheldon Limestone was described as a buff to light gray, fossiliferous limestone. The thickness of this limestone unit varied from about 1.5 feet to 2.8 feet across the site. The Jones Point Shale Member was encountered below the Sheldon Limestone and this bedrock unit typically consists of gray, silty to clayey shale that was about 1.8 to 2.2 feet thick at the boring locations where it was encountered.

The Jones Point Shale was underlain by the Curzon Limestone, which is the thickest limestone unit of the Topeka Formation. The Curzon Member is typically comprised of two or more beds of medium to thick-bedded, buff to light gray, fossiliferous limestone. The thickness of the Curzon

Limestone ranged from about 5.9 to 6.3 feet at the boring locations where it was encountered. The Curzon Member was underlain by the Iowa Point Shale Member. The Iowa Point Member is typically a hard, gray, clayey to silty shale that locally contains sandstone layers. At the proposed building site, the Iowa Point Shale had a thickness of only about 1 to 2 feet. The Iowa Point Shale was underlain by the Hartford Limestone Member, which is the basal member of the Topeka Limestone Formation. The Hartford Member typically has a total thickness of about 5 to 6 feet and consisted of massive, gray to bluish gray, fossiliferous limestone. Core samples of the bedrock from Borings B-2 and B-4 had recovery rates of 78 to 100 percent, with Rock Quality Designation (RQD) values in the range of 56 to 100 percent, indicating fair to good quality rock. The unconfined strength of the limestone units ranged from about 1,970 to 9,520 psi.

GROUNDWATER OBSERVATIONS

Groundwater observations were made in the boreholes both during and following completion of the drilling operations. Groundwater was encountered in Borings B-1, B-5, B-9 and B-15 at depths ranging from about 0.5 to 12.0 feet below the existing ground surface. At Boring B-15, groundwater was encountered very near the existing ground surface. The other borings remained, dry prior to coring, and no visible groundwater seepage was observed at the time the borings were performed.. The materials encountered in the test borings have relatively low permeabilities and observations over an extended period of time through use of piezometers or cased borings would be required to better define current groundwater conditions.

Coring of the bedrock at boring locations B-2 and B-4 required the introduction of water into the borehole as a drilling fluid to cool the bit and to flush the cuttings from the hole. No noticeable loss of drilling fluid was noted. The water levels indicated on the boring logs where coring procedures were used represent the water level in the borings after removal of casing and drill tools and is generally not an indicated of a true water table.

Groundwater in the underlying bedrock typically flows through joints and fissures in the limestone bedrock units. The shale bedrock units are generally less permeable and do not transmit significant amounts of groundwater seepage.

The composition of the glacial soils is often erratic due to the random nature of its deposition. Glacial deposits frequently contain isolated pockets of water bearing sands and gravel, as well as cobbles and large boulder size materials. Water bearing lenses within natural glacial deposits are generally limited in extent. Excavations encountering such lenses typically experience a sudden influx of groundwater due to the high permeability of the materials within the lens. Foundation and other excavations that encounter trapped water within the glacial soils can normally be dewatered using conventional sump pumps.

Fluctuations of groundwater levels can occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were performed. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our evaluation, it is our professional opinion that the proposed project site can be developed for the proposed building and utility tunnel using conventional grading and foundation construction techniques. The existing undocumented fill was quite variable across the site and contained significant amounts of rubble and construction debris at some of the boring locations. Because of this, the undocumented fill is not suitable for support of shallow spread footings.

We have recommended that the proposed building be supported on drilled pier foundations that extend through the undocumented fill and naturally deposited glacial clay soils and are founded in the Curzon Limestone Member that underlies the proposed building site. Recommendations for

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design and construction of drilled pier foundations are presented in the follow sections of this report.

As an alternative to supporting the proposed building on drilled pier foundations, shallow foundation support bearing on a *Geopier®* reinforced subgrade would appear to be a viable foundation option for this project that may potentially provide an economic benefit to this project. Geopiers are rammed aggregate piers that are installed by a specialty contractor using a proprietary method. Recommendations for design and construction of geopiers is normally provided by Geopier US, the company that developed this method of ground improvement and foundation support.

The major concern, from a geotechnical engineering standpoint, is the presence of undocumented fill and the potential for encountering old foundations, walls and other buried structures, as well as large concentrations of rubble from the former buildings that previously occupied the site. If buried structures and/or large concentration rubble are encountered, they could hamper the installation of the drilled pier foundations and/or the drilling of the boreholes for the Geopiers. Removal and replacement of the existing undocumented fill does not appear to be an economical option for this project. One way to deal with the uncertainty, would be to establish a contingency fund for removal of old buried structures and/or rubble in areas affected by the new construction.

The construction of the proposed utility tunnel between the proposed building and Statehouse Parking Garage should be relatively straight forward. The borings indicated that some rock excavation will likely be required to install the tunnel at the currently proposed bottom elevations. Removal of the rock will likely require the use of pneumatic breakers, rock teeth or some other method of hard rock removal. Groundwater was not encountered in the borings that were drilled along the proposed tunnel alignment. However, it would be prudent to include underdrains below the floor slab of the tunnel and adjacent to the tunnel walls to prevent hydrostatic loading of the walls and seepage into the tunnel, should groundwater levels change in the future.

To reduce the potential for subgrade volume change and floor slab movement, we have recommended that a minimum of 24 inches of select, low volume change material be placed below building floor slabs. Thorough site preparation will be required to correct areas that were disturbed by previous construction activity at the proposed building site. The recommendations given in the following sections of this report describe subgrade preparation for building foundations, floor slabs and pavements, as well as undercutting procedures to remove existing fill, soft soils, expansive clays and other unsuitable materials. Proper fill placement techniques are also discussed and include: recommended types of fill materials, maximum lift thickness, as well as soil moisture content and compaction criteria for structural fill sections.

The recommendations submitted herein are based, in part, upon data obtained from our subsurface exploration. It should be recognized that subsurface conditions may vary between the exploration points and that the nature and extent of any subsurface variations that may exist at the proposed site will not become evident until exposed during construction. If variations appear evident, then the recommendations presented in this report should be reevaluated. In the event that any changes in the nature, design, location or floor slab elevations of the proposed building are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed by the geotechnical engineer and our recommendations modified in writing, if necessary.

SITE PREPARATION

Initial site preparation for the proposed project should commence with the removal of the existing pavement section and the demolition of any existing structures that are located within proposed construction areas. Demolition should include complete removal of all grade supported slabs, pavements, sidewalks and shallow spread footings. All broken concrete, asphalt and other debris from demolition of these structures should be removed from the site. Areas disturbed during demolition of the existing structures should be thoroughly evaluated by the geotechnical engineer prior to placement of structural fill. All disturbed soils should be undercut prior to placement of structural fill.

Relocation of any existing utility lines within the zone of influence of proposed construction areas should also be completed as part of the site preparation. The lines should be relocated to areas outside of the proposed construction. Excavations created during the removal of the existing lines should be cut wide enough to allow for use of heavy construction equipment to recompact the fill. In addition, the base of the excavations should be thoroughly evaluated by a geotechnical engineer or engineering technician prior to placement of fill. All fill should be placed in accordance with the recommendations presented in the Structural Fill section of this report.

Following completion of the demolition work, it is recommended that the exposed grade be scarified to a minimum depth of 8 inches and be moisture conditioned to bring the moisture content of the soils into the range recommended for structural fill. Moisture conditioning is the process of adjusting the moisture content of the scarified materials to a moisture content that is within a range of 0 to 4 percent above the optimum moisture content as determined by the Standard Proctor (ASTM D-698) compaction procedure. Following moisture conditioning, the scarified materials should be recompacted to a minimum of 95 percent of Standard Proctor (ASTM D-698) maximum dry density. Soft or unstable areas that hamper compaction of the subgrade should be undercut and replaced with structural fill.

Following moisture conditioning and prior to placement of any new fill, it is recommended that the exposed grade be proofrolled. Proofrolling of the subgrade provides a more stable base for placement of structural fill and aids in identifying soft or disturbed areas. Unsuitable areas identified by the proofrolling operation should be undercut and replaced with structural fill. Proofrolling can be accomplished through use of a fully-loaded, tandem-axle dump truck or similar equipment providing an equivalent subgrade loading. Suitable structural fill should then be placed to design grades as soon as practical after reworking the subgrade to avoid moisture changes in the underlying soils.

If soft or unstable conditions are encountered during the proofrolling operation, stabilization of the soils may be required. Clean crushed rock having a particle diameter of 3 to 6 inches could be used to stabilize the subgrade prior to placement of structural fill. After initial undercutting, the large rock would be spread over the unstable subgrade and worked into the soft soils by close tracking with a bulldozer or other suitable construction equipment. Additional rock would be added until the subgrade becomes firm enough to support construction equipment. The use of a geotextile fabric, in conjunction with crushed rock, could also be considered as a means of stabilizing the exposed grade.

CLIMATIC CONDITIONS

Weather conditions will influence the site preparation required. In spring and late fall, following periods of rainfall, the moisture content of the near surface soils may be significantly above the optimum moisture content. Additionally, it is common to encounter wet, unstable soils upon removal of the site pavements or flatwork as a result of moisture becoming trapped beneath relatively impervious concrete or asphalt pavements. These conditions could seriously impede grading by causing an unstable subgrade condition. Typical remedial measures include aerating the wet subgrade, removal of the wet materials and replacing them with dry materials or treating the wet material with fly ash.

If site grading commences during summer months, the moisture contents of the onsite soils may be abnormally low, which can significantly increase the swell potential of the clay soils. Typically, discing and moisture conditioning of the exposed subgrade materials to the moisture content criteria outlined in the Structural Fill section will reduce this swell potential of the dry materials. As an alternative, the dry materials could be undercut and replaced with structural fill.

EXCAVATIONS

Excavations will be required for foundations, underground utilities and a utility tunnel for this project. It is anticipated that the foundation excavations will be in undocumented fill and naturally deposited clay soils above the water table. These materials can generally be excavated with conventional earthmoving equipment such as backhoes and large track hoes. Rubble fill and buried structures within the undocumented fill could hamper excavations in some areas of the site. Utility excavations that extend into the underlying weathered shale bedrock with a Standard Penetration Resistance (N) value of less than 25 blows per foot can generally be excavated with conventional earthmoving equipment such as backhoes, large track hoes, loaders, etc. The borings indicated that the proposed utility tunnel excavation along SW Van Buren Street will extend into harder, less weathered shale and/or limestone bedrock units. Removal of the hard shale and limestone will be more difficult and will probably require the use of rock teeth, pneumatic breakers, or some other method of hard rock removal to complete the excavation for the utility tunnel.

Temporary construction slopes should be designed in strict compliance with the most recent governing regulations. The naturally deposited clay soils encountered in the borings would generally be classified as Type B soils, under Part 1926 of the OSHA regulations pertaining to open excavations. For these soils, it is recommended that temporary construction slopes be no steeper than 1(H) to 1(V). Construction slopes should be closely observed for signs of mass movement: tension cracks near the crest, bulging at the toe, etc. If potential stability problems are observed, the geotechnical engineer should be immediately contacted. The responsibility for excavation safety and stability of temporary construction slopes should lie solely with the contractor.

STRUCTURAL FILL

All structural fill should consist of approved materials, free of organic matter and debris. Fill placed within 24 inches below the building floor slab and leveling course materials should consist of a lower plasticity cohesive soil having a liquid limit less than 45. Higher plasticity soils could be used as structural fill in the lower portion of deep fill sections in the building area and/or as structural fill in pavement areas where more movement can generally be tolerated. Fill should be placed in lifts having a maximum loose lift thickness of 9 inches. All fill should be compacted to a minimum of 95 percent of the material's maximum dry density as determined by ASTM D-698 (standard Proctor compaction). The moisture content of the fill at time of compaction should be within a range of 0 to 4 percent above optimum moisture content as defined by the standard Proctor compaction procedure. Moisture contents should be maintained within this range until completion of the building floor slab.

Granular materials that do not have a well-defined moisture-density relationship that are placed below foundations and other structures should be compacted to a minimum of 70 percent of the materials maximum relative density as determined by ASTM Specifications D-4253 and 4254. Granular backfill materials placed next to structures should be compacted to a minimum of 65 percent of the materials maximum relative density. There is no specific moisture content requirement for compaction of sands and sandy soils and the moisture content of these soils should be maintained in a suitable range that facilitates the compaction of the sand.

Based on the proposed floor slab elevations, it appears that it will be necessary to import fill material to the site. It is recommended the low volume change material be imported to complete the required fill sections.

FOUNDATIONS

The borings encountered undocumented fill with variable amounts of rubble and construction debris. The undocumented fill is not considered suitable for support of shallow spread footings. Because of this, we have recommended that the proposed building be supported on drilled pier foundations that extend through the undocumented fill and naturally deposited glacial clay soils and are founded in the Curzon Limestone that underlies the proposed building site. As an alternate to supporting the proposed building on drilled pier foundations, shallow foundation support bearing on a *Geopier®* reinforced subgrade would appear to be a viable foundation option for this project. As previously discussed, Geopiers are rammed aggregate piers that are installed by a specialty contractor using a proprietary method. Recommendations for design and construction of geopiers is normally provided by Geopier US, the company that developed this method of ground improvement and foundation support.

DRILLED PIER FOUNDATIONS

Based on the subsurface conditions encountered at the site, it recommended that the proposed building be supported by a drilled pier and grade beam foundation system. It is recommended that all drilled piers be founded in the Curzon Limestone. Based on the borings, it is anticipated that the bearing elevations of the drilled piers will range from about 908 to 913 feet, across the proposed building site. Greater penetration into the bedrock may be required at some locations depending on the extent and severity of bedrock weathering. Drilled piers that are founded in suitable limestone may be designed and proportioned using an allowable end bearing pressure of 60,000 psf.

Any uplift loads acting on the foundations can be resisted by the effective dead weight of the piers plus an allowable side friction value of 250 psf for the portion of the shaft in soils and 2,000 psf for the portion of the shaft in weathered shale and/or limestone bedrock.

Properly reinforced drilled piers are also capable of resisting transient lateral loads from wind and/or earthquakes. It has been our experience that drilled piers with a minimum shaft diameter of 30 inches and an embedment length of at least 10 feet are capable of resisting lateral loads of 25 kips or more, with maximum top of pier deflections of ½ inch or less. If desired, GeoSource can perform a more comprehensive lateral load analysis and provide additional recommendations, when final loads become available. All piers subject to lateral loads should be properly reinforced.

All piers should have a minimum shaft diameter of 36-inches in order to accommodate dewatering equipment and/or to permit access for proper hand cleaning and observation of the base. Some groundwater seepage should be anticipated during the installation of drilled piers and use of temporary casing and dewatering techniques may be required. Temporary casing may also be required in areas where significant amounts of debris and/or rubble are present in the undocumented fill. To minimize disturbance to the bearing surfaces caused by ponding of water, it is recommended that concrete be placed the same day that the piers are drilled. It is also recommended that temporary casing be installed when personnel are required to enter a drilled pier excavation to clean or observe the bearing surface.

To minimize disturbance to the bearing surfaces caused by ponding of water, it is recommended that concrete be placed the same day that the drilled shafts are completed. The bottom of the pier excavation should be clean and free of water and loose materials prior to placement of the reinforcing steel and concrete. Concrete placement should be continuous from the bottom to the top elevation of the shaft. For dry excavations, concrete may be placed by the free fall method, provided that it can be directed down the center of the shaft without hitting the reinforcing steel or sides of the excavation. Wet excavated shafts will require that the concrete either be pumped from the bottom up or placed using a tremie. The tremie pipe should be clean and have a sufficient inside diameter for use with the specific concrete mix, but not less than 10 inches. The discharge end of the tremie should allow free radial flow of the concrete and be immersed at least 5 feet in concrete and maintain a positive pressure differential during placement to prevent water or spoil intrusion.

It is anticipated that the drilled piers can be installed with conventional drilling equipment. It is possible that obstructions, such as rubble fill or old buried foundations, walls and other structures from the former buildings may be encountered during the installation of the drilled piers. Core barrels, rock augers or special construction methods may be required to remove obstructions and/or to remove loose rock and other materials to properly prepare the foundation bearing surface for the drilled piers.

Temporary steel casing and dewatering procedures may be required for proper installation of the drilled piers. If concrete will be placed in conjunction with the use of temporary casing, there must be a sufficient head of concrete inside the casing to prevent soil and water from entering the pier excavation as the temporary casing is pulled. It is recommend that concrete be designed to have a minimum slump in the range of 6 to 8 inches to reduce the potential for arching as the casing is removed.

It is recommended that all drilled pier and/or footing excavations be observed and evaluated by the geotechnical engineer or his representative immediately prior to placement of foundation concrete. Unsuitable areas identified at this time should be corrected. Corrective procedures would be dependent upon conditions encountered and will most probably include deepening of the drilled piers.

Long-term structural settlement of drilled piers designed and constructed as outlined above should be minor; i.e., ½ inch or less.

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GEOPIER FOUNDATION SYSTEM

As an alternate to supporting the proposed building on drilled pier foundations, shallow foundation support bearing on a *Geopier*® reinforced subgrade appears to be a viable option for this project and may potentially provide an economic benefit to this project. Based on our experience with the *Geopier* soil reinforcement system, we anticipate that a *Geopier* reinforced subgrade could be designed to increase the net allowable soil bearing pressure at this site while limiting foundation settlement.

The *Geopier* soil reinforcement system has been used for a number of years to support structures as an alternative to deep foundations and/or to the removal and replacement of soft or unsuitable soils. The system allows the use of conventional spread footings and floor slabs cast on-grade, and reliably controls settlement to within design tolerances.

The *Geopier* soil reinforcement system consists of highly densified aggregate piers. The *Geopier* elements are installed by drilling 30-inch diameter holes, and ramming thin lifts of well-graded aggregate within the holes to form very stiff, high-density aggregate piers. The drilled holes for this project should extend through the undocumented fill to the underlying bedrock, a depth of about 13 to 19 feet below the finished floor elevation of the existing building. Following drilling of the geopier hole, well graded aggregate is compacted in 12-inch loose lifts in the drill hole. Ramming takes place with a high-energy beveled tamper that both densifies the aggregate and forces the aggregate laterally into the sidewalls of the hole. This action increases the lateral stress in surrounding soils, thereby further stiffening the reinforced composite soil mass. The result of *Geopier* installation is a significant strengthening and stiffening of subsurface soils that then support floor slabs and high-capacity footings.

Geopier designs are based on a two-layer settlement analysis as described by Lawton et al. (1994) and in the *Geopier* Reference Manual. Settlements within the “upper zone” (zone of soil that is reinforced with *Geopier* elements) are computed using a weighted modulus method that accounts for the stiffness of the *Geopier* elements, the stiffness of the matrix soil, and the area coverage of *Geopier* elements below supported footings. Settlements within the “lower zone” (zone of soils beneath the upper zone which receives lower intensity footing stresses) are computed using conventional geotechnical settlement methods.

The *Geopier* soil reinforcement system is a design-build system and *Geopier* US should be contacted to provide engineering analyses and project specific design information for this project. Please contact Mr. Aaron J. Gaul, of *Geopier* Foundation Company – Midwest at (816) 531-6026 regarding the final system design, including the allowable foundation bearing pressure, *Geopier* shaft lengths and spacing, anticipated floor slab thickness, and a cost to support the proposed building.

If the *Geopier* system is selected, Quality Assurance testing should be performed during installation, including documentation of the soil conditions encountered, the shaft lengths, amount of aggregate used, verification of the modulus test readings, and tests on the compacted aggregate lifts. GeoSource would be pleased to provide this service.

SEISMIC HAZARDS DETERMINATION

Earthquake hazard evaluation is a complex task. Seismic sources must be identified and characterized, path effects must be evaluated (i.e., selection of appropriate attenuation relationships), and ground motions must be completed. Finally, an analysis of the motion with respect to the proposed construction must be made. In addition to the multi-discipline nature of this process, there is substantial parameter and modeling uncertainty associated with each of the steps. Typically, code based approaches are used for seismic hazard analyses. Our seismic hazard evaluation follows the IBC 2009 procedures.

United States Geological Society (USGS) has developed and mapped maximum earthquake response spectra for two design levels: an earthquake having a 10% probability of exceedance in 50 years and an earthquake having a 2% probability of exceedance in 50 years. The motions developed by USGS represent soft rock conditions, which are assumed to be representative of the soil/rock that would be encountered below a depth of approximately 100 feet below existing grades at the site.

The USGS "soft rock" peak ground accelerations for the 10%/50 year and 2%/50 year events are 5.10% g and 18.60% g, respectively. Maximum spectral accelerations at the 0.2 second/1.0 second periods for the 10%/50 year and 2%/50 year events are 5.10% g / 2.10% g and 15.40% g / 5.40% g, respectively. Based on the subsurface information, the project site would be characterized as a Site Class C per the 2009 International Building Code (IBC). In addition, there is no significant risk of liquefaction or mass movement of the on-site soils due to a seismic event.

BUILDING FLOOR SLABS

The recommendations outlined in the Site Preparation and Structural Fill sections of this report are intended to produce subgrades that are suitable for support of building floor slabs. These recommendations include capping the building pad with a minimum of 24 inches of select, low volume change material below the floor slab and leveling course. The select fill layer below the floor slabs has been recommended to reduce the potential for subgrade volume change and floor slab movement. The recommended low plasticity structural fill thickness is in addition to any granular section that will be required below the floor slabs. The moisture content of the subgrade soils should be maintained within the recommended range until floor slabs are completed. Depending upon weather conditions, periodic wetting may be required.

Where possible, floor slabs should be designed and constructed as free slabs to allow for some differential movement between the walls, column points and floor slabs. It is recommended that a granular leveling course, having a minimum thickness of 4 inches, be used below normally loaded building floor slabs supported on soil subgrades. The granular section provides a capillary moisture break and acts as a leveling course. Clean crushed limestone gravel, with a nominal size of ½ to ¾ inch, would be recommended for the leveling course. A modulus of subgrade reaction of 100 pci may be used to design floor slabs constructed on an untreated clay subgrade.

In areas where floor loads are greater than 200 psf, it is recommended that a minimum of 12 inches of crushed limestone aggregate be placed below the building floor slab. The crushed rock may be substituted for a portion of 18 inches of select, low volume change fill layer recommended for normally loaded floor slabs. The purpose of the crushed rock is to provide an improved subgrade for the more heavily loaded floor slab areas. In addition, the crushed rock will also provide a good working surface during construction. It is recommended that the crushed rock have a gradation similar to KDOT AB-3. The crushed rock should be placed in 6 inch lifts and compacted to a minimum of 95 percent of the material's maximum dry density as determined by ASTM D 698. A modulus of subgrade reaction of 250 pci may be used to design floor slabs constructed on 12 inches of compacted crushed limestone aggregate.

Subsurface moisture and moisture vapor naturally migrate upward through the soil and, where the soil is covered by a building or pavement, this moisture will collect. To reduce the impact of this subsurface moisture and the potential impact of future induced moisture (such as landscape irrigation or precipitation), the current industry standard is to place a vapor retarder below the compacted crushed limestone layer. This membrane typically consists of visquene or polyvinyl plastic sheeting, having a thickness of at least 10 mils. It should be noted that although vapor barrier systems are currently the industry standard, this system may not be completely effective in preventing floor slab moisture problems. These systems typically will not necessarily assure that floor slab moisture transmission rates will meet floor covering manufacturer standards and that indoor humidity levels be appropriate to inhibit mold growth. The design and construction of such systems are totally dependent on the proposed use and design of the proposed building and all elements of building design and function should be considered in the slab-on-grade floor design. Building design and construction may have a greater role in perceived moisture problems since sealed buildings/rooms or inadequate ventilation may produce excessive moisture in a building and affect indoor air quality.

Special precautions must be taken during the placement and curing of all concrete slabs. Excessive slump (high water-cement ratio) of the concrete and/or improper curing procedures used during either hot or cold weather conditions could lead to excessive shrinkage, cracking or curling of the slabs. High water-cement ratio and/or improper curing also greatly increase the water vapor permeability of the concrete. We recommend that all concrete placement and curing operations be performed in accordance with the American Concrete Institute (ACI) Manual.

The above procedures should reduce the potential for subgrade moisture variations and consequently reduce floor slab movement and cracking. However, these procedures will not completely eliminate the volume change characteristics of the natural clay soils and, because of the presence of unaltered clay soils that extend to much greater depths, some long-term volume change may occur along with some floor slab movement and cracking. Isolation of floor slabs from walls and columns should be considered to accommodate minor differential movement of floor slabs. If it is desired to further minimize the potential for subgrade volume change, the use of a greater thickness of low volume change material beneath the floor slab should be considered.

LATERAL EARTH PRESSURES

Based on our experience with soils similar to those encountered at the site, it is recommended that the walls of the utility tunnel be designed using an equivalent fluid pressure of 55 pounds per cubic foot. This lateral earth pressure assumes an "at rest" stress distribution condition; i.e., no wall rotation is allowed. The recommended load distribution does not include a factor of safety or take into account the influence of any hydrostatic loading of the walls. Also, the stress distributions do not include the influence of any foundations, pavement or other surcharge loads located in or adjacent to wall backfill.

To prevent hydrostatic loading on the walls and/or seepage into the utility tunnel, it is recommended that perforated drain lines be installed at the base of the walls and also under the bottom floor slab of the tunnel. The drain lines should be sloped to provide positive gravity and should extend to a sump or storm drain where the water is removed. The drain line should be wrapped with filter fabric to prevent intrusion of fines. The drain line should be backfilled with free draining granular material extending vertically above the drain line to within 2 feet of final grade. The remaining portion of the excavation should be backfilled with cohesive soils to minimize the infiltration of surface water. The granular section behind the wall should have a minimum width of 2 feet and should be encapsulated in the suitable filter fabric to minimize intrusion of fines. The use of a prefabricated drainage blanket on the foundation wall could also be considered to prevent hydrostatic loading. Drainage blankets should be installed in accordance with the manufacturer's recommendations.

PAVEMENTS

Parking and drive area subgrades should be prepared in accordance with the recommendations given in the Site Preparation and Structural Fill sections of this report. The site soils are considered poor subgrade materials for support of pavements. Based on the soil types encountered at this site and previous experience with materials of this type, a design CBR value of 3 is recommended for design of pavement sections. For this design value, a full-depth asphaltic concrete section having a minimum thickness of 6 inches is recommended for automobile parking areas and 7.5 inches is recommended for the access drives. For asphaltic concrete pavements, a minimum surface course thickness of 2 inches is normally recommended.

Service drives used by semi-trailer and other heavy delivery trucks require thicker pavement sections. GeoSource would be pleased to provide specific thickness recommendations for heavy duty pavements, after we receive additional information regarding the type and number of trucks that are projected to use this facility over the design life of the pavement. Portland cement concrete pavements are recommended for approach slabs, dock aprons, truck drives and parking areas, trash dumpster pads and other areas where heavy wheel loads will be concentrated. It is recommended that the concrete pavements in these areas have a minimum thickness of 8 inches. We normally recommend a 4-inch leveling and drainage course of clean, crushed rock be placed below all concrete pavements.

Portland cement concrete pavements are recommended for the trash dumpster pad and other paved areas subjected to concentrated wheel loads and high stresses. The minimum recommended thickness in these areas is 7 inches. Normally, a 4-inch layer of granular fill is placed below concrete pavement sections.

We recommend that the pavement subgrades be evaluated by proofrolling immediately prior to paving. The moisture content and density of the top 8 inches of the subgrade should be checked within two days prior to commencement of actual paving operations. If the material is not in compliance with the required ranges of moisture or density, the subgrade should then be moisture conditioned and recompacted. If any significant event, such as precipitation, occurs after the evaluation, the subgrade should be reviewed by qualified personnel immediately prior to placing the pavement. The subgrade should be in its finished form at the time of the final review.

Proper drainage is a key to the long term performance of any pavement section. It is recommended that all pavements be properly sloped to provide rapid runoff of surface water. Water should not be allowed to pond on or adjacent to pavements, since this could result in saturation of the subgrade and cause premature deterioration of pavements. Pavements in Kansas are normally subjected to 30 or more freeze-thaw cycles in any given year. Because of this, periodic maintenance of all of the pavements is essential to long term performance and should be anticipated. This should include sealing of all cracks and joints and by maintaining proper surface drainage next to paved areas.

PLANS AND SPECIFICATIONS REVIEW

It is recommended that the geotechnical engineer be provided the opportunity to review the plans and specifications so that comments can be made regarding the interpretation and implementation of our geotechnical engineering recommendations in the design and specifications. In the event that GeoSource is not given the opportunity to perform this recommended review, we will assume no responsibility for misinterpretation of our geotechnical engineering recommendations.

CONSTRUCTION OBSERVATION AND TESTING

To effectively achieve the intent of the geotechnical recommendations presented in this report and to maintain continuity from design through construction, GeoSource should be retained to provide observation and testing services during earthwork and foundation construction phases of the project. This will provide the geotechnical engineer with the opportunity to observe the subsurface conditions encountered during construction, evaluate the applicability of the geotechnical recommendations presented in our report as they relate to the soil and bedrock conditions encountered, and to provide follow up recommendations if conditions differ from those described in our report.

LIMITATIONS

The analysis and recommendations submitted in this report are based in part upon the subsurface information obtained from the exploration points performed at the indicated locations and our present knowledge of the proposed construction as outlined in the Project Description. Subsurface conditions may vary between the exploration points and across the site and our report does not reflect any variations which may occur. The nature and extent of such variations may not become evident until construction. If subsurface conditions are encountered during construction that differ from those described in this report, GeoSource should be notified immediately so that a review may be made and any supplemental recommendations provided. If the scope of the proposed construction, including the proposed loads, floor slab elevations or locations, changes from that described in this report, our recommendations should also be reviewed and the recommendations modified accordingly.

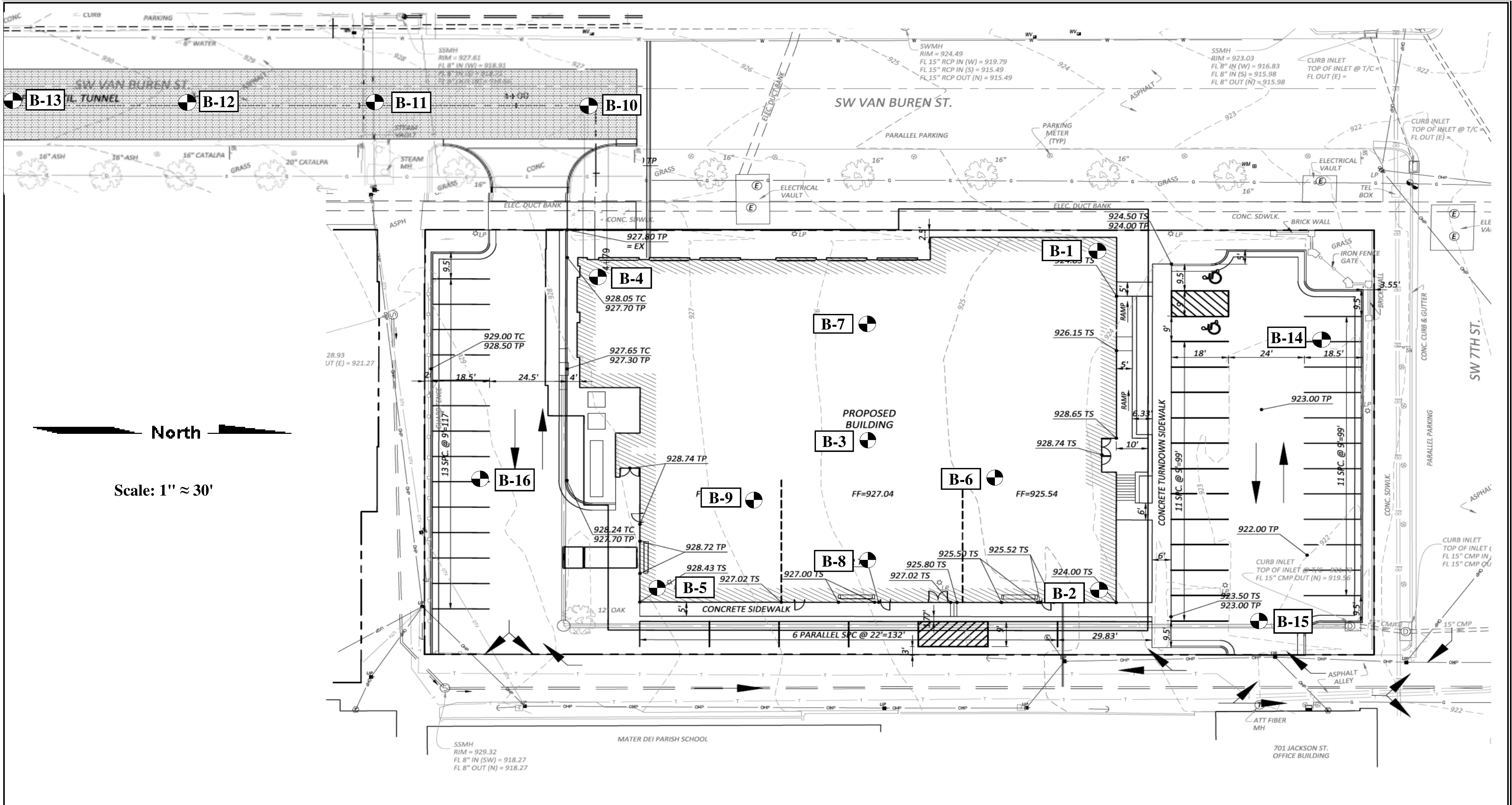
This report has been prepared in accordance with the generally accepted geotechnical engineering practice as it exists in the area at the time of our study. No warranty is expressed or implied. The recommendations provided in this report are based on the assumption that an adequate program of observation and testing will be conducted during the construction phase in order to evaluate compliance with our recommendations. Our scope of services did not include any environmental assessment or exploration for the presence of hazardous or toxic materials in the soil, surface water, groundwater or air, on, below or around this site.

This report has been prepared for the exclusive use of our client for specific application to the project discussed. Any party other than the client who wishes to use this report shall notify GeoSource in writing of such intended use. Additional work may be required before an updated report can be issued. Non-compliance with any of these requirements will release GeoSource from any liability resulting from the use of this report by any unauthorized party and client agrees to defend, indemnify and hold harmless GeoSource from any claim or liability associated with such unauthorized or non-compliance.

GEOSOURCE

APPENDIX

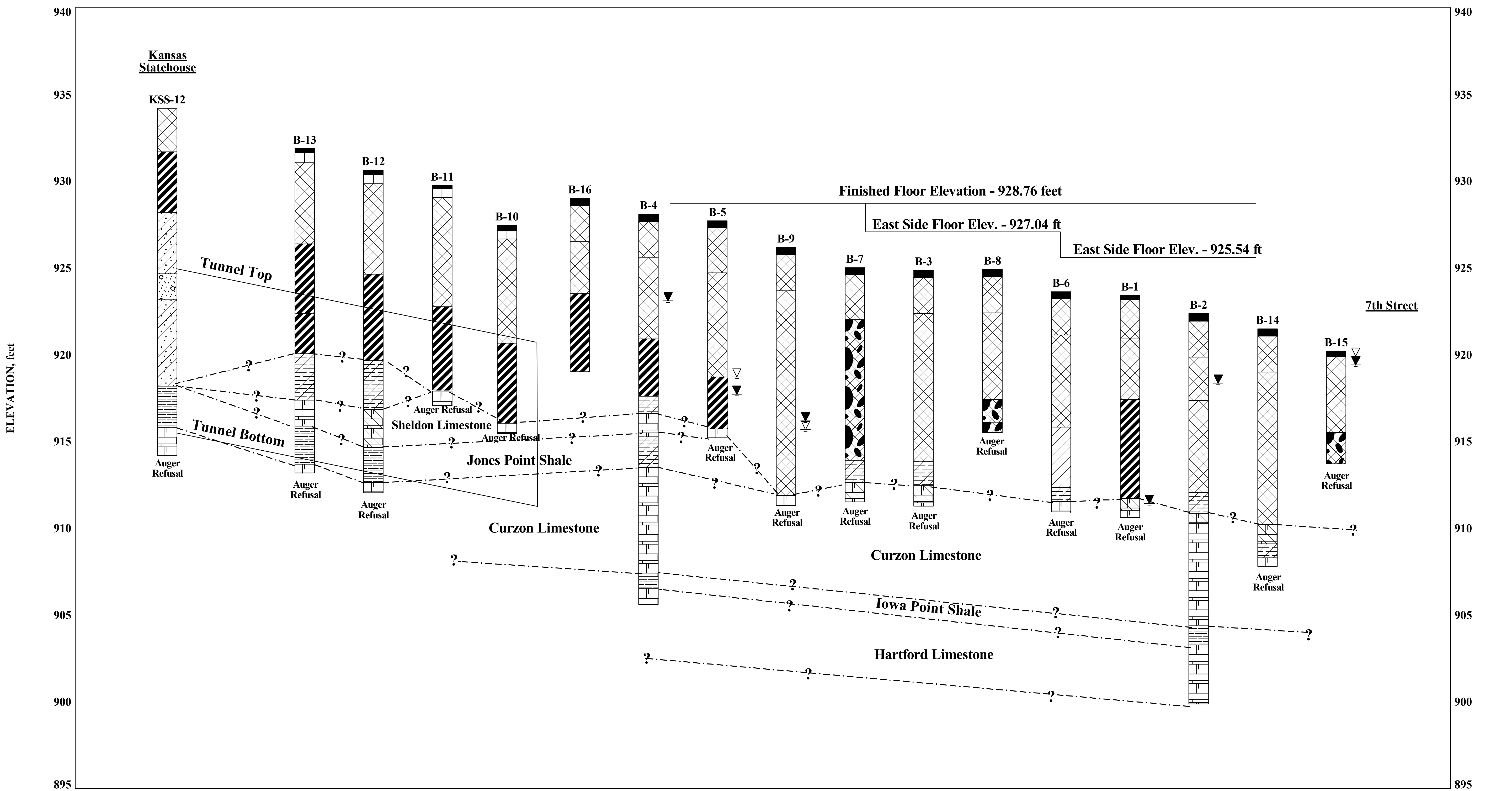
FIGURE 1: BORING LOCATION SKETCH
FIGURE 2: GENERALIZED SUBSURFACE PROFILE
BORING LOGS
GENERAL NOTES AND TERMS
BORING LOG SYMBOLS



Boring Location Sketch

Figure 1

Proposed Kansas Energy and Service Facility **SW 7th Street and Van Buren Street** **Topeka, Kansas**		GEOSOURCE Your Source for Geotechnical and Materials Engineering
Approved By: JJZ	**Project No. D14G1399**	



GENERALIZED SUBSURFACE PROFILE

FIGURE 2

Proposed Kansas Energy & Service Center
SW 7th Street and Van Buren Street
Topeka, Kansas

Approved By: JJZ | Project No.: D14G1399

LEGEND

Asphalt, Brick Pavers, Baserock, Rubble, Fill, Silt, Silty Sand, Sandy Silt, Clayey Silt, Lean to Fat Clay, Sandy Lean Clay, Sandy Clay, Sand (SP), Sand (SW), Gravel, Fat Clay, Lean Clay, Fat Clay, Weathered Shale, Weathered Limestone, Weathered Sandstone, Shale, Limestone, Sandstone

Water Levels
While Drilling
24 hrs. A.B.

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JCSBC
2-2-2016
Att.9G.--1093

LOG OF BORING NO. B-1

BOREHOLE INFORMATION

STATION | OFFSET

NORTHING | EASTING

DRLLING COMPANY **GeoSource, LLC**

METHOD **4-inch Flight Augers** | HAMMER **Auto**

PROJECT NAME **Proposed Kansas Energy & Service Center**

SITE LOCATION **SW 7th Street and Van Buren Street Topeka, Kansas**

OWNER / ARCHITECT **State of Kansas / HTK Architects**

Offset 4 feet east due to utilities

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	DEPTH, Feet	MATERIAL DESCRIPTION (Approx. Surface Elevation: 923.4)	ELEVATION
	PA								**Asphaltic Concrete (3")**	
1	ST	15		*1500	102	25.6	CL	2.5	**FILL**, lean clay, medium stiff, light brown, trace fine sand	920.9
	PA									
2	SS	18	7	*1500		21.6	CL CH	6.0	**FILL**, lean to fat clay, stiff, dark gray brown, trace gravel, brick, cinders and miscellaneous construction debris	917.4
	PA									
3	ST	20		4410	101	28.0	CH	11.7	**FAT CLAY**, stiff, brown mottled light gray and rust	911.7
	PA							12.8	****LIMESTONE**, weathered, broken and seamy to very hard, light gray	910.6

AUGER REFUSAL @ 12.8 FEET

ATTERBERG LIMITS

Sample 1, Depth 1-3 feet

LL	PL	PI
37	18	19

**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS

- ∇ **12.0 feet W.D.**
- ▼ **12.0 feet A.B.**
- **Backfilled @ Completion**

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BORING STARTED	12-17-14		
BORING COMPLETED	12-17-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION	Page 1 of 2
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY **GeoSource, LLC**	
METHOD **4-inch Flight Augers**	HAMMER **Auto**

LOG OF BORING NO. B-2

PROJECT NAME	**Proposed Kansas Energy & Service Center**
SITE LOCATION	**SW 7th Street and Van Buren Street Topeka, Kansas**
OWNER / ARCHITECT	**State of Kansas / HTK Architects**

Offset 8 feet west due to utilities

Approx. Surface Elevation: 922.4

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	DEPTH, Feet	MATERIAL DESCRIPTION	ELEVATION
	PA								Asphaltic Concrete (5")	
1	ST	13		2420	107	22.7	CL	2.5	**FILL**, lean clay, stiff, light brown brown, trace fine sand	919.9
	PA									
2	SS	18	8	*4000		29.4	CL CH	5.0	**FILL**, fat clay, stiff, gray brown	917.4
	PA									
3	ST	18	9	*1000		55.7	CL CH	10.3	**FILL**, lean to fat clay, soft, dark gray brown and geenish gray mixed, trace gravel (Stong Fuel Odor)	912.1
	PA							11.5	**SHALE, weathered, soft, olive tan	910.9
								12.1	**LIMESTONE, weathered, seamy, gray	910.3
R1	NQ3	100%	RQD= 75%	**4990	138	8.7		18.0	**LIMESTONE**, hard, solid, medium to thick-bedded, fossiliferous, buff to light gray	904.4
R2	NQ3	78%	RQD= 57%	**8040	150	5.4		19.1	**SHALE**, mod. hard, very thin bedded, tan	903.3
				**3180	145	6.5			**LIMESTONE**, hard, solid, medium bedded, fossiliferous, buff to light gray	

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS
∇ Dry Prior to Coring
▼ 4.0 feet A.C.R.
Backfilled @ Completion

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BORING STARTED	12-17-14		
BORING COMPLETED	12-17-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION	Page 2 of 2
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY	GeoSource, LLC
METHOD 4-inch Flight Augers	HAMMER Auto

LOG OF BORING NO. B-2

PROJECT NAME **Proposed Kansas Energy & Service Center**

SITE LOCATION **SW 7th Street and Van Buren Street Topeka, Kansas**

OWNER / ARCHITECT **State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	GRAPHIC LOG	DEPTH, Feet.	MATERIAL DESCRIPTION	
R3	NQ3	100%	RQD= 100%	**7480	152	3.5			22.5	**LIMESTONE**, hard, solid, thick-bedded, fossiliferous, light gray	899.9
										BOTTOM OF BORING	

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS
Dry Prior to Coring
4.0 feet A.C.R.
Backfilled @ Completion

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BORING STARTED	12-17-14		
BORING COMPLETED	12-17-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION	Page 1 of 1
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY	**GeoSource, LLC**
METHOD **4-inch Flight Augers**	HAMMER **Auto**

LOG OF BORING NO. B-3

PROJECT NAME	**Proposed Kansas Energy & Service Center**
SITE LOCATION	**SW 7th Street and Van Buren Street** **Topeka, Kansas**
OWNER / ARCHITECT	**State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	GRAPHIC LOG	DEPTH, Feet.	MATERIAL DESCRIPTION Approx. Surface Elevation: 924.9
	PA									**Asphaltic Concrete (5")**
1	ST	14		4500	115	15.3	CL		2.5	**<u>FILL</u>**, lean clay, very stiff, light brown, trace fine sand — 922.4
	PA									
2	SS	18	20	*1500		19.0	CL CH		5	**<u>FILL</u>**, lean to fat clay, medium stiff to stiff, dark gray brown, trace gravel, brick, cinders and miscellaneous construction debris
	PA									
3	SS	18	9	*3000		31.3	CL CH		10	
									11.0	913.9
	PA								12.4	**<u>SHALE</u>, weathered, soft, olive tan — 912.5
									13.6	**<u>LIMESTONE</u>, weathered, broken and seamy to very hard, light gray — 911.3

AUGER REFUSAL @ 13.6 FEET

<u>ATTERBERG LIMITS</u>

Sample 1, Depth 1-3 feet

LL	PL	PI
39	19	20

**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS	
▽	Dry W.D.
▼	Dry A.B.
	Backfilled @ Completion

GEOSOURCE
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BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION	Page 1 of 2
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY	GeoSource, LLC
METHOD 4-inch Flight Augers	HAMMER Auto

LOG OF BORING NO. B-4

PROJECT NAME	Proposed Kansas Energy & Service Center
SITE LOCATION	SW 7th Street and Van Buren Street Topeka, Kansas
OWNER / ARCHITECT	State of Kansas / HTK Architects

Approx. Surface Elevation: 928.1

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL
	PA						
1	ST	10		1500	107	19.3	CL
	PA						
2	SS	18	8	*3000		27.0	CH
	PA						
3	ST	18	10	*4500		17.5	CH
	PA						
R1	NQ3	94%	RQD= 56%	**7800 **1970	153 136	5.2 15.2	
R2	NQ3	100%	RQD= 65%	**9520 **4410	149 146	5.6 5.7	

DEPTH, Feet	MATERIAL DESCRIPTION	ELEVATION
	Asphaltic Concrete (5")	
2.5	**FILL**, lean clay, medium stiff, light brown, trace fine sand	925.6
7.2	**FILL**, fat clay, stiff, dark gray brown mixed, trace gravel and miscellaneous construction rubble	920.9
10.5	**FAT CLAY**, very stiff, light gray mottled light brown	917.6
11.5	****SHALE**, weathered, soft, olive tan	916.6
12.8	**LIMESTONE**, hard, solid, thin-bedded, fossiliferous, buff	915.3
14.6	**SHALE**, weathered, soft, tan to light brown	913.5
	LIMESTONE, hard, solid, medium to thick-bedded, fossiliferous, buff to light gray	

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS
∇ Dry Prior to Coring
▼ 5.0 feet A.C.R.
Backfilled @ Completion

GEOSOURCE
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BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION	Page 2 of 2
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY GeoSource, LLC	
METHOD 4-inch Flight Augers	HAMMER Auto

LOG OF BORING NO. B-4

PROJECT NAME **Proposed Kansas Energy & Service Center**

SITE LOCATION **SW 7th Street and Van Buren Street**
Topeka, Kansas

OWNER / ARCHITECT **State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	GRAPHIC LOG	DEPTH, Feet.	MATERIAL DESCRIPTION	
									20.9		907.2
R3	NQ3	25%	RQD= 0%							**SHALE**, hard, very thin bedded, gray	
									21.6		906.5
										LIMESTONE, hard, light gray	
									22.5		905.6
										BOTTOM OF BORING	

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS
▽ Dry Prior to Coring
▼ 5.0 feet A.C.R.
Backfilled @ Completion

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BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION

LOG OF BORING NO. B-5

STATION OFFSET

NORTHING EASTING

DRLLING COMPANY **GeoSource, LLC**

METHOD **4-inch Flight Augers** HAMMER **Auto**

PROJECT NAME **Proposed Kansas Energy & Service Center**

SITE LOCATION **SW 7th Street and Van Buren Street Topeka, Kansas**

OWNER / ARCHITECT **State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	DEPTH, Feet.	MATERIAL DESCRIPTION (Approx. Surface Elevation: 927.7)
	PA								Asphaltic Concrete (5")
1	ST	16		2940	109	20.3	CL		**FILL**, lean clay, stiff, light brown, trace fine sand
								3.0	924.7
2	ST	13		5300	106	22.1	CL CH	5	**FILL**, lean to fat clay, very stiff to medium stiff, dark gray brown, trace gravel, brick, cinders and miscellaneous construction debris
	PA								
								9.0	▽ 918.7
3	ST	10		2050	106	22.1	CL CH	10	**FAT CLAY**, stiff, reddish brown ▼
	PA							12.0	915.7
								12.5	**LIMESTONE**, hard, gray — 915.2

AUGER REFUSAL @ 12.5 FEET

ATTERBERG LIMITS

Sample 1, Depth 1-3 feet

LL	PL	PI
36	19	17

**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS

▽ **9.0 feet W.D.**

▼ **10.0 feet A.B.**

Backfilled @ Completion

GeoSource

Your Source for Geotechnical and Materials Engineering

BORING STARTED	**12-17-14**		
BORING COMPLETED	**12-17-14**		
RIG	**CME-55**	DRILLER	**MC**
APPROVED	**JJZ**	JOB #	**D14G1399**

BOREHOLE INFORMATION	Page 1 of 1
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY **GeoSource, LLC**	
METHOD **4-inch Flight Augers**	HAMMER **Auto**

LOG OF BORING NO. B-6

PROJECT NAME **Proposed Kansas Energy & Service Center**

SITE LOCATION **SW 7th Street and Van Buren Street Topeka, Kansas**

OWNER / ARCHITECT **State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	GRAPHIC LOG	DEPTH, Feet.	MATERIAL DESCRIPTION Approx. Surface Elevation: 923.6
	PA									Asphaltic Concrete (5")
1	ST	14		*2500	104	21.1	CL		2.5	**FILL**, lean clay, stiff, light brown, trace fine sand — 921.1
	PA									
2	SS	18	16	*2000		22.3	CL CH		5	**FILL**, lean to fat clay, medium stiff to stiff, dark gray brown, trace gravel, brick, cinders and miscellaneous construction debris
	PA								7.8	915.8
3	SS	18	7	*2500		20.1	CL		10	**LEAN CLAY**, stiff, dark gray brown (Possible Fill)
	PA								11.3	912.3
									12.1	****SHALE**, weathered, soft, olive tan — 911.5
									12.7	****LIMESTONE**, hard, gray — 910.9

AUGER REFUSAL @ 12.7 FEET

**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS	
▽	Dry W.D.
▼	Dry A.B.
	Backfilled @ Completion

GEOSOURCE
Your Source for Geotechnical and Materials Engineering

BORING STARTED	12-19-14		
BORING COMPLETED	12-19-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION

LOG OF BORING NO. B-7

STATION OFFSET

NORTHING EASTING

DRLLING COMPANY **GeoSource, LLC**

METHOD **4-inch Flight Augers** HAMMER **Auto**

PROJECT NAME **Proposed Kansas Energy & Service Center**

SITE LOCATION **SW 7th Street and Van Buren Street Topeka, Kansas**

OWNER / ARCHITECT **State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	GRAPHIC LOG	DEPTH, Feet.	MATERIAL DESCRIPTION — Approx. Surface Elevation: 925.0
	PA									Asphaltic Concrete (5")
1	ST	20		2950	107	20.0	CL			**FILL**, lean clay, stiff, light brown, trace fine sand
									3.0	922.0
	PA									
2	SS	12	76			11.4				**RUBBLE FILL**, brick, cinders, limestone and/or concrete rubble in a clay matrix
	PA								5	
3	SS	3	50/3"			15.1				
	PA								10	
									11.1	913.9
										****SHALE**, weathered, soft, grayish tan
									12.4	912.6
										****LIMESTONE**, weathered, broken and seamy to very hard, light gray
									13.5	911.5

AUGER REFUSAL @ 13.5 FEET

ATTERBERG LIMITS

Sample 1, Depth 1-3 feet

LL	PL	PI
34	19	15

**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS

- ▽ **Dry W.D.**
- ▼ **Dry A.B.**
- **Backfilled @ Completion**

GEOSOURCE — Your Source for Geotechnical and Materials Engineering

BORING STARTED	**12-18-14**		
BORING COMPLETED	**12-18-14**		
RIG	**CME-55**	DRILLER	**MC**
APPROVED	**JJZ**	JOB #	**D14G1399**

BOREHOLE INFORMATION	Page 1 of 1
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY **GeoSource, LLC**	
METHOD **4-inch Flight Augers**	HAMMER **Auto**

LOG OF BORING NO. B-8

PROJECT NAME	**Proposed Kansas Energy & Service Center**
SITE LOCATION	**SW 7th Street and Van Buren Street Topeka, Kansas**
OWNER / ARCHITECT	**State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	DEPTH, Feet.	MATERIAL DESCRIPTION (Approx. Surface Elevation: 924.9)	Elevation
	PA								Asphaltic Concrete (5")	
1	ST	10		3630	110	19.0		2.5	**FILL**, lean clay, stiff, light brown, trace fine sand	922.4
	PA									
2	SS	18	5	*2500		23.3			**FILL**, lean to fat clay, medium stiff, dark gray brown, trace gravel, brick, cinders and miscellaneous construction debris	
	PA							7.5		917.4
3	SS	4	50/4"						**RUBBLE FILL**, brick, cinders, limestone or concrete debris in a clay matrix	
	PA							9.4		915.5

AUGER REFUSAL @ 9.4 FEET

Driller' Note: Auger refusal on apparent limestone and/or concrete rubble.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS
Dry W.D.
Dry A.B.
Backfilled @ Completion

GEOSOURCE
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BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION

STATION OFFSET

NORTHING EASTING

DRLLING COMPANY **GeoSource, LLC**

METHOD **4-inch Flight Augers** HAMMER **Auto**

LOG OF BORING NO. B-9

PROJECT NAME **Proposed Kansas Energy & Service Center**

SITE LOCATION **SW 7th Street and Van Buren Street Topeka, Kansas**

OWNER / ARCHITECT **State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	DEPTH, Feet.	MATERIAL DESCRIPTION (Approx. Surface Elevation: 926.2)
	PA								**Asphaltic Concrete (5")**
1	ST	8		2590	109	17.8	CL		**FILL**, lean clay, stiff, light brown, trace fine sand
								2.5	923.7
	PA								**FILL**, lean to fat clay, soft to medium stiff, dark gray brown, trace gravel, brick, cinders and miscellaneous construction debris
2	SS	18	4	*1500		25.7	CL CH	5	
	PA								
3	SS	18	10	*2000		30.7	CL CH	10	
	PA								
								14.3	911.9
								14.9	**LIMESTONE, hard, gray 911.3

AUGER REFUSAL @ 14.9 FEET

ATTERBERG LIMITS

Sample 1, Depth 1-3 feet

LL	PL	PI
34	18	16

**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS

- ▽ **10.5 feet W.D.**
- ▼ **10.0 feet A.B.**
- **Backfilled @ Completion**

GEOSOURCE
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BORING STARTED	**12-17-14**		
BORING COMPLETED	**12-17-14**		
RIG	**CME-55**	DRILLER	**MC**
APPROVED	**JJZ**	JOB #	**D14G1399**

BOREHOLE INFORMATION **Page 1 of 1**

STATION OFFSET

NORTHING EASTING

DRLLING COMPANY **GeoSource, LLC**

METHOD **4-inch Flight Augers** HAMMER **Auto**

LOG OF BORING NO. B-10

PROJECT NAME **Proposed Kansas Energy & Service Center**

SITE LOCATION **SW 7th Street and Van Buren Street Topeka, Kansas**

OWNER / ARCHITECT **State of Kansas / HTK Architects**

Offset 4 feet east due to parked cars

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	DEPTH, Feet.	MATERIAL DESCRIPTION (Approx. Surface Elevation: 927.6)
	PA								**Asphaltic Concrete (4")** **Brick Pavers** FILL, lean to fat clay, medium stiff, dark gray brown, trace gravel, brick, cinders and miscellaneous construction debris
1	ST	6		*1500	98	26.5	CL CH	5	
	PA							6.8	920.8
									FAT CLAY, very stiff, light grayish tan mottled rust
2	SS	18	10	*4500		17.1	CH	10	
	PA							11.4	916.2
								12.0	**LIMESTONE, hard, gray — 915.6

AUGER REFUSAL @ 12.0 FEET

**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS	
▽	Dry W.D.
▼	Dry A.B.
	Backfilled @ Completion

GEOSOURCE
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BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

LOG OF BORING NO. B-11

BOREHOLE INFORMATION

STATION	
OFFSET	
NORTHING	
EASTING	
DRLLING COMPANY	**GeoSource, LLC**
METHOD	**4-inch Flight Augers**
HAMMER	**Auto**

PROJECT NAME	**Proposed Kansas Energy & Service Center**
SITE LOCATION	**SW 7th Street and Van Buren Street Topeka, Kansas**
OWNER / ARCHITECT	**State of Kansas / HTK Architects**

Offset 6 feet east due to parked cars

MATERIAL DESCRIPTION

Approx. Surface Elevation: 929.8

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	DEPTH, Feet.	MATERIAL DESCRIPTION	Elevation
	PA								**Asphaltic Concrete (4")** **Brick Pavers** **FILL**, lean clay, medium stiff, dark gray brown, trace fine sand and gravel	
1	ST	10		1420	97	25.8	CL			
	PA							5		
								7.0		922.8
									FAT CLAY, very stiff, light grayish tan mottled rust	
2	SS	18	10	*5500		24.1	CH	10		
	PA									
								11.8		918.0
								12.7	**LIMESTONE**, hard, gray	917.1

AUGER REFUSAL @ 12.7 FEET

**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS	
▽ Dry	W.D.
▼ Dry	A.B.
Backfilled @ Completion	

GEOSOURCE
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BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION	Page 1 of 2
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY	GeoSource, LLC
METHOD 4-inch Flight Augers	HAMMER Auto

LOG OF BORING NO. B-12

PROJECT NAME	Proposed Kansas Energy & Service Center
SITE LOCATION	SW 7th Street and Van Buren Street Topeka, Kansas
OWNER / ARCHITECT	State of Kansas / HTK Architects

Offset 6 feet east due to parked cars

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	GRAPHIC LOG	DEPTH, Feet.	MATERIAL DESCRIPTION Approx. Surface Elevation: 930.7
										Asphaltic Concrete (3") **Brick Pavers**
	PA									**FILL**, lean to fat clay, medium stiff, dark gray brown mixed, trace gravel
1	ST	10		1480	98	25.9	CL CH			
									5	
									6.0	924.7
	PA									**FAT CLAY**, very stiff, light grayish tan mottled rust
3	ST	12		4440	107	20.0	CH			
									10	
									11.0	919.7
	PA									**SHALE**, weathered, soft, olive tan to light gray
4	SS	1	50/1"			6.4			13.8	916.9
										LIMESTONE, weathered, seamy to thin-bedded, buff to light gray
									15	
	PA								16.0	914.7
										SHALE, hard, gray
									18.0	912.7
									18.6	**LIMESTONE**, hard, gray — 912.1
										AUGER REFUSAL @ 18.6 FEET

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS	
▽	Dry W.D.
▼	Dry A.B.
	Backfilled @ Completion

GEOSOURCE
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BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

LOG OF BORING NO. B-12

BOREHOLE INFORMATION	
STATION	
OFFSET	
NORTHING	
EASTING	
DRLLING COMPANY	GeoSource, LLC
METHOD	4-inch Flight Augers
HAMMER	Auto

PROJECT NAME	Proposed Kansas Energy & Service Center
SITE LOCATION	SW 7th Street and Van Buren Street Topeka, Kansas
OWNER / ARCHITECT	State of Kansas / HTK Architects

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	GRAPHIC LOG	DEPTH, Feet.	MATERIAL DESCRIPTION
										**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS	
∇	Dry W.D.
▼	Dry A.B.
	Backfilled @ Completion

GEOSOURCE
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BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION		Page 1 of 2
STATION	OFFSET	
NORTHING	EASTING	
DRLLING COMPANY **GeoSource, LLC**		
METHOD **4-inch Flight Augers**	HAMMER **Auto**	

LOG OF BORING NO. B-13

PROJECT NAME **Proposed Kansas Energy & Service Center**

SITE LOCATION **SW 7th Street and Van Buren Street Topeka, Kansas**

OWNER / ARCHITECT **State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL
	PA						
1	ST	9		2830	104	28.3	CH
	PA						
3	SS	18	12	*3500		23.6	CH
	PA						
4	SS	15	56/9"			20.7	
	PA						

DEPTH, Feet.	MATERIAL DESCRIPTION	Elevation
	Approx. Surface Elevation:	931.9
	Asphaltic Concrete (3")	
	Brick Pavers	
	FILL, lean to fat clay, stiff, dark gray brown, trace gravel	
5.5		926.4
	FAT CLAY, very stiff, gray brown	
9.5		922.4
	FAT CLAY, very stiff, reddish brown	
11.8		920.1
	**SHALE, weathered, soft, olive tan to gray brown	
14.5		917.4
	**LIMESTONE, weathered, seamy to thin-bedded, light gray	
16.0		915.9
	**SHALE, hard, gray	
18.2		913.7
18.7	**LIMESTONE, hard, gray	913.2
	AUGER REFUSAL @ 18.7 FEET	

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS	
Dry W.D.	
Dry A.B.	
Backfilled @ Completion	

GeoSource

Your Source for Geotechnical and Materials Engineering

BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION	Page 2 of 2
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY GeoSource, LLC	
METHOD 4-inch Flight Augers	HAMMER Auto

LOG OF BORING NO. B-13

PROJECT NAME	**Proposed Kansas Energy & Service Center**
SITE LOCATION	**SW 7th Street and Van Buren Street** **Topeka, Kansas**
OWNER / ARCHITECT	**State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	GRAPHIC LOG	DEPTH, Feet.	MATERIAL DESCRIPTION
										**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS	
∇	Dry W.D.
▼	Dry A.B.
	Backfilled @ Completion

GEOSOURCE
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BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION

STATION OFFSET

NORTHING EASTING

DRLLING COMPANY **GeoSource, LLC**

METHOD **4-inch Flight Augers** HAMMER **Auto**

LOG OF BORING NO. B-14

PROJECT NAME **Proposed Kansas Energy & Service Center**

SITE LOCATION **SW 7th Street and Van Buren Street Topeka, Kansas**

OWNER / ARCHITECT **State of Kansas / HTK Architects**

Approx. Surface Elevation: **921.5**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	DEPTH, Feet.	MATERIAL DESCRIPTION	Elevation
	PA								Asphaltic Concrete (5")	
1	ST	10		1450	109	21.8	CL	2.5	**FILL**, lean to fat clay, medium stiff, light brown, trace fine sand	919.0
	PA									
2	SS	18	5	*2000		18.5	CH		**FILL**, fat clay, medium stiff to stiff, reddish brown, dark brown and brown layers, trace gravel	
	PA							5		
3	SS	18	6	*2500		36.5	CH	10		
	PA							11.3		910.2
								12.4	**LIMESTONE**, weathered, seamy	909.1
								13.2	**SHALE**, weathered, soft, tan	908.3
								13.7	**LIMESTONE**, hard, gray	907.8

AUGER REFUSAL @ 13.7 FEET

**Rock classification is based on drilling characteristics and visual observation of disturbed samples. Core samples may reveal other rock types.

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS

▽ **Dry W.D.**

▼ **Dry A.B.**

Backfilled @ Completion

GEOSOURCE Your Source for Geotechnical and Materials Engineering

BORING STARTED	**12-19-14**		
BORING COMPLETED	**12-19-14**		
RIG	**CME-55**	DRILLER	**MC**
APPROVED	**JJZ**	JOB #	**D14G1399**

JCSBC
2-2-2016
Att.9G.--1111

BOREHOLE INFORMATION	Page 1 of 1
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY	**GeoSource, LLC**
METHOD **4-inch Flight Augers**	HAMMER **Auto**

LOG OF BORING NO. B-15

PROJECT NAME	**Proposed Kansas Energy & Service Center**
SITE LOCATION	**SW 7th Street and Van Buren Street** **Topeka, Kansas**
OWNER / ARCHITECT	**State of Kansas / HTK Architects**

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	GRAPHIC LOG	DEPTH, Feet.	MATERIAL DESCRIPTION Approx. Surface Elevation: 920.2
	PA									**Asphaltic Concrete (4")**
1	SS	18	14	*1000		19.7	CL CH			**FILL**, lean to fat clay, soft, to medium stiff, dark gray brown, tan and brown mixed, with some gravel and miscellaneous construction rubble
	PA									
2	SS	14	55/8"			27.4	CL CH		4.7	915.5
	PA								5	**RUBBLE FILL**, brick, cinders, limestone or concrete debris in a clay matrix
									6.5	913.7
										AUGER REFUSAL @ 6.5 FEET

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS	
∇ 0.3	feet W.D.
▼ 0.8	feet A.B.
Backfilled @ Completion	

GEOSOURCE
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BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

BOREHOLE INFORMATION	Page 1 of 1
STATION	OFFSET
NORTHING	EASTING
DRLLING COMPANY	GeoSource, LLC
METHOD 4-inch Flight Augers	HAMMER Auto

LOG OF BORING NO. B-16

PROJECT NAME	Proposed Kansas Energy & Service Center
SITE LOCATION	SW 7th Street and Van Buren Street Topeka, Kansas
OWNER / ARCHITECT	State of Kansas / HTK Architects

SAMPLE NO.	SAMPLE TYPE	RECOVERY	STANDARD PENETRATION BLOWS/FT.	UNCONFINED STRENGTH PSF	DRY DENSITY PCF	MOISTURE CONTENT, %	UNIFIED SOIL SYMBOL	GRAPHIC LOG	DEPTH, Feet.	MATERIAL DESCRIPTION (Approx. Surface Elevation: 929.0)
	PA									Asphaltic Concrete (5")
1	ST	8		5990	106	13.4	CL		2.5	**FILL**, lean clay, very stiff, light brown, trace fine sand — 926.5
2	ST	13		4570	105	22.9	CL CH		5 / 5.5	**FILL**, lean to fat clay, very stiff, brown — 923.5
	PA									**FAT CLAY**, very stiff, light brown to gray brown mottled rust and light gray
3	SS	18	8	*4500		20.6	CH		10 / 10.0	919.0
										BOTTOM OF BORING

* Calibrated Penetrometer ** Rock Strength in psi

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ the transition may be gradual.

WATER LEVEL OBSERVATIONS	
∇ Dry W.D.	
▼ Dry A.B.	
Backfilled @ Completion	

GeoSource
Your Source for Geotechnical and Materials Engineering

BORING STARTED	12-18-14		
BORING COMPLETED	12-18-14		
RIG	CME-55	DRILLER	MC
APPROVED	JJZ	JOB #	D14G1399

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-98)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI>4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

BEDROCK AND OTHER MATERIAL SYMBOLS

Weathered Shale	Topsoil
Shale	Asphaltic Concrete
Seamy Limestone	Concrete
Joint or Void	Fill
Limestone	Rubble or Debris Fill
Weathered Sandstone	Boulders and Cobble
Sandstone	Granular Baserock
Coal	Lean to Fat Clay

BEDROCK PROPERTIES & DESCRIPTIONS

ROCK QUALITY DESIGNATION

DESCRIPTION	RQD (%)
Very Poor	0 - 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90
Excellent	90 -100

BEDDING CHARACTERISTICS

TERM	THICKNESS (inches)
Massive	> 60
Very Thick Bedded	36 - 60
Thick Bedded	12 - 36
Medium Bedded	4 - 12
Thin Bedded	1 - 4
Very Thin Bedded	0.4 - 1
Laminated	< 0.4

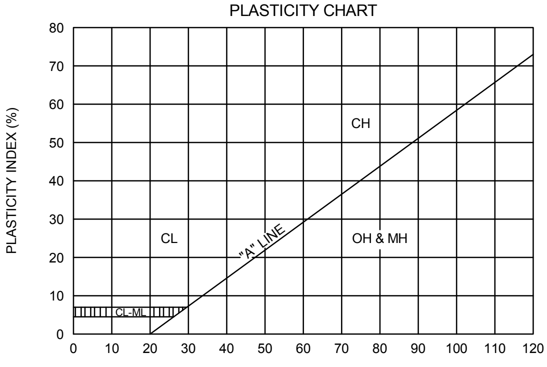
DEGREE OF WEATHERING

Slightly Weathered - Slight decomposition of Parent material in joints and seams.
Weathered - Well-developed and decomposed joints and seams.
Highly Weathered - Rock highly decomposed, may be extreemly broken.

BEDROCK DISCONTINUITIES

Bedding Planes — Planes dividing the individual layers, beds or strata of rocks.
Joints — Fractures in rock, generally more or less vertical to the bedding.
Seams — Applies to bedding planes with an unspecified degree of weathering.

PLASTICITY CHART



PENETRATION RESISTANCE
(RECORDED AS BLOWS / 0.5 FT)

SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	COMPRESSIVE STRENGTH (TSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.50
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.50 - 1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

GEOSOURCE
Your Source for Geotechnical and Materials Engineering

General Notes and Terms

BORING LOG SYMBOLS

SURFACE MATERIALS

- TOPSOIL
- FILL MATERIAL
- ASPHALTIC CONCRETE
- CONCRETE
- GRANULAR BASE

COHESIVE SOILS

- SILT
- CLAYEY SILT
- LEAN CLAY
- LEAN TO FAT CLAY
- FAT CLAY

LARGE GRANULAR SOILS

- CLAYEY GRAVEL
- SILTY GRAVEL
- POORLY GRADED GRAVEL
- WELL GRADED GRAVEL
- COBBLES & BOULDERS

GRANULAR SOILS

- SANDY SILT
- SILTY SAND
- FINE SAND
- POORLY GRADED SAND
- WELL GRADED SAND
- GRAVELLY SAND

BEDROCK UNITS

- SHALE
- FISSILE SHALE
- SANDSTONE
- LIMESTONE
- COAL

WEATHERED BEDROCK

- JOINT OR VOID
- WEATHERED SHALE
- WEATHERED SANDSTONE
- WEATHERED LIMESTONE

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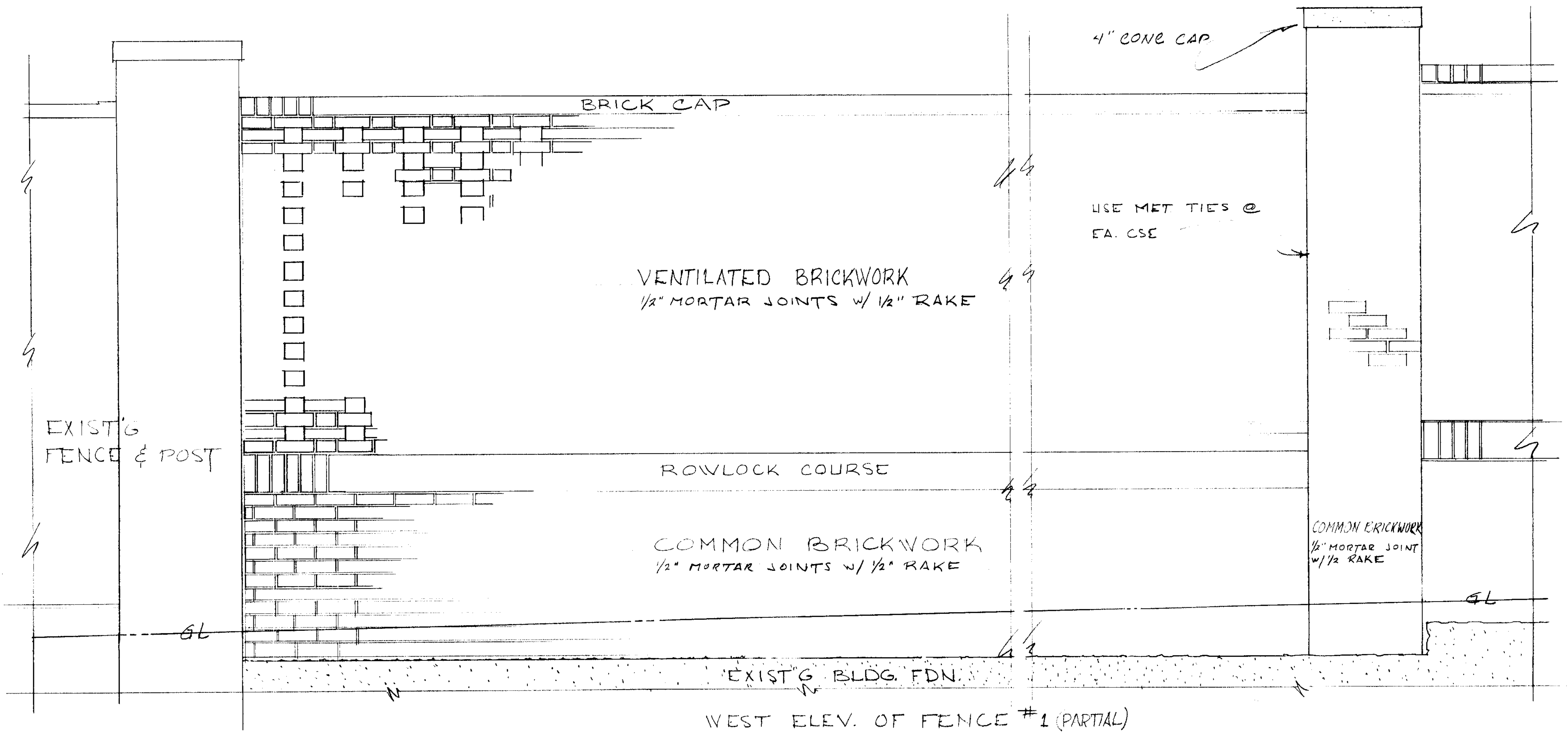
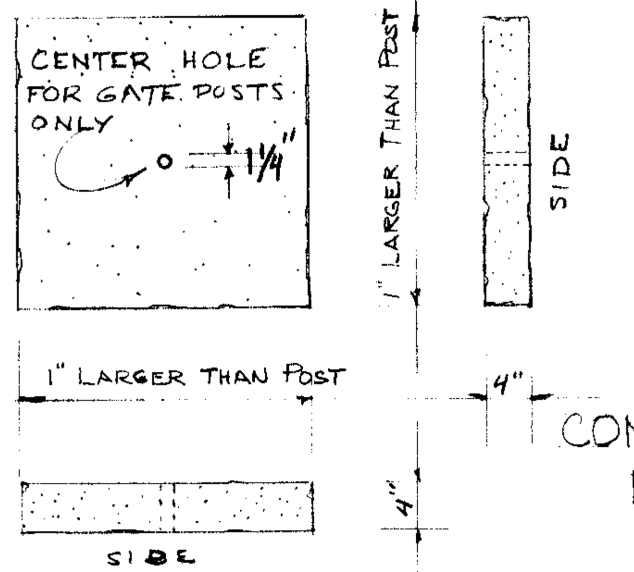


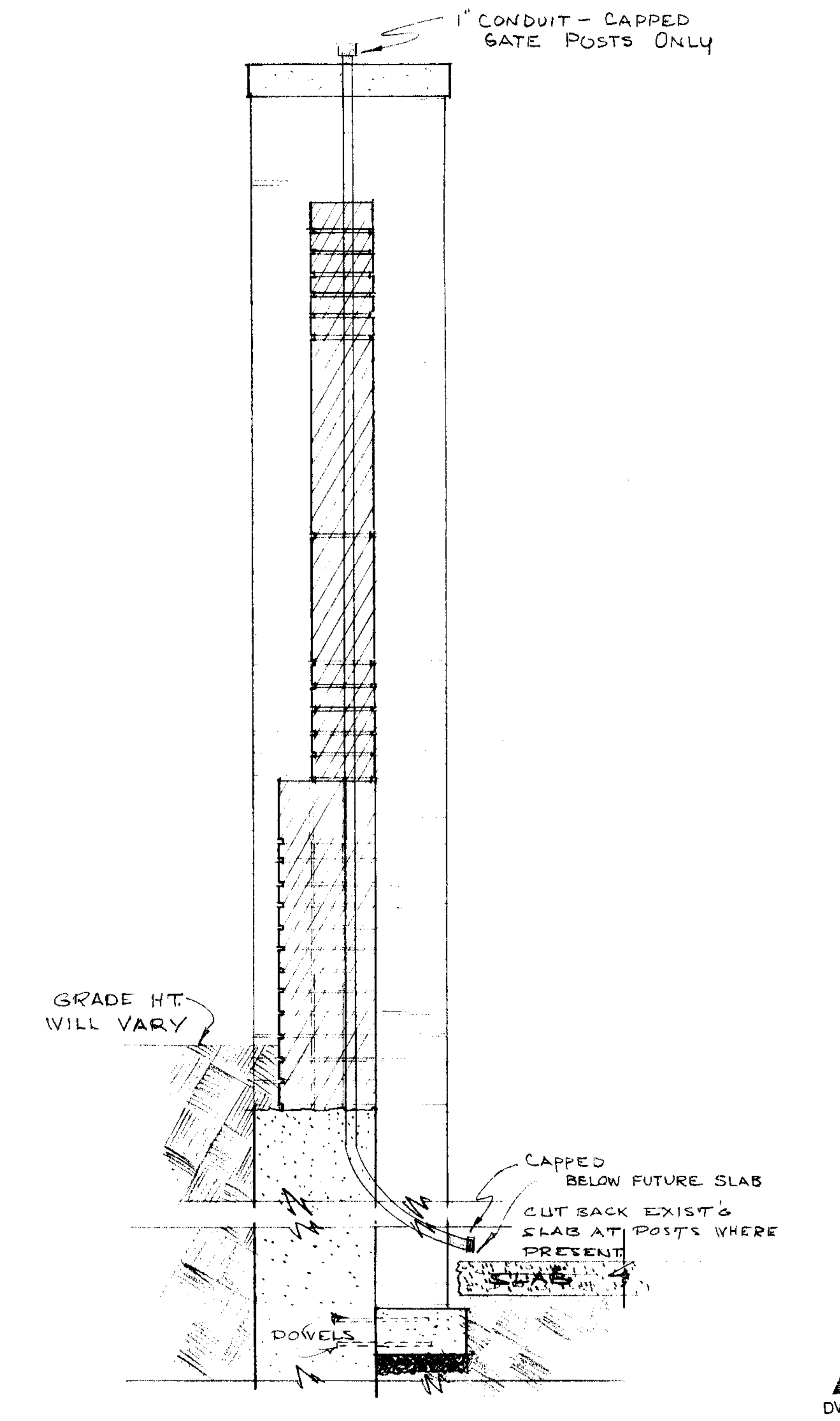
WEST ELEV. OF FENCE #1 (PARTIAL)

TYPICAL BRICKWORK ELEVATION

3/4" = 1'-0"



CONC POST CAP
DETAIL
NO SCALE



TYPICAL SECTION
SCALE 3/4" = 1'-0"

BRICK FENCE
DET'S.
SCALE 3/4" = 1'-0"

B-1105(B)

VAN BUREN PLANT FENCE

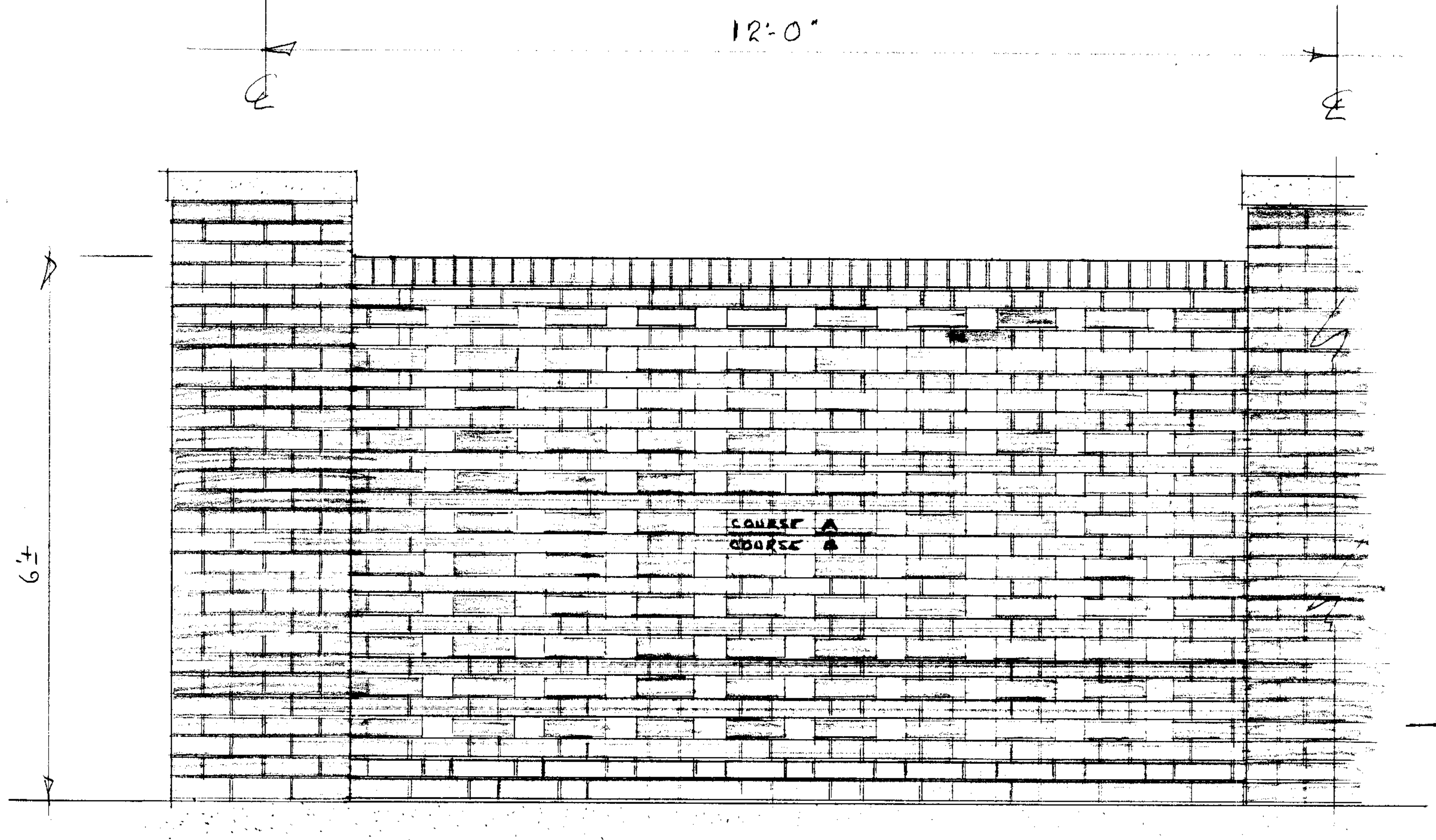
KPL

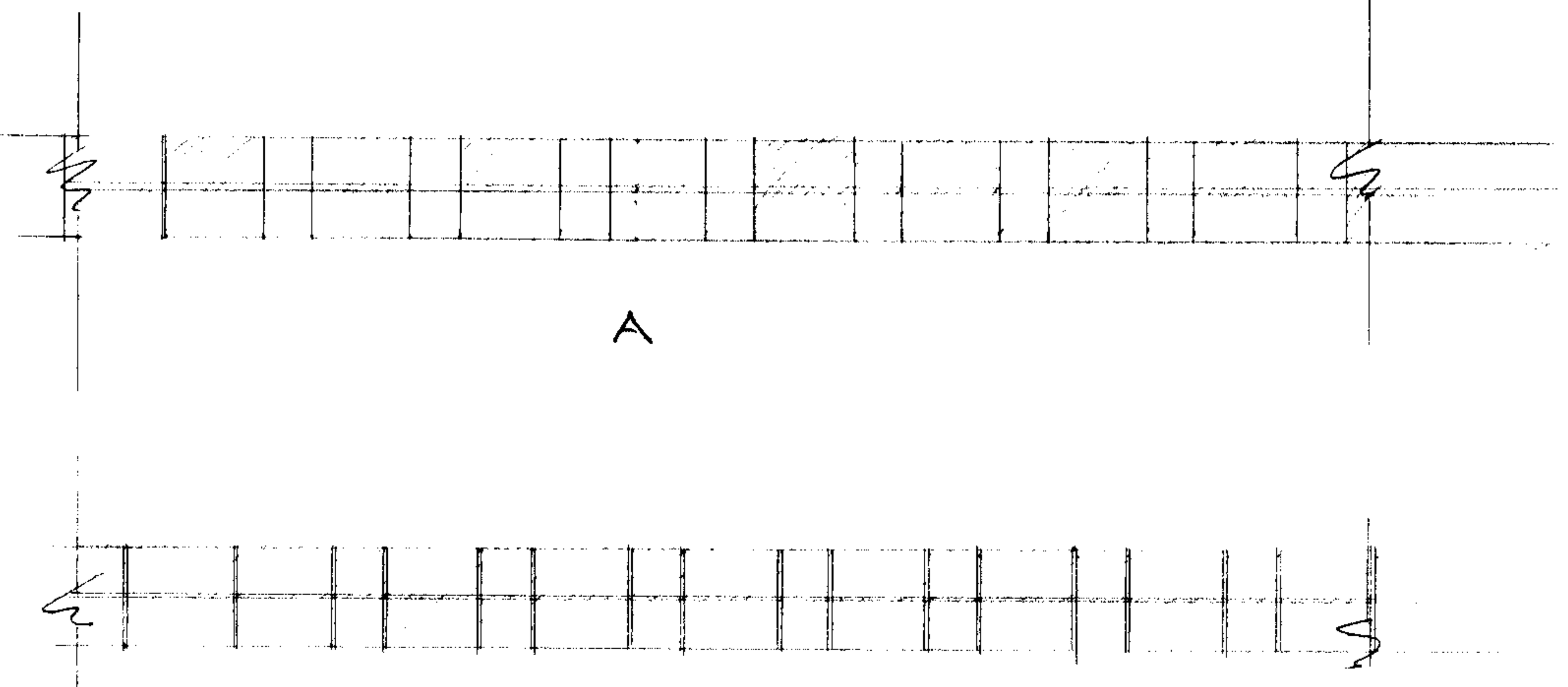
3/3


4" CONC. CAP
BRICK CAP
VENTILATED BRICKWORK
1/2" MORTAR JOINTS W/ 1/2" RAKE
TIE NEW FENCE TO EXIST'G POST @ EACH COURSE BY METAL STRIPS
TIE FENCE TO POST EVERY COURSE BY METAL STRIPS
EXIST'G FENCE & POST
FENCE # 1
POST # 1
COMMON BRICKWORK
1/2" JOINTS WITH 1/2" RAKE
ROWLOCK COURSE
1/2" MORTAR JOINTS W/ 1/2" RAKE
GL
COMMON BRICKWORK
1/2" MORTAR JOINTS, FLUSH
EXIST'G. FOUNDATION
WEST ELEV OF FENCE # 1
TYPICAL BRICKWORK
3/4" = 1'-0"
NORTH
CENTER HOLE FOR POSTS 3, 4, 6 + 8.
1 1/4" ϕ
25"
SIDE
TOP
25"
4"
SIDE
CONC. POST CAP DETS.
3/4" = 1'-0"
P-1
P-2
P-3
P-4
P-5
P-6
P-7
P-8
P-9
P-10
F-1
F-2
F-3
F-4
F-5
F-6
F-7
G-1
G-2
G-3
PLAN 1/8" = 1'-0"
EXIST'G FENCE & POST
D.O.
EXIST'G FOUNDATION
20'
20'
26'
22'
61'
18'
2'
18'
2'
18'
2'
4'
2'
20'
2'
22'
2'
12'
2'
12'
2'
7'
2'
149'
WEST ELEVATION 1/8" = 1'-0"
2'
6'
2'
10'
SOUTH ELEVATION 1/8" = 1'-0"
Scanning America
DWG_LABEL
FM013276
SUPERCEDED
1105 (13)

SECTION A A
SCALE 1½" = 1'-0"
SECTION THRU
RETAINING WALL
SCALE 1½" = 1'-0"
TOP OF BRICK ELEV 106'4"
ELEV 107'
ELEV 107'
ELEV 107'8"
ELEV 108'4"
ELEV 108'4"
EXIST'G FENCE
AND POST
ELEV 101'8"
96'
TOP OF BRICK ELEV 99'0"
TOP OF BRICK ELEV 99'-8"
ELEV 100'4"
ELEV 101'0"
APROX GRADE
150'
EXISTING FOUNDATION
WEST ELEV
SCALE 1/8" 1'-0"
REMOVAL OF FOUNDATION ABOVE
APPROXIMATE LINE AS SHOWN BY
OTHERS.
PICKET FENCE
ELEV.
SCALE 1/8" = 1'-0"
DWG_LABEL
FM013277
B-1104 (P)
VAN BUREN PLANT FENCE
9/13/67
2/2


PLAN
GATE
GATE
BLDG
2'x2 COLS
FENCE DETAIL
SCALE 3/4" = 1'-0"
2%
CONNECTION A
CONN. B
CONNECTIONS
6'-0"
5'-9"
5/8" SQUARE RODS 6" C-C
2" CHANNEL
2%
2%
GRADE 2%
GATE
GATE
EXIST BRICK FENCE CUT DOWN 3'6" OFF TOP
31'-0"
30'
30'
15
12'
33'
12'
18'
150'0"
WEST ELEVATION OF FENCE
Scale 1/8" = 1'-0"
FENCE FOR VAN BUREN STREET PLANT
24 JUNE 57
SUPERCEDED
Ref Drwg 1104 (P)





TYPICAL DETS.
SCALE 3/4" = 1'-0"

SECTION IN PLAN
OF ALTERNATE COURSES
SCALE 3/4" = 1'-0"

WEST ELEV.
SCALE 1/8" = 1'-0"

A FENCE FOR VAN BUREN PLANT

SUPERCEDED
Ref Dwg 1105(B)

THE KANSAS POWER AND LIGHT COMPANY

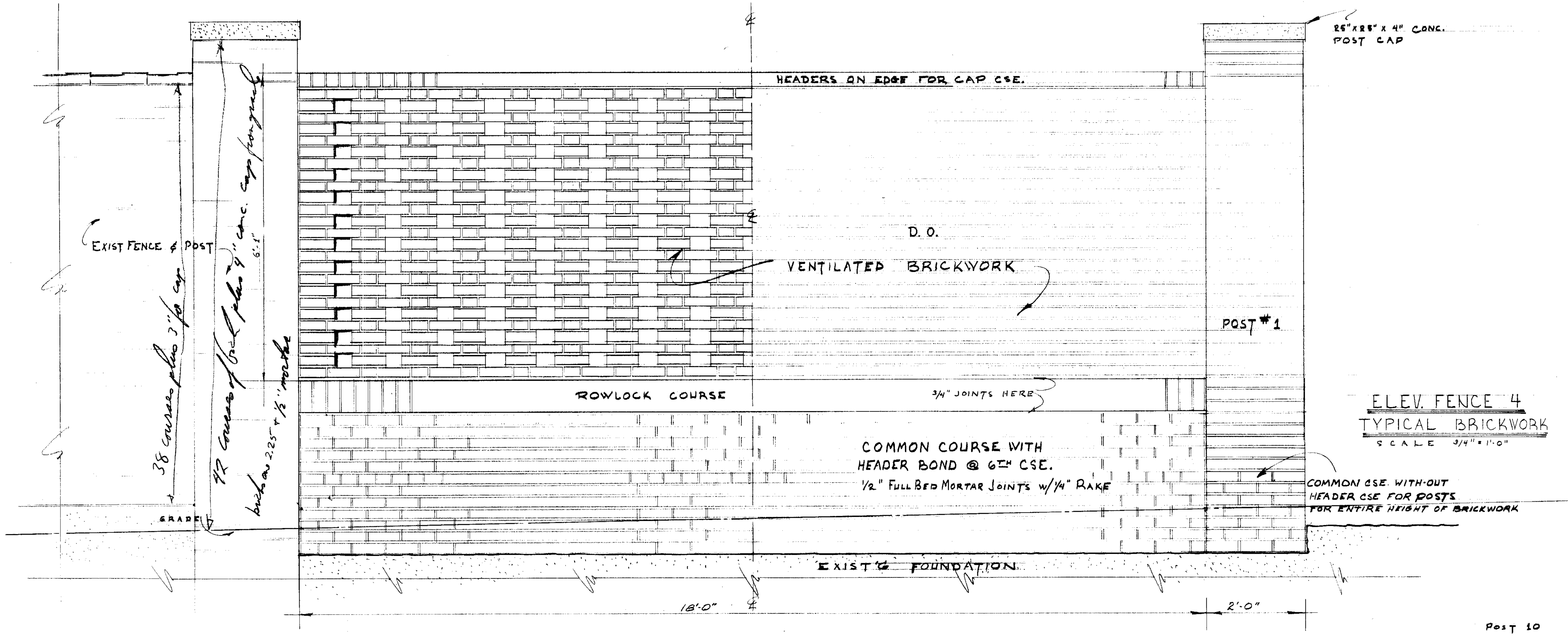
DUANE D. GOODRICH
18 JULY 57

PLAN
31'-0"
124'-0"
26'-0"
BLDG.
dead on setback code
2'x2' BRICK COLS.
5/8" STEEL BARS - SQUARE ON 2" CHANNELS. BARS 6" C.C.
EXIST. FENCE
EXIST. FDN
GRADE
6'-0"
31'
10'
2'
4'
8'
150'-0"
124' OF EXIST. FOUNDATION
WEST ELEVATION OF FENCE
SCALE 1/8" = 1'-0"
SUPERCEDED
Ref Dwg 1104 P

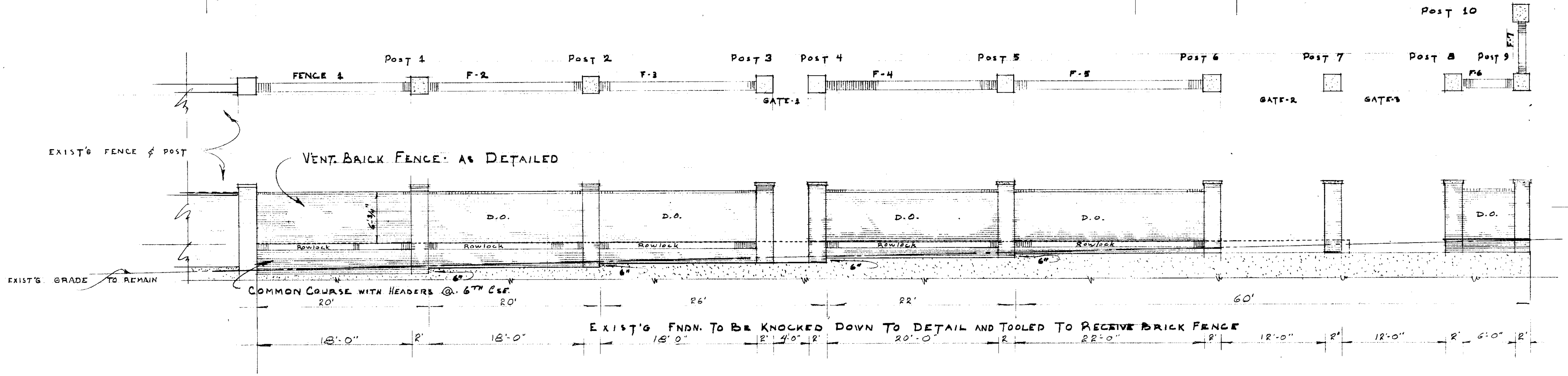
BLDG
3' WOVEN WIRE MESH
GRADE - 2%
31'
150'-0"
Scanning America
DWG_LABEL
FM013281
SUPERSEDED
Ref Dwg
1104(P)

6" C TO C
4" CONC. CAP
12"
4'-3"
9"
EXIST'G
FENCE & POST
ROWLOCK COURSE
RUN EVERY SIXTH LEG 6" INTO MASONRY
ROWLOCK COURSES WILL VARY
BY TWO BRICK COURSES EACH BAY
COMMON BRICKWORK
1/2" MORTAR JOINTS W/ 1/2" RAKE
GL
GL
TYPICAL ELEVATION
3/4" = 1'-0"
CENTER HOLE
FOR GATE POSTS
ONLY
1 1/4"
TOP
2'0"
SIDE
4"
SIDE
CONC POST CAP
DETAIL
SCALE 3/4" = 1'-0"
HOOK ANCHOR TO POST
AND GROUT
PICKET CONST.
DETAILS
SCALE 3" = 1'-0"
SECTION
5/8" x 2" BAR
PLAN
1/2" x 1/2" BAR
ELEV
RUN LEG 6" INTO MASONRY
AND GROUT
CAP
1" Ø CONDUIT
AT GATE POSTS ONLY
1'-0"
4'-4"
GRADE HT.
WILL VARY
BRING CONDUIT OUT
AT 9" ABOVE FIN. GRADE
CUT BACK EXIST'G SLAB
AT POSTS WHERE PRESENT
EXISTING FOUNDATION
EXIST SLAB
DOWELS
TYPICAL SECTION
SCALE 3/4" = 1'-0"
DWG_LABEL
FM013282
PICKET FENCE
DET'S.
SCALE 3/4" = 1'-0"
B-1104 (P)
9/13/67
VAN BUREN PLANT FENCE
3/2

SEC BB
SIDEWALK ELEV
POST FOUNDATIONS
BY OTHERS
100'
71'
NEW BUILDING
ELEV. 100
ELEV. 96
ELEV 100
RETAINING WALL
To Height of Bldg Floor
ELEV. 100
FILL
ELEV. 100
EXIST'G SLAB
HOOK ANCHOR BOLTS
FOR HINGES
GATE ISLAND
SCHOOL BLDG
ALLEY
EXIST'G FENCE & GATE
NEW FENCE #1
NEW GATE #1
NEW FENCE #2
NEW GATE #2
NEW GATE #3
NEW FENCE #3
ELEV 107.5
ELEV. 99
32'
22' 8"
150'
11' 8"
SIDEWALK
ALLIGN WITH EXISTING
BRICKWORK
TOWER & BASE
SEC. AA
SEC CC
SEC DD
SIDEWALK
ELEV 96
EXIST'G FOUND.
ANCHOR TO EXIST'G
WALL
#6 BARS 8" OC
BOTH WAYS
SIDEWALK ELEV
SIDEWALK
OR ALLEY
ELEV.
SCALE 3/8" = 1'0"
DWG_LABEL
FM013283
BRICK FENCE
PLAN
SCALE 1/8" = 1'-0"
B-1105(B)
VAN BUREN PLANT FENCE
KPL
DUANE D. GOODRICH
9/13/57
1/3



ELEV. FENCE 4
TYPICAL BRICKWORK
SCALE 3/4" = 1'-0"

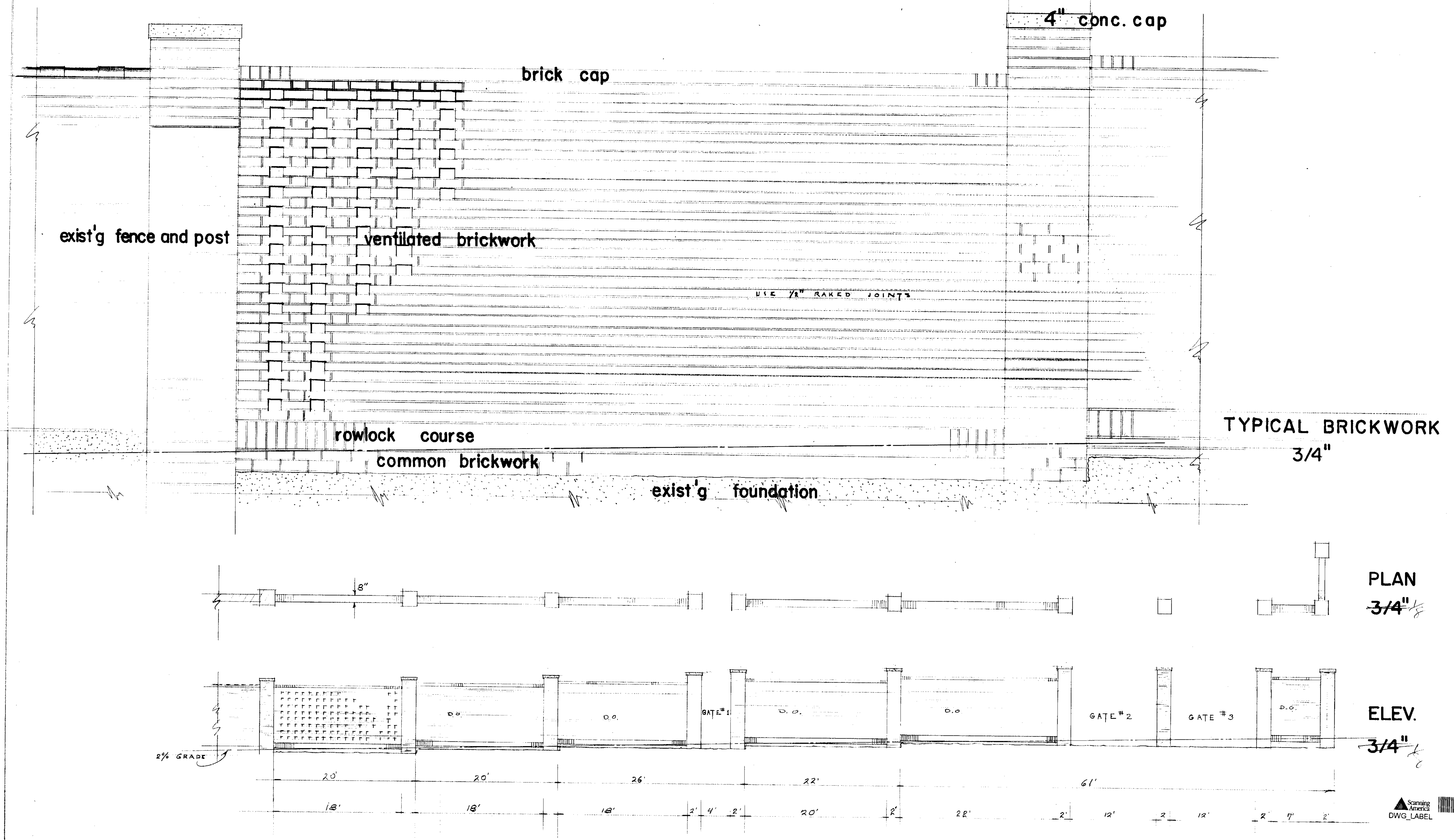


PLAN
SCALE 1/8" = 1'-0"

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

DWG_LABEL FM013284

SUPERCEDED
Ref Dwg
1105 (13)



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1105 (13)

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A FENCE FOR THE VAN BUREN PLANT

THE KANSAS POWER AND LIGHT COMPANY

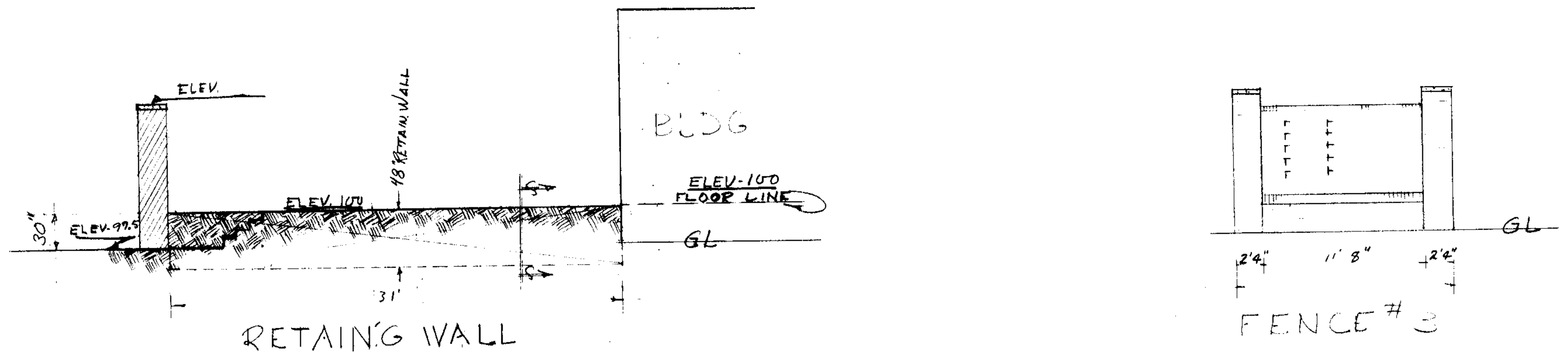
DUANE D. GOODRICH

D. D. Goodrich 28 AUG 57

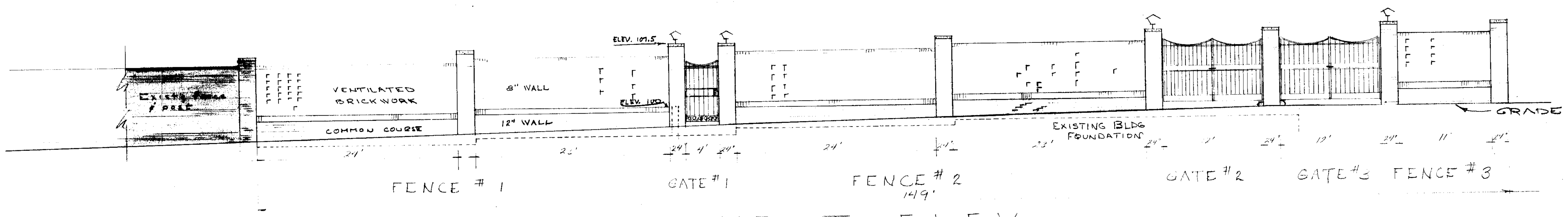
VAN BUREN PLANT FENCE

B-1104 (P)

1/3



SOUTH ELEV.
SCALE 1/8" = 1'-0"



WEST ELEV.
SCALE 1/8" = 1'-0"

BRICK FENCE
ELEV.
SCALE 1/8" = 1'-0"

B-1105(B)

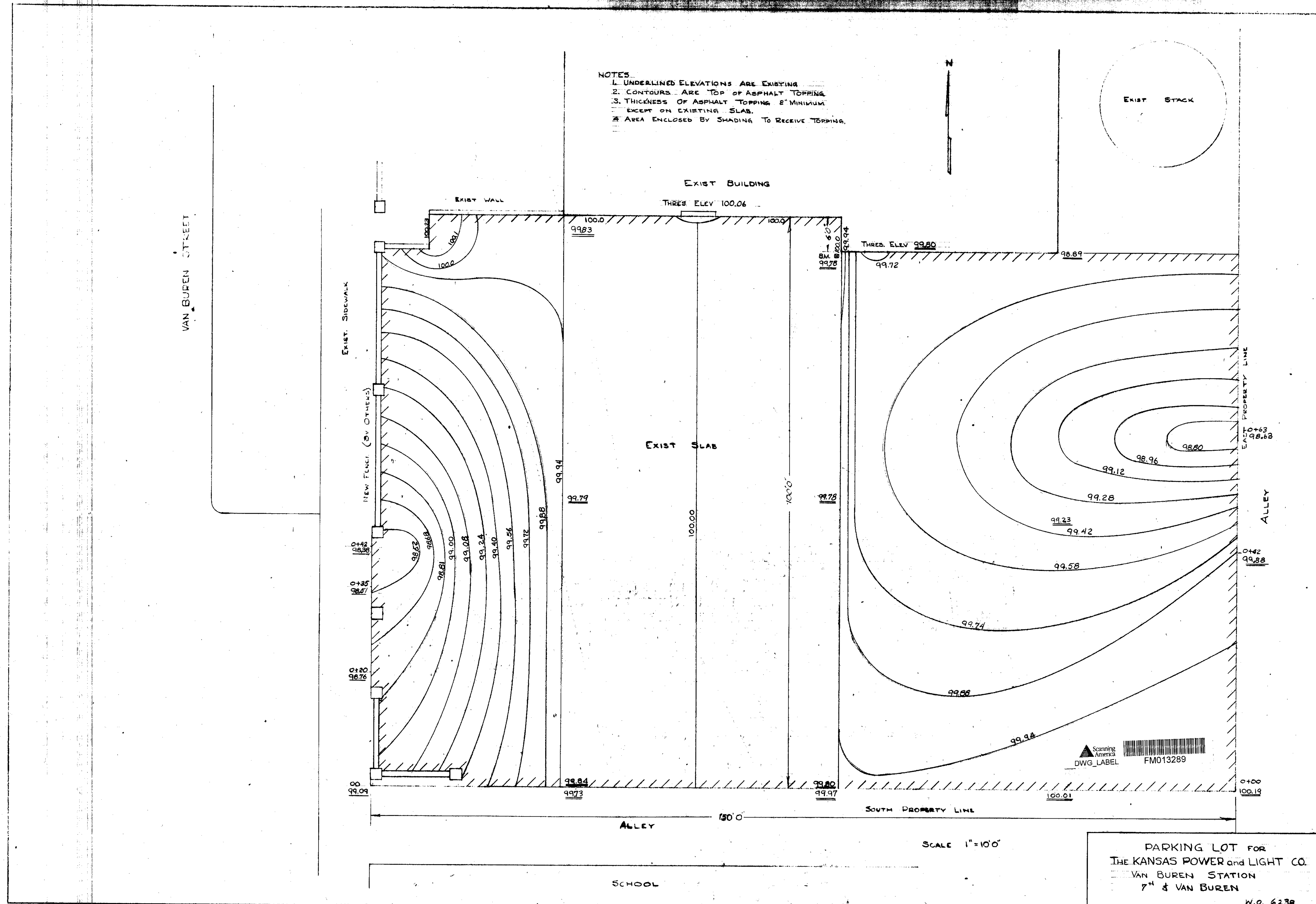
VAN BUREN PLANT FENCE

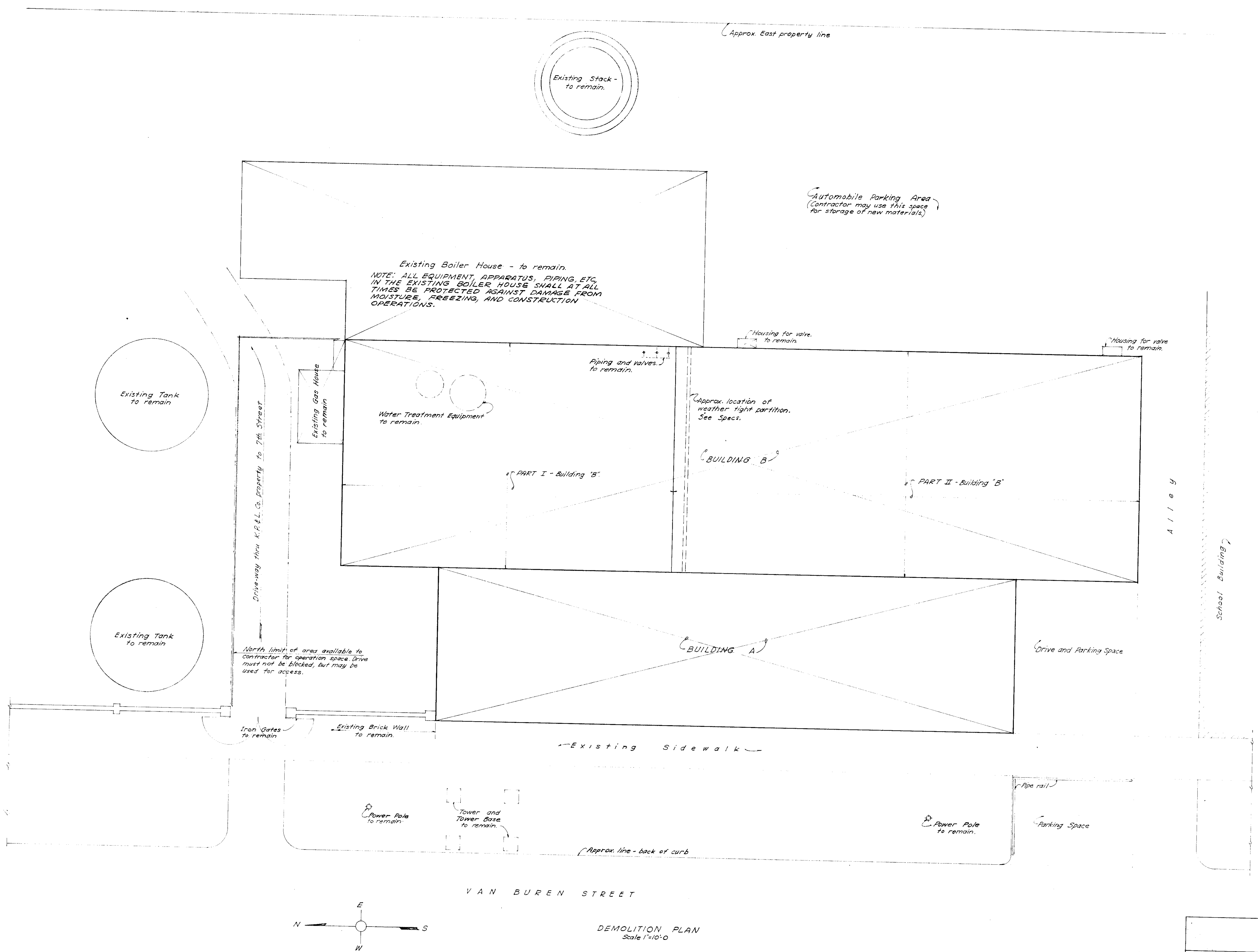
KPL

DUANE D. GOODRICH

9/3/57

2/3


NOTES
1. UNDERLINED ELEVATIONS ARE EXISTING
2. CONTOURS ARE TOP OF ASPHALT TOPPING
3. THICKNESS OF ASPHALT TOPPING 2" MINIMUM EXCEPT ON EXISTING SLAB.
4. AREA ENCLOSED BY SHADING TO RECEIVE TOPPING.
N
EXIST STACK
EXIST BUILDING
EXIST WALL
THRES ELEV 100.06
THRES. ELEV 99.80
VAN BUREN STREET
EXIST. SIDEWALK
NEW FENCE (BY OTHERS)
EXIST SLAB
EAST PROPERTY LINE
ALLEY
SOUTH PROPERTY LINE
ALLEY
150'0"
100'0"
SCHOOL
SCALE 1"=10'0"
PARKING LOT FOR
THE KANSAS POWER and LIGHT CO.
VAN BUREN STATION
7TH & VAN BUREN
W.O. 6238
FM013289



DEMOLITION PLAN
Scale 1"=10'-0

GENERAL NOTE - DEMOLITION

Buildings shall be razed to the level of existing floor slabs. Building materials, plumbing, heating, and electrical fixtures in place in buildings A and B, shall become the property of the contractor. All shop equipment of The Kansas Power and Light Co., located in Part II of Building B, shall be relocated by the owner in the new building which replaces Part I of Building B, prior to razing of Part II of Building B.

All electrical equipment and apparatus now in place in Buildings A and B, necessary for operation of the power station, remains the property of the owner, and shall be removed by the owner from Buildings A and B prior to the start of this contract.

The 20-ton crane located in Part I of Building B remains the property of the owner, and shall be removed by the owner prior to the start of this contract. The crane rails and crane beams become the property of the contractor.

The owner shall be responsible for the cut-off of the following utilities: water, gas, and electricity.

All sewers not to be reused, shall be plugged at the property line in a manner approved by the City Plumbing Inspector.

Floor drains in existing floor slabs to be exposed to weather shall be plugged.

See Specifications.

DEMOLITION PROCEDURE

1. Install wind bracing in present roof system of existing Boiler House.
2. Raze building A.
3. Raze Part I of Building B.
4. Construct new building in place of Part I, Building B.
5. Raze remaining portion of Building B.

Note: Any changes in the above procedure are to be approved by the owner.

PROTECTION OF EQUIPMENT

The following items shall remain in place as operating equipment of the owner. It is the contractor's responsibility to protect this equipment during the demolition and construction.

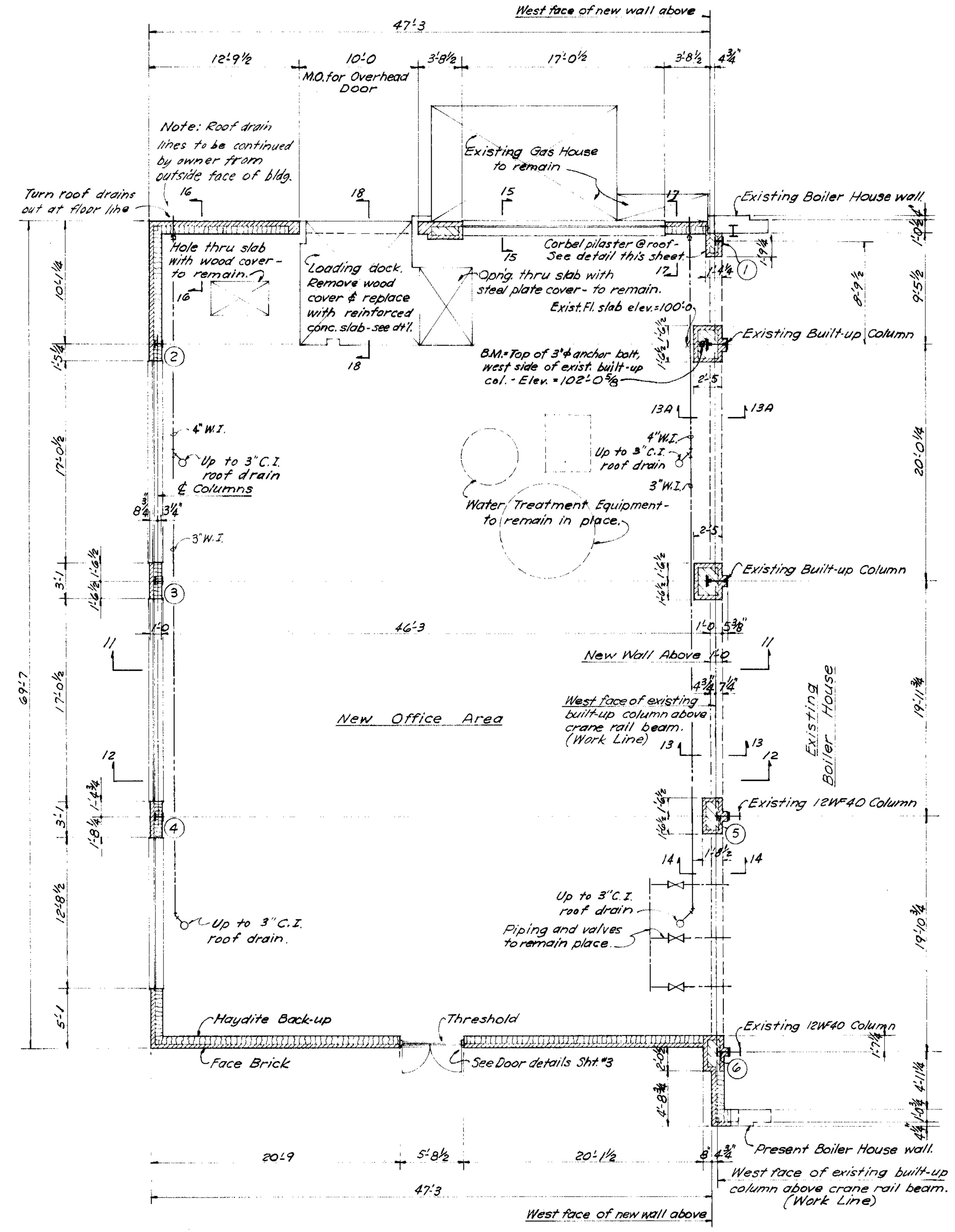
1. Water treatment equipment located in Part I of Building B.
2. Valves and piping at S.E. corner of Part I of Building B.
3. Valves adjacent to East wall of Part II, Building B. Valves are near grade line, one in S.E. corner, and one in N.E. corner near existing Boiler House.
4. Floor slabs and slabs over tunnels or basement.
5. Existing piping and equipment along or attached to the east face of west Boiler House wall which is to be replaced.

REMODELING OF THE KANSAS POWER AND LIGHT COMPANY'S VAN BUREN STATION AT 7TH AND VAN BUREN STREETS, TOPEKA, KANSAS

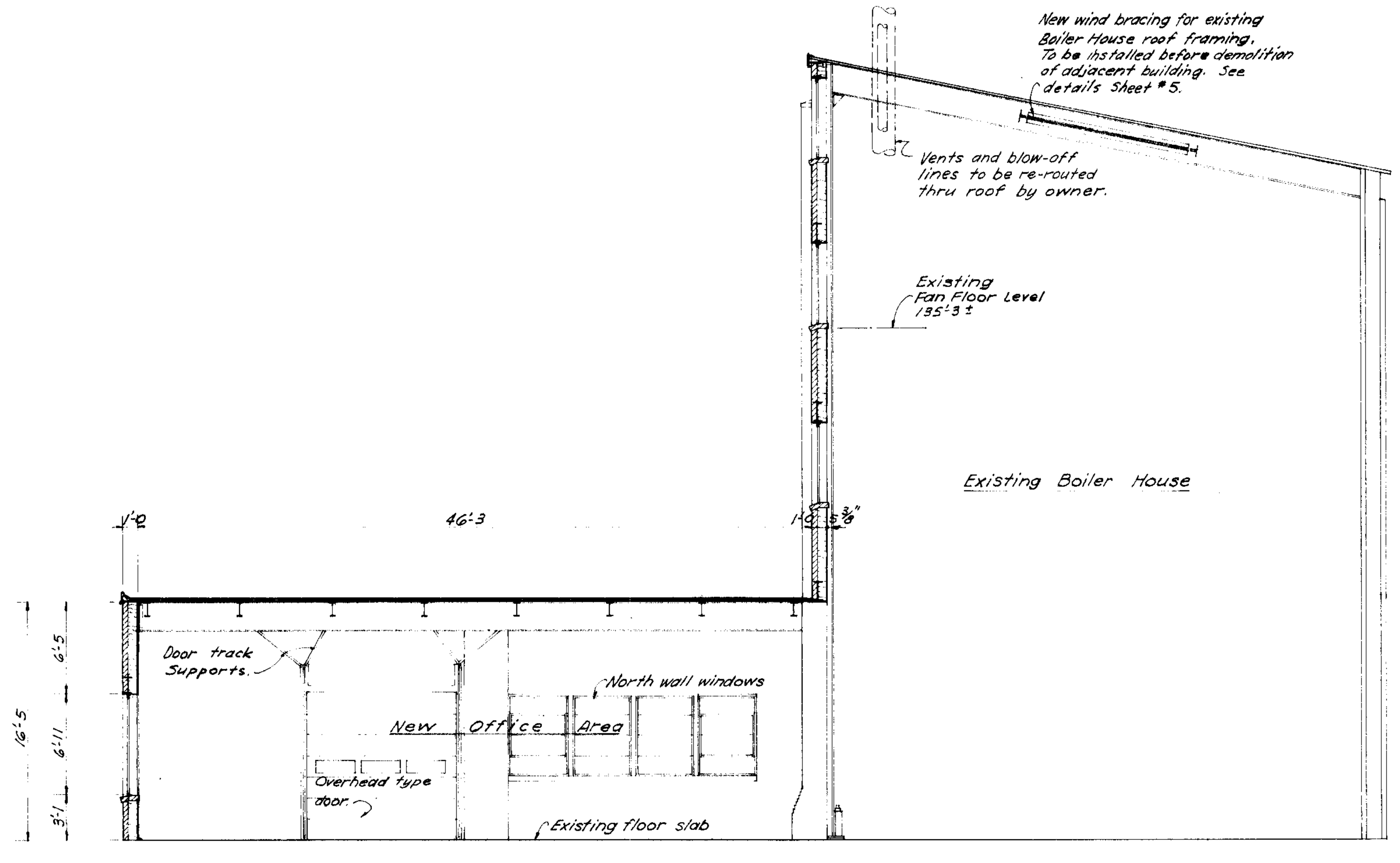
Finney & Turnipseed
603 Topeka Ave.
Consulting Engineers
Topeka, Kansas

Date - May 21, 1957

SHEET NO. 1 of 5



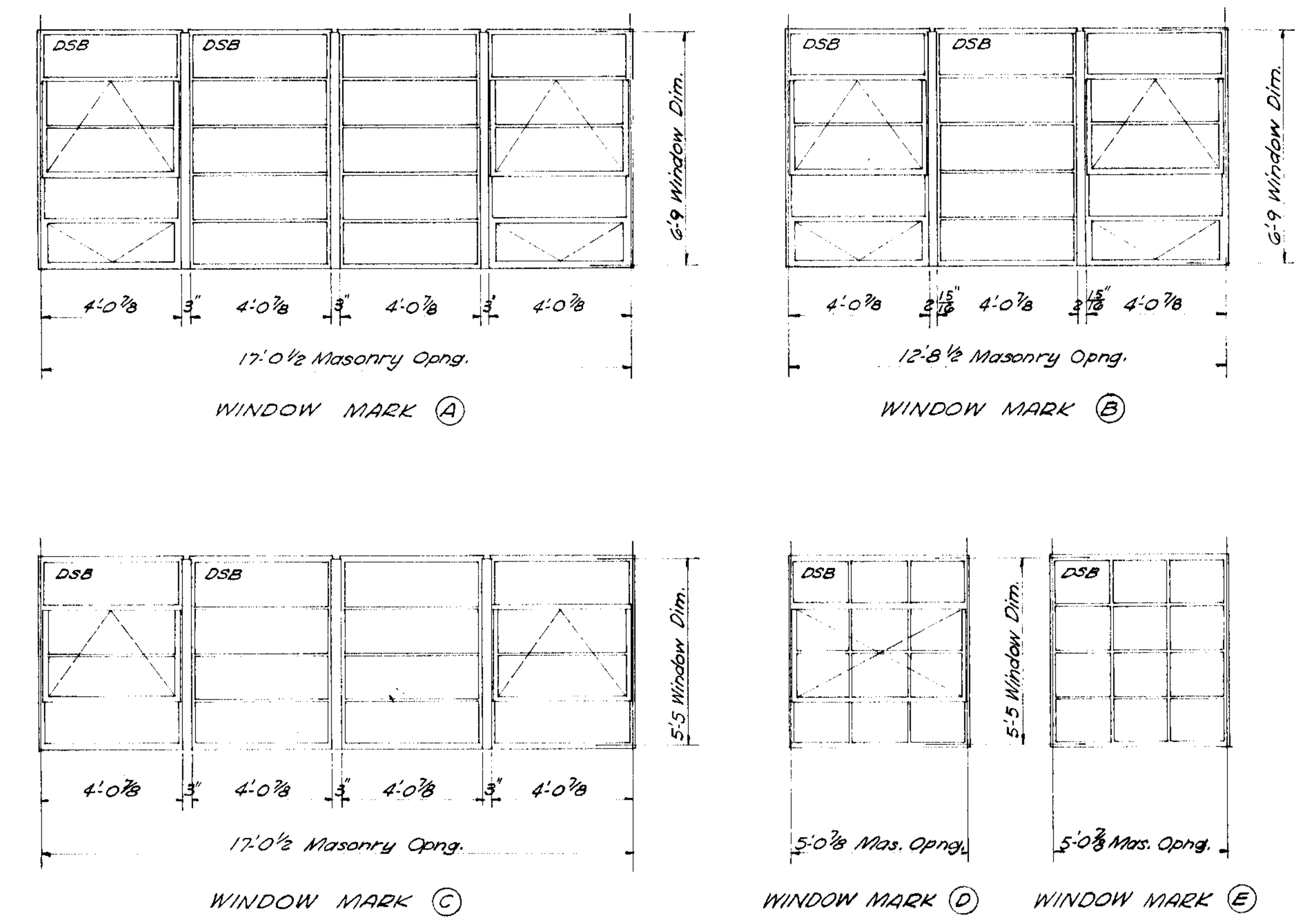
PLAN - FIRST FLOOR
Scale 1/8" = 1'-0
Note: See sheet #3 for section details.



SECTION 11-11
Scale 1/8" = 1'-0

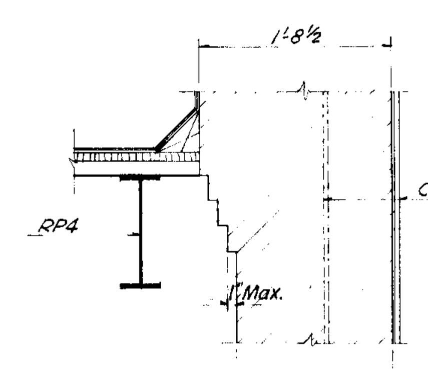
GENERAL NOTES

All dimensions shall be verified on the job.
See Sheet No. 1 for demolition.
New wind bracing for existing Boiler House roof framing shall be installed prior to demolition of adjacent building.
The Contractor shall be responsible for protection of existing equipment, piping, etc., that is to remain in place. Adequate shoring, bracing, etc., shall be provided to make the existing Boiler House safe during demolition and construction stages.

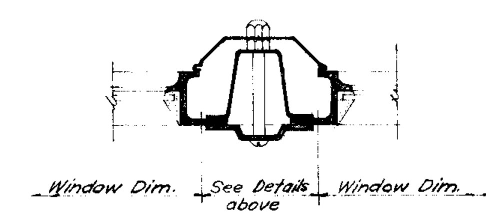


WINDOW MARK (A)
WINDOW MARK (B)
WINDOW MARK (C)
WINDOW MARK (D)
WINDOW MARK (E)

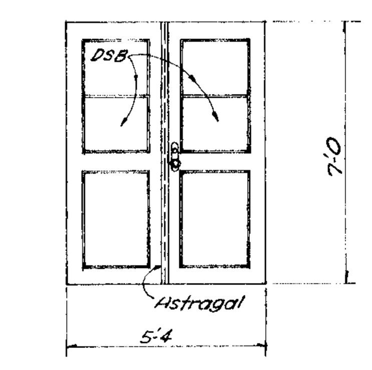
NOTE: Windows, Marks (A), (B), and (C) shall be Architectural Projected steel windows.
Windows, Marks (D) and (E) shall be Horizontally Pivoted steel windows.
All operating sash of windows, Mark (A), (B), and (C) shall be provided with solid bronze, bronze lacquered, cam acting lock handle.
Four (4) windows Mark (D) (top tier) shall be provided with a spring lock, roller bracket, and 14'-0 of chain for operating sash.
Four (4) windows Mark (D) (at Fan Floor level) shall be provided with push bar for operating sash.
See Specifications.



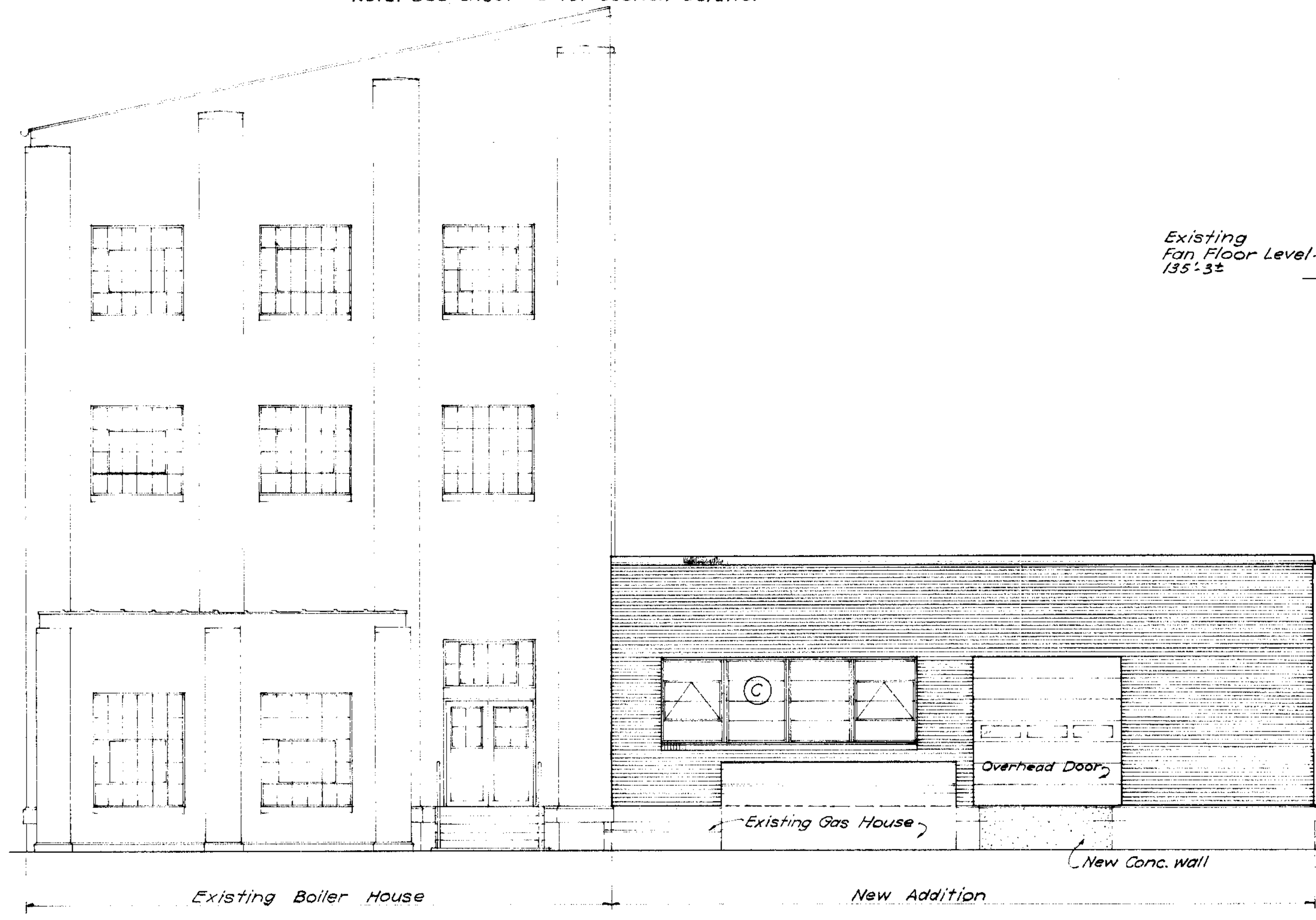
DETAIL - CORBEL OF PILASTER THRU ROOF AT COLUMN NO. 1



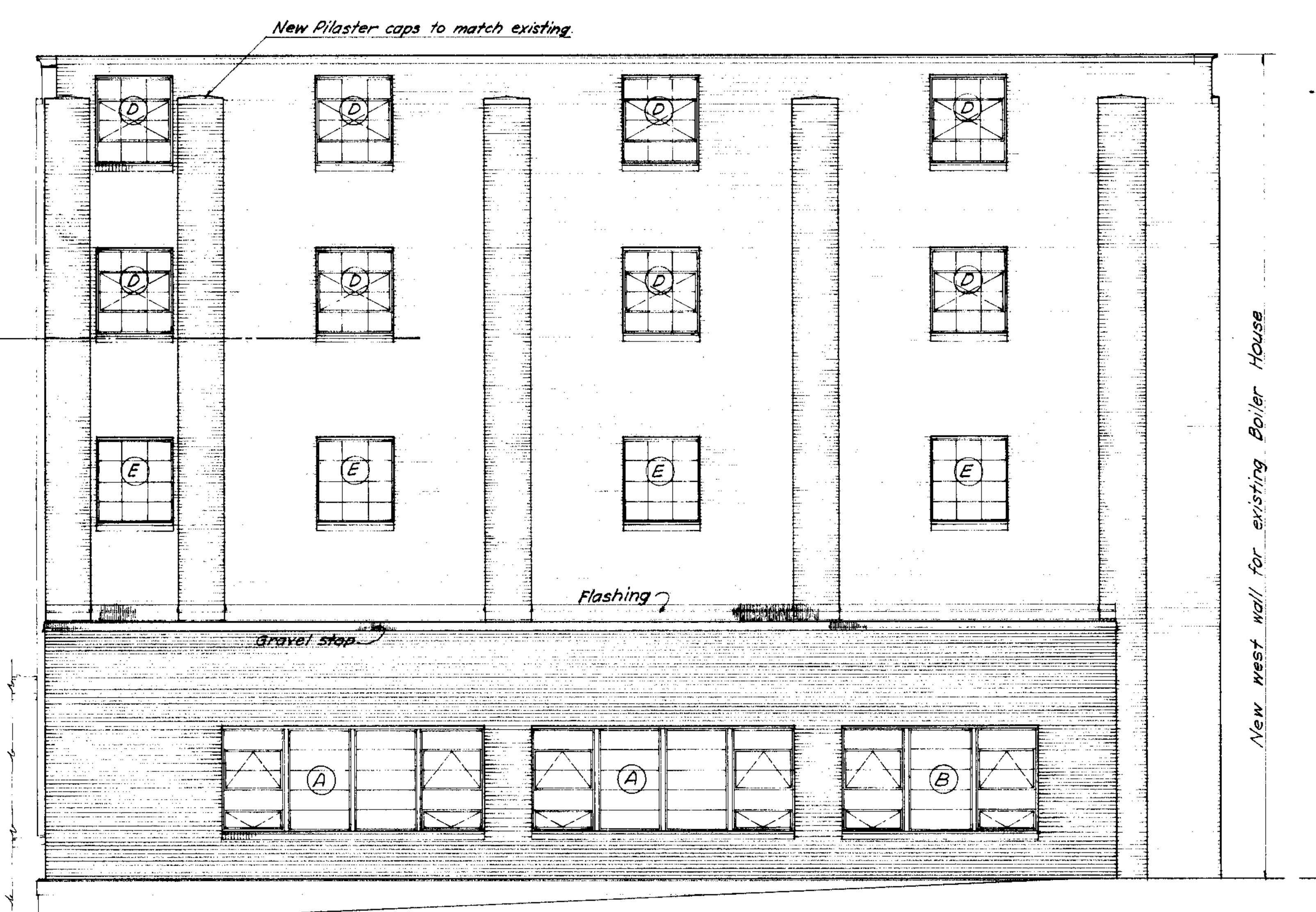
TYPICAL WINDOW MULLION DETAIL



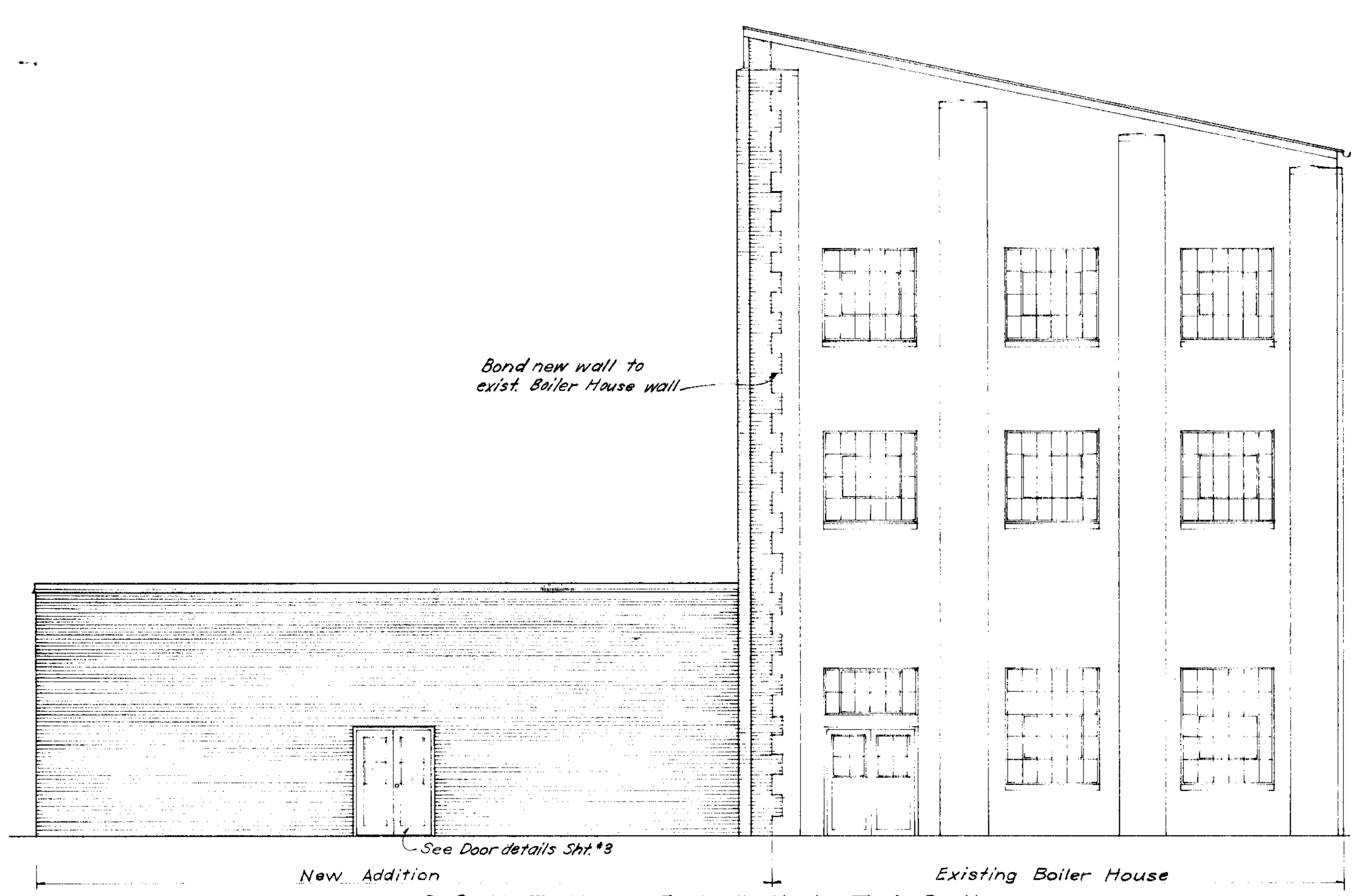
EXTERIOR ELEVATION SOUTH ENTRANCE DOOR
Doors shall be Hollow Metal Doors of 18 ga. steel. No. 5470-G2, double swing out, R.H. leaf active
See Specifications.



NORTH ELEVATION
Scale 1/8" = 1'-0



WEST ELEVATION
Scale 1/8" = 1'-0



SOUTH ELEVATION
Scale 1/8" = 1'-0

DWG_LABEL FM013292

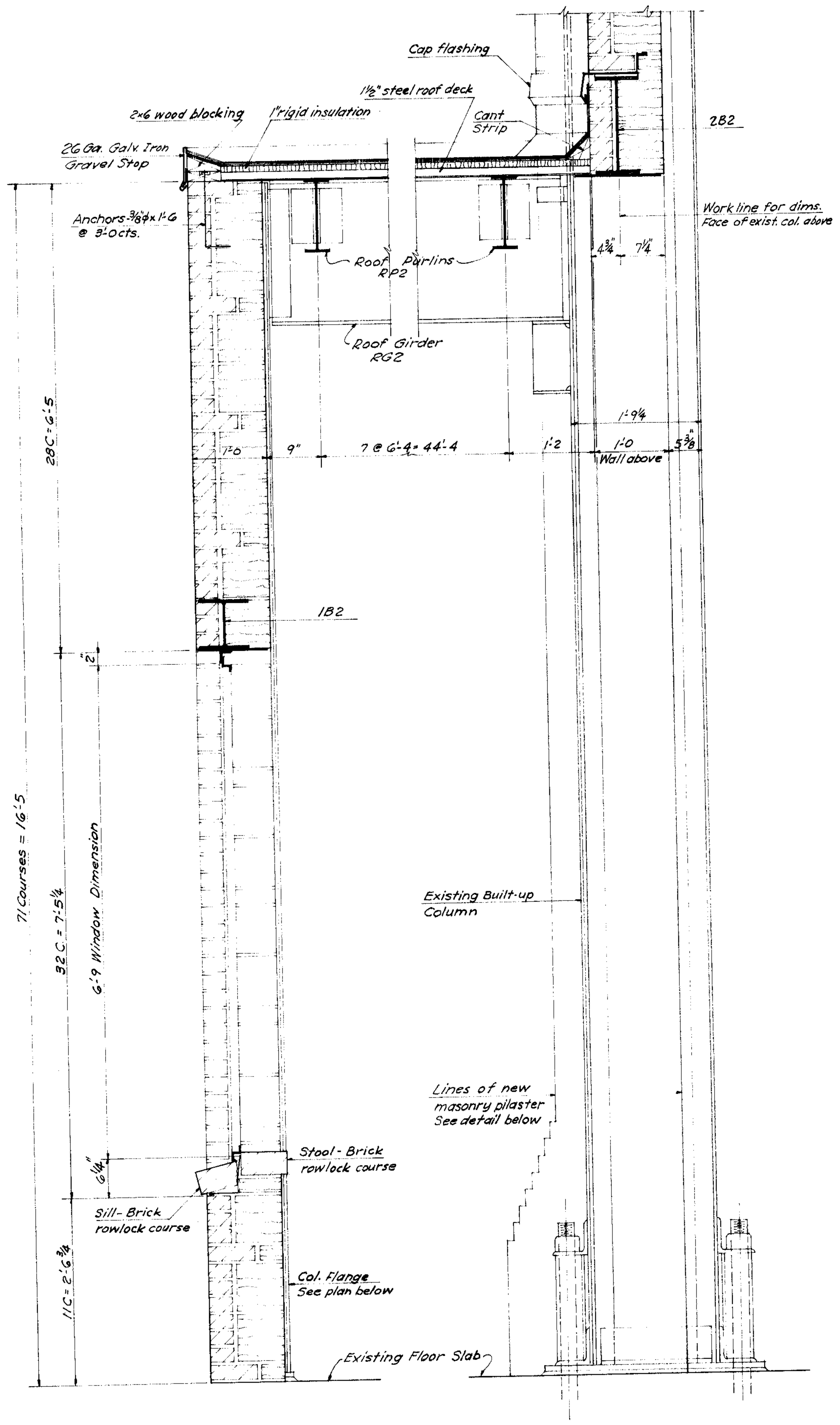
REMODELING OF THE KANSAS POWER AND LIGHT COMPANY'S VAN BUREN STATION AT 7TH AND VAN BUREN STREETS, TOPEKA, KANSAS

Finney & Turnipseed
603 Topeka Ave.

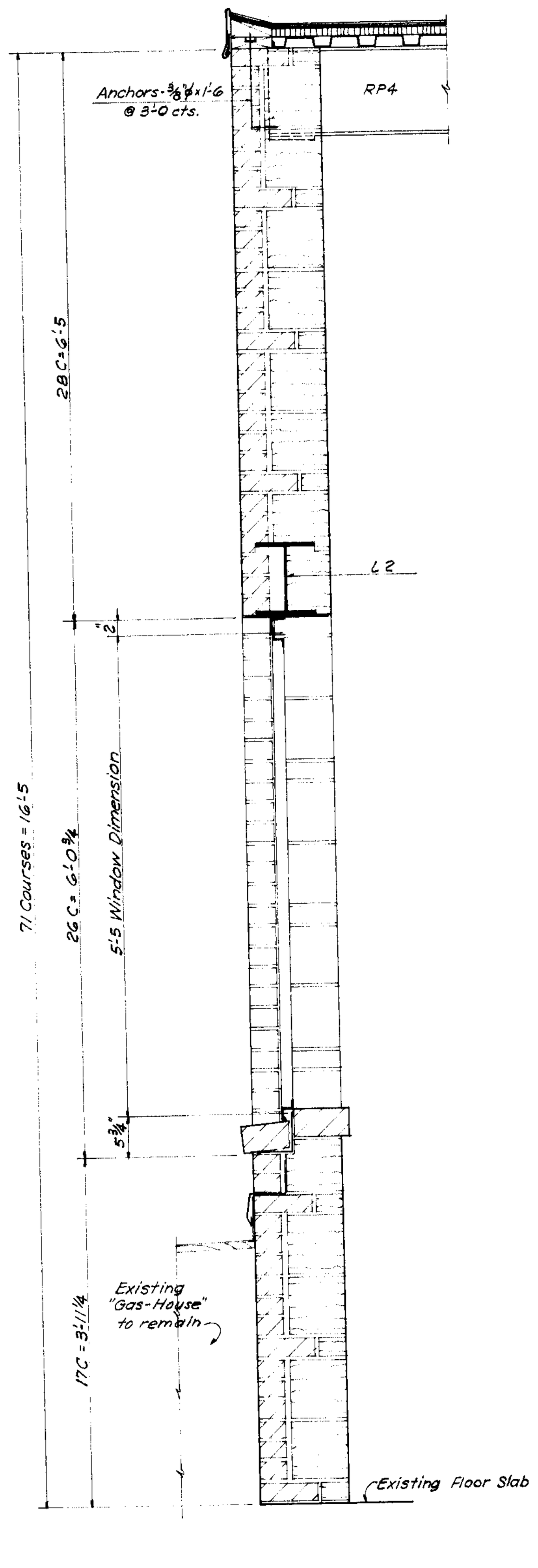
Consulting Engineers
Topeka, Kansas

Date - May 21, 1957

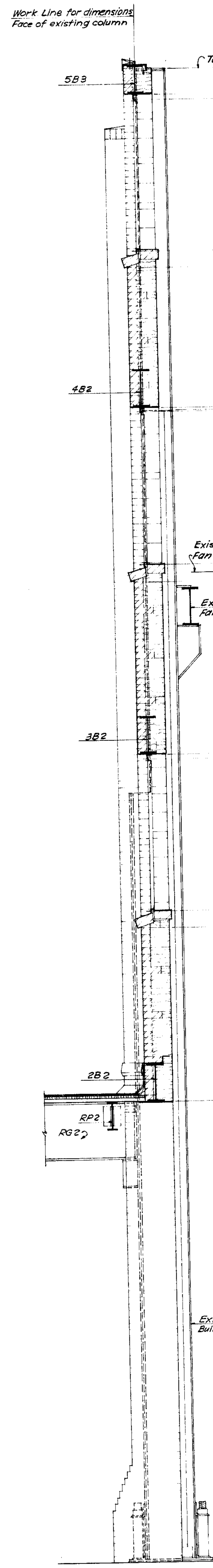
SHEET NO. 2 of 5



DETAIL 12-12
Scale ¾"=1'-0

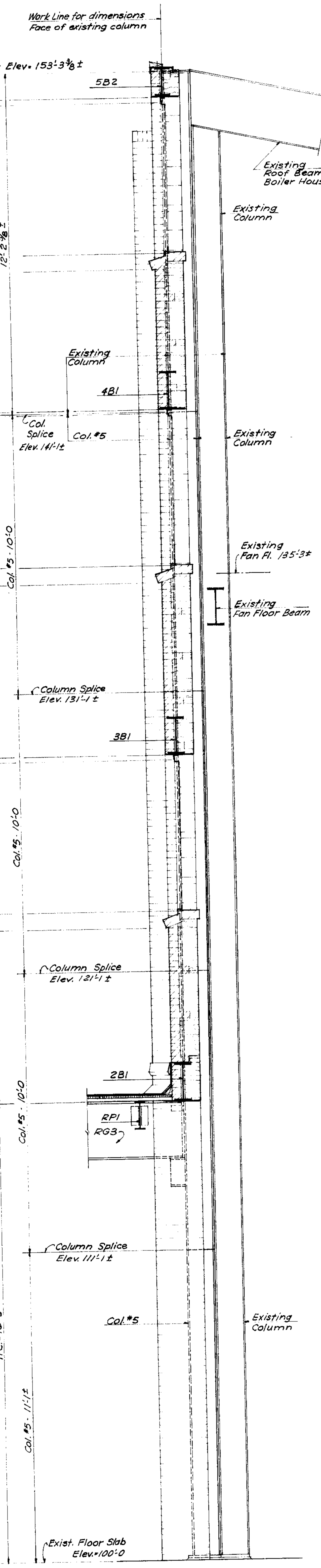


DETAIL 15-15
Scale ¾"=1'-0

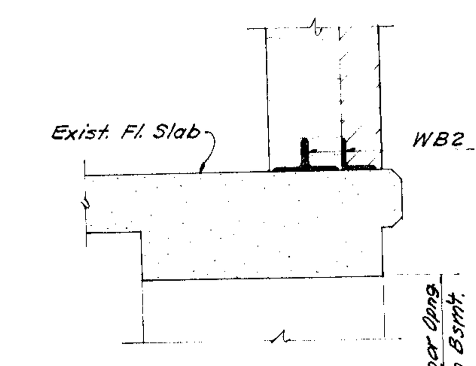


DETAIL 13-13
DETAIL 13A-13A SIMILAR
Scale ⅜"=1'-0

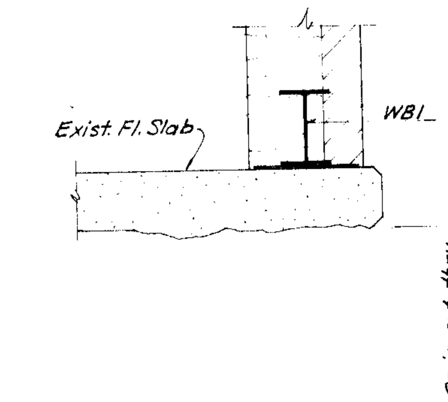
NOTE: ALL EQUIPMENT, APPARATUS, PIPING, ETC., IN THE EXISTING BOILER HOUSE SHALL AT ALL TIMES BE PROTECTED AGAINST DAMAGE FROM MOISTURE, FREEZING, AND CONSTRUCTION OPERATIONS.



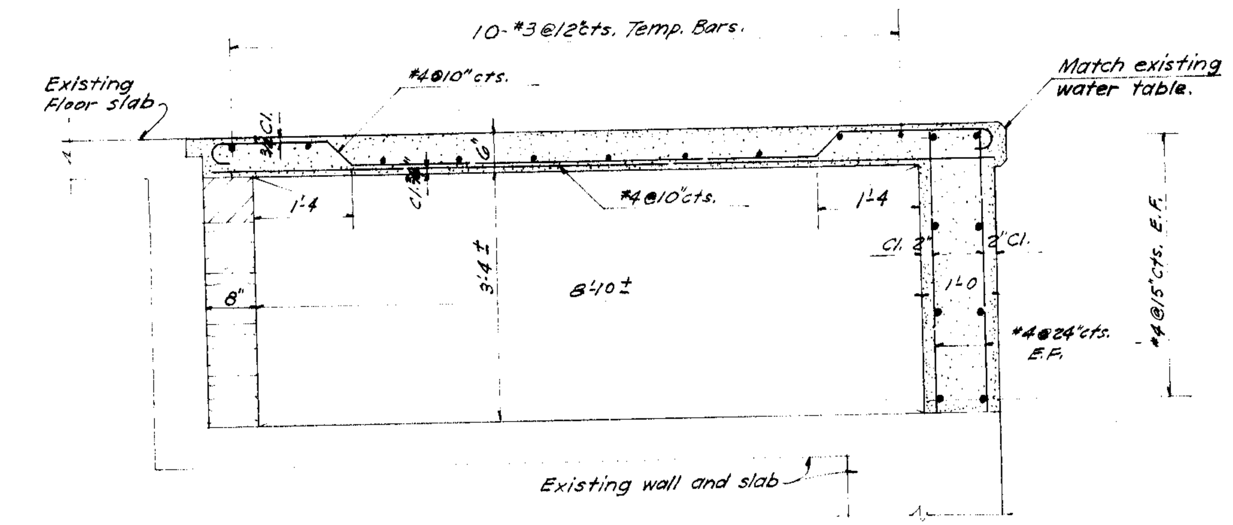
DETAIL 14-14
Scale ⅜"=1'-0



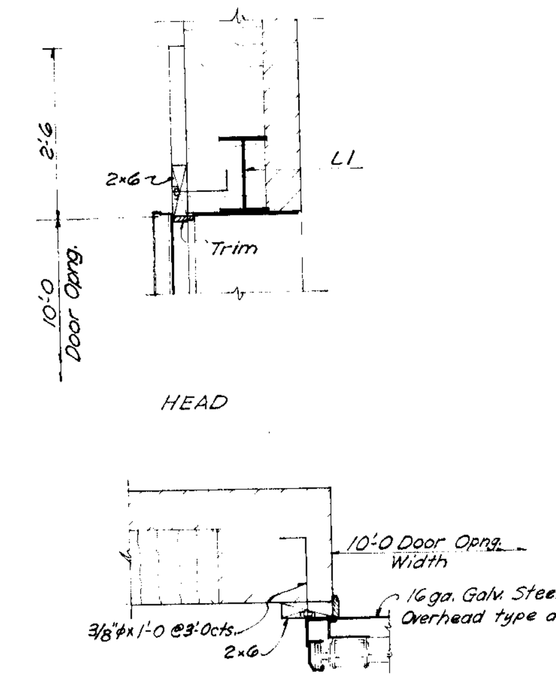
DETAIL 16-16



DETAIL 17-17

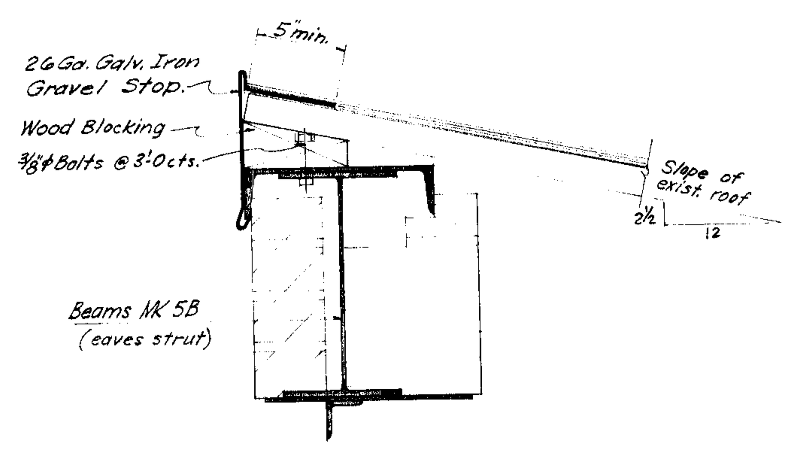


DETAIL 18-18
Scale ½"=1'-0



JAMB

OVERHEAD DOOR DETAILS
Scale ¾"=1'-0



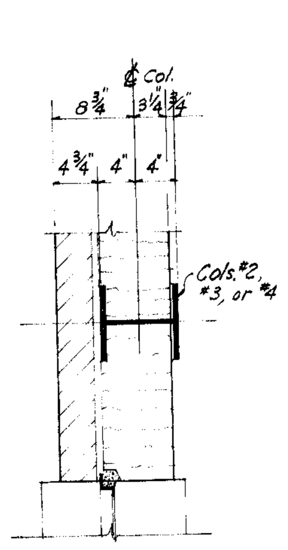
TYPICAL DETAIL
EAVES STRUT
Scale 1½"=1'-0

GENERAL NOTE – CONCRETE AND REINFORCING STEEL

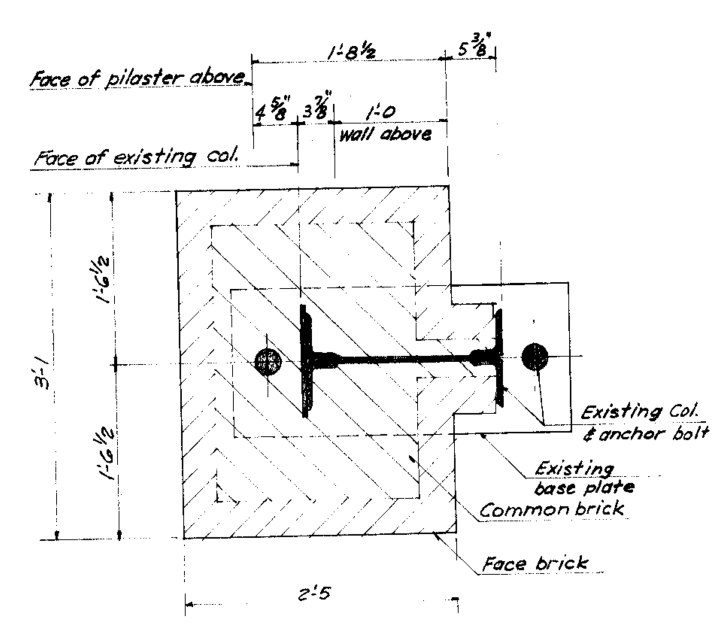
All concrete shall have a minimum compressive strength of 2600 lbs per sq. inch at 7 days and 4000 lbs. per sq. inch at 28 days.

The minimum concrete coverage for reinforcing steel, unless otherwise detailed, shall be 2" for formed walls, and ¾" for slabs.

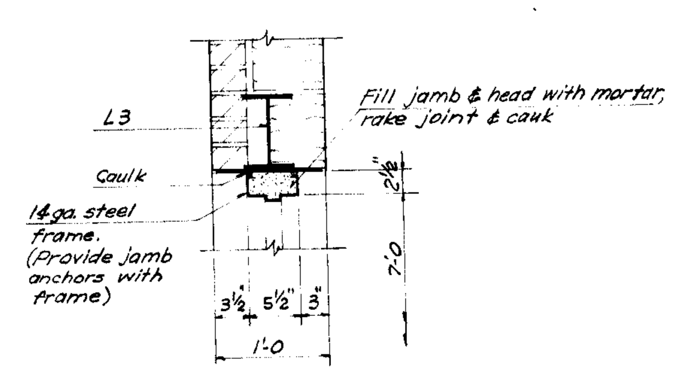
All reinforcing bars shall be lapped a minimum of 32 bar diameters, unless otherwise detailed. All bars shall be properly spaced and supported by means of approved metal bar supports, following, in general, procedures outlined in the latest American Concrete Institute Manual of Standard Practice for Detailing Reinforced Concrete Structures (A.C.I.-315). All bars, except #2 size shall have deformations conforming to the latest A.S.T.M. Specification A-305.



TYPICAL JAMB DETAIL
AND TYPICAL COLUMN LOCATION IN WALL
FOR COLS. #2, #3, & #4
Scale ¾"=1'-0



DETAIL - PLAN OF NEW PILASTER
AT EXISTING BUILT-UP COLUMN
Scale ¾"=1'-0



HEAD
JAMB SIMILAR
EXTERIOR DOOR DETAIL
Scale ¾"=1'-0

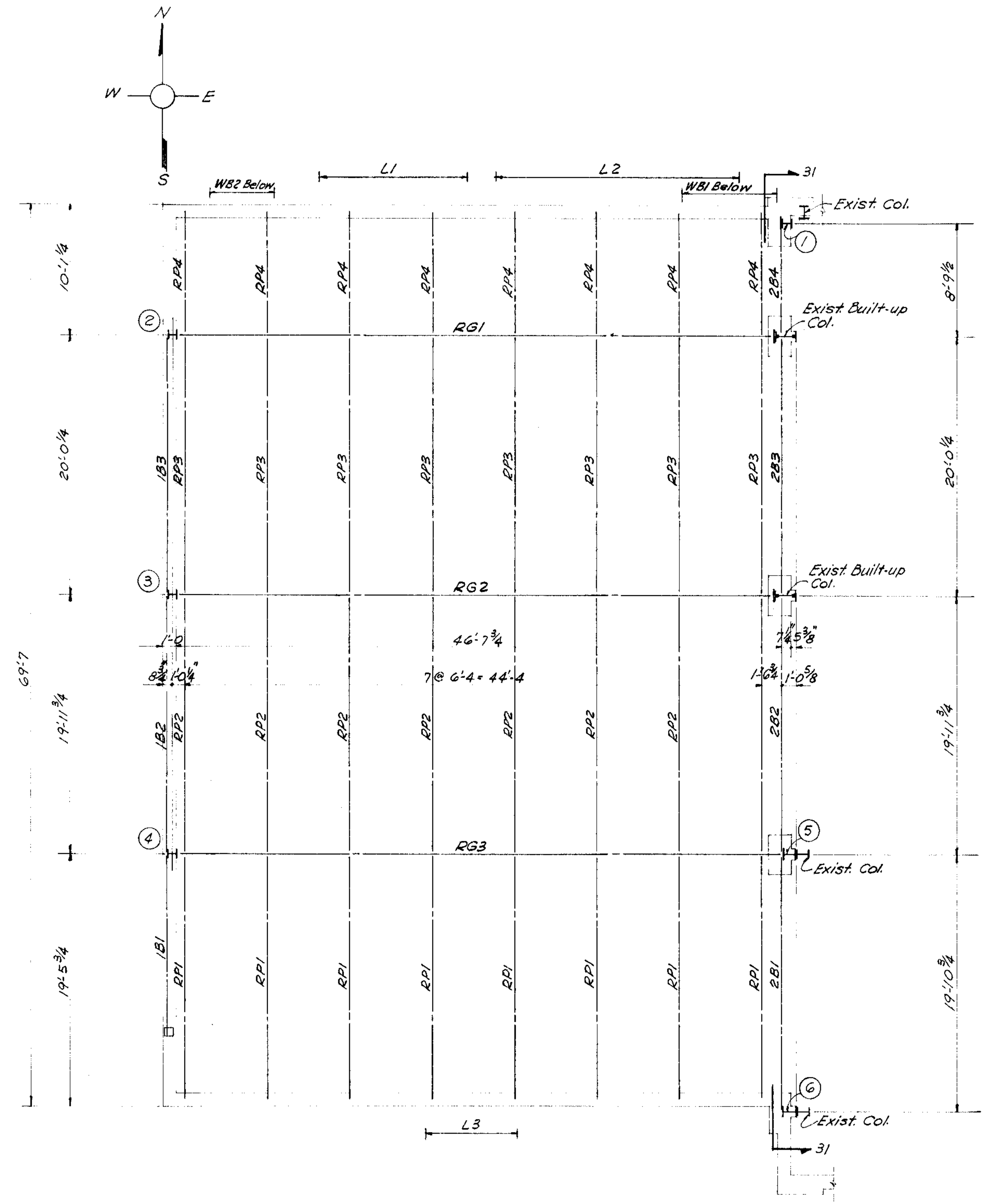
REMODELING OF THE KANSAS POWER AND LIGHT COMPANY'S VAN BUREN STATION AT 7TH AND VAN BUREN STREETS, TOPEKA, KANSAS

Finney & Turnipseed
603 Topeka Ave.

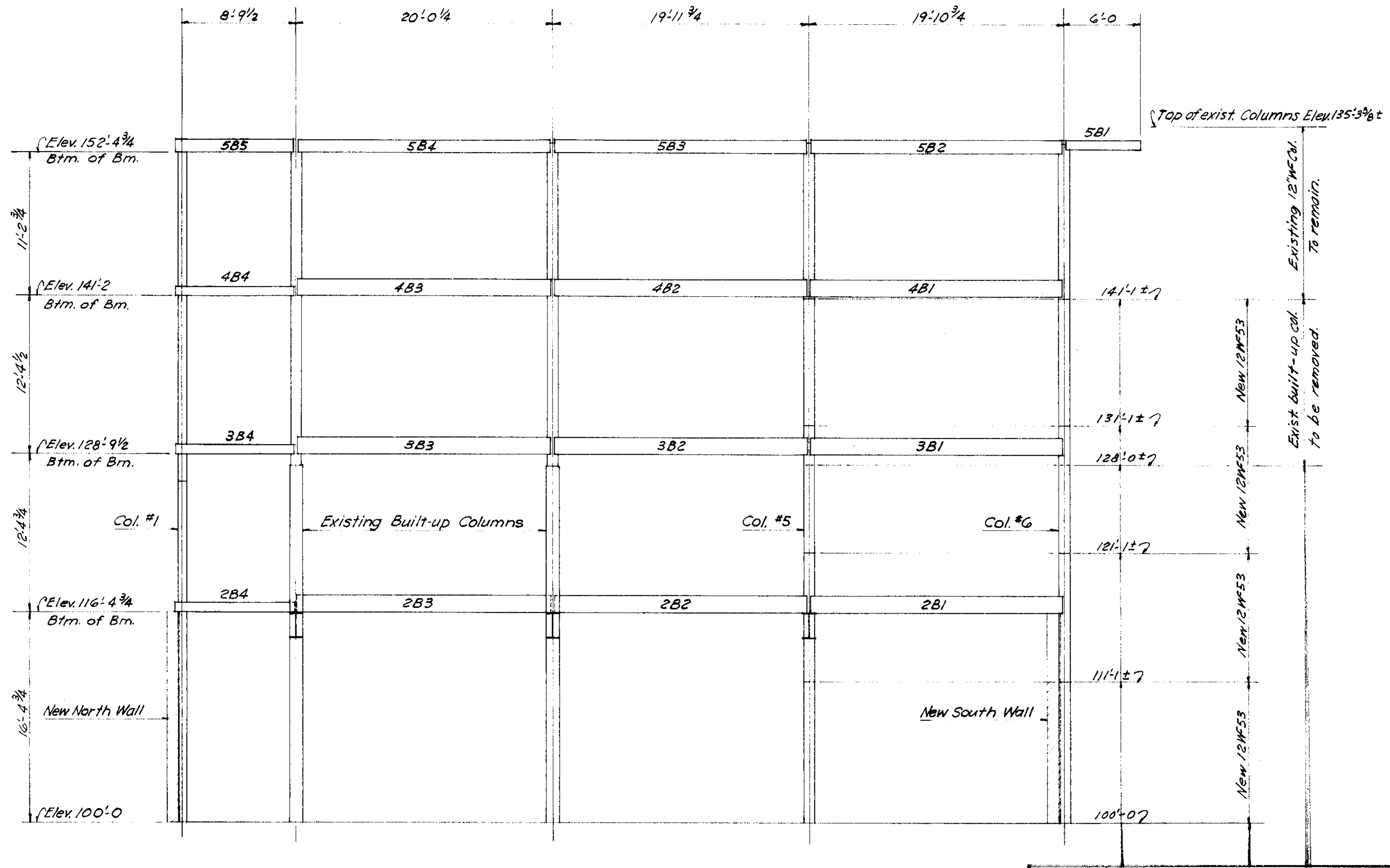
Consulting Engineers
Topeka, Kansas

Date- May 21, 1957

SHEET NO. 3 of 5



ROOF FRAMING PLAN
Scale 1/8"=1'-0



Note: This information applies only to columns #5 & #6. See Column Schedule and the note for procedure of erection of Cols. #5 & #6. See also detail 14-14 and Column details.

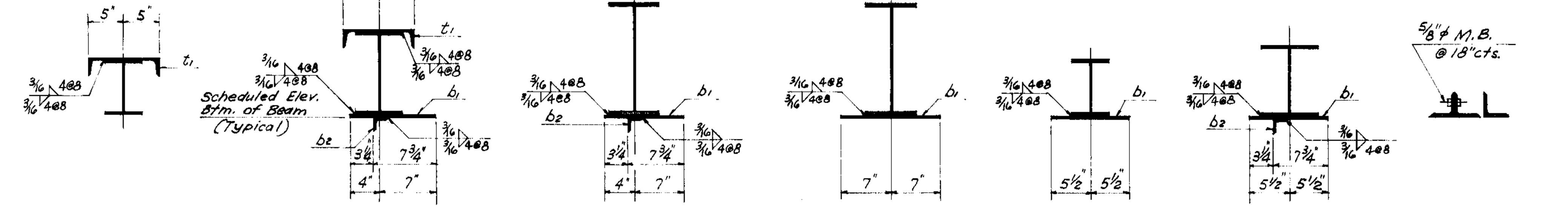
DETAIL 31 - 31
WEST ELEVATION OF HIGH WALL
(West wall of existing Boiler House)
Scale 1/8"=1'-0

SCHEDULE OF STEEL BEAMS

BEAM MARK	NO. BEAMS REQ'D.	TYPE	SECTION – BEAM – BEAM SIZE	BEAM – APPROX. LENGTH	BEAM – ELEVATION – TOP OF BM.	BEAM – ELEVATION – BTM. OF BM.	ATTACHED PIECES – Pc. MK	ATTACHED PIECES – SIZE	ATTACHED PIECES – APPROX. LENGTH	DETAILS FOR END CONNECTIONS – NORTH OR EAST END	DETAILS FOR END CONNECTIONS – SOUTH OR WEST END	BEARING PLATES – NORTH OR EAST END	BEARING PLATES – SOUTH OR WEST END
5B1	1	A	8WF17	5'-10¾	---	152'-8¾	t1	10[15.3	5'-10¾	8b	See Detail	---	---
5B2	1	B	12WF27	19-8¼	---	152'-4¾	t1	10[15.3	19-8¼	12b	12b	---	---
							b1	PL11×¼	19-8¼				
							b2	1L-2×¼×2	18-10¼				
5B3	1	B	12WF27	19-9¼	---	do	t1	10[15.3	19-9¼	12b	12b	---	---
							b1	PL11×¼	19-9¼				
							b2	1L-2×¼×2	18-11¼				
5B4	1	B	12WF27	19-9¾	---	do	t1	10[15.3	19-9¾	12b	12b	---	---
							b1	PL11×¼	19-9¾				
							b2	1L-2×¼×2	18-11¾				
5B5	1	B	12WF27	9'-3¼	---	152'-4¾	t1	10[15.3	9-3¼	12b	12b	---	---
							b1	PL11×¼	9-3¼				
							b2	1L-2×¼×2	7-10				
4B1	1	C	16WF40	19'-8¼	---	141'-2	b1	PL11×¼	19'-8¼	16a	16a	---	---
							b2	1L-2×¼×2	18-10¼				
4B2	1	C	16WF40	19-9¼	---	do	b1	PL11×¼	19-9¼	16a	16a	---	---
							b2	1L-2×¼×2	18-11¼				
4B3	1	C	16WF40	19-9¾	---	do	b1	PL11×¼	19-9¾	16a	16a	---	---
							b2	1L-2×¼×2	18-11¾				
4B4	1	C	8WF17	9'-3¼	---	141'-2	b1	PL11×¼	9-3¼	8b	8b	---	---
							b2	1L-2×¼×2	7-10				
3B1	1	C	16WF40	19'-8¼	---	128'-9½	b1	PL11×¼	19'-8¼	16a	16a	---	---
							b2	1L-2×¼×2	18-10¼				
3B2	1	C	16WF40	19-9¼	---	do	b1	PL11×¼	19-9¼	16a	16a	---	---
							b2	1L-2×¼×2	18-10¼				
3B3	1	C	16WF40	19'-9¾	---	do	b1	PL11×¼	19-9¾	16a	16a	---	---
							b2	1L-2×¼×2	18-9¾				
3B4	1	C	8WF17	9'-3¼	---	128'-9½	b1	PL11×¼	9'-3¼	8b	8b	---	---
							b2	1L-2×¼×2	7'-9				
2B1	1	D	16WF40	19'-8¼	---	116'-4¾	b1	PL1'-2×¼	19'-2¼	16a	16a	---	---
2B2	1	D	16WF40	19-10¼	---	do	b1	PL1'-2×¼	19-4¼	16a	16b	---	---
2B3	1	D	16WF40	19-11½	---	do	b1	PL1'-2×¼	19-11½	16c	16c	---	---
2B4	1	D	8WF17	9'-4	---	116'-4¾	b1	PL1'-2×¼	9-4	8a	8b	---	---
1B1	1	C	8WF24	15'-0½	---	110'-0	b1	PL11×¼	14'-4¼	8b	---	---	8×½×0'-8
							b2	1L-2×¼×2	12-8¼				
1B2	1	C	8WF31	19-9¼	---	do	b1	PL11×¼	19-9¼	8b	8b	---	---
							b2	1L-2×¼×2	17-0				
1B3	1	C	8WF31	19'-9¾	---	110'-0	b1	PL11×¼	19-9¾	8b	8b	---	---
							b2	1L-2×¼×2	17-0				
RG1	1	---	24WF100	45'-10½	116'-5	---	---	---	---	24a	24b	---	---
RG2	1	---	24WF100	45-10½	do	---	---	---	---	24a	24b	---	---
RG3	1	---	24WF100	46'-7¼	116'-5	---	---	---	---	24a	24b	---	---
RP1	8	---	12B16.5	19'-0	116'-5	---	---	---	---	---	12a	6×⅝×0'-10	---
RP2	8	---	12B16.5	19'-10¼	do	---	---	---	---	12a	12a	---	---
RP3	8	---	12B16.5	19-10¾	do	---	---	---	---	12a	12a	---	---
RP4	8	---	12B16.5	9'-7½	116'-5	---	---	---	---	12a	---	---	6×⅝×0'-10
L1	1	E	8WF17	11'-6	---	110'-0	b1	PL11×¼	10'-2	L WALL ANCHORS SEE DETAIL	L WALL ANCHORS SEE DETAIL	8×½×0'-8	8×½×0-8
L2	1	F	10WF33	18'-8½	---	do	b1	PL11×¼	17-3	L WALL ANCHORS SEE DETAIL	L WALL ANCHORS SEE DETAIL	9×¾×0'-9	9×¾×0'-9
							b2	1L-2×¼×2	17-0½				
L3	1	E	8WF17	7'-2½	---	110'-0	b1	PL11×¼	5'-10	L WALL ANCHORS SEE DETAIL	L WALL ANCHORS SEE DETAIL	8×½×0'-8	8×½×0'-8
WB1	1	E	8WF17	7'-4	---	100'-0	b1	PL11×¼	6'-0	---	---	---	---
WB2	1	G	3L-3½×3½×5/16	4'-11	---	100'-0	---	---	---	---	---	---	---

NOTE: Provide 2" camber in beams RG1, RG2, RG3.
A minimum of three courses of solid masonry shall be provided at wall bearing ends of steel beams.
For beams connecting into existing columns, drill columns in the field to match beam connection holes. Present holes in existing column flanges or webs, within 4" of new beam connections, shall be plug welded and ground smooth prior to drilling new connection holes.

NOTE: MAXIMUM HOIST LOAD FOR RG1, RG2, & RG3 = 3 TON. HOIST
MAXIMUM HOIST LOAD FOR PURLINS RP1, RP2, RP3, & RP4 = 1 TON HOIST.



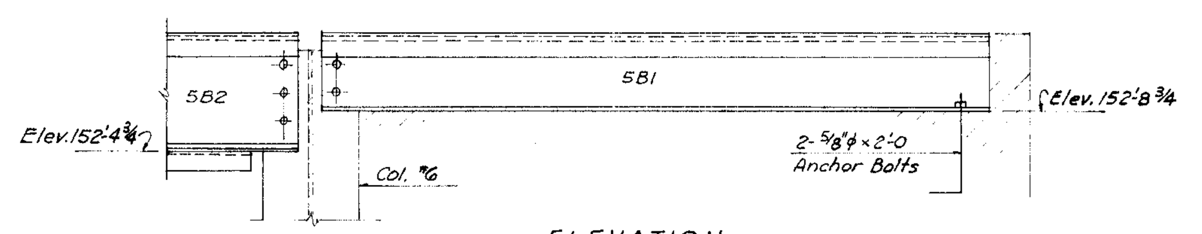
TYPE A TYPE B TYPE C TYPE D TYPE E TYPE F TYPE G

BEAM TYPES

GENERAL NOTE – METAL ROOF DECK

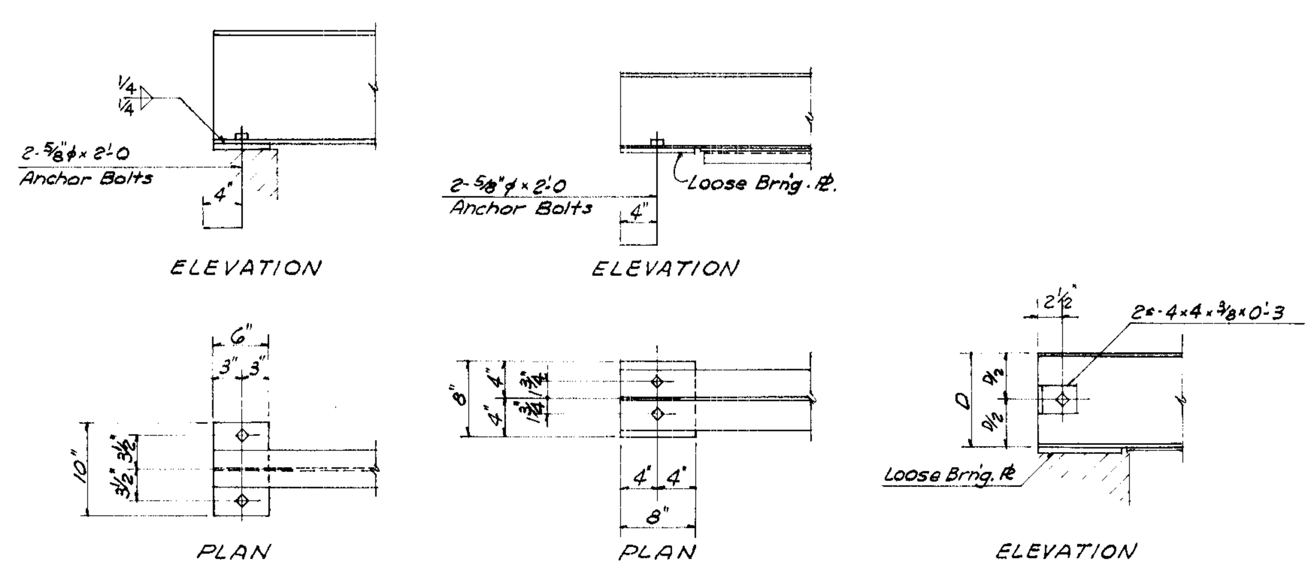
Steel roof deck over beams RP1 thru RP4 shall be 1½" steel deck, 20ga. minimum. Deck shall span over a minimum of 2 bays and shall be field-welded to supporting steel members in accordance with manufacturer's recommendations. Deck shall be designed and manufactured in accordance with the latest specifications of the Metal Roof Deck Technical Institute for a total load of 50 lbs. per square foot, calculated on center to center distance between supporting members, and shall have a maximum deflection under full load of 1/240 of that span.

See Specifications.



ELEVATION

DETAIL – BEAM 5B1
Scale ¾"=1'-0



ELEVATION ELEVATION

PLAN PLAN ELEVATION

DETAIL - BEARING PLATES FOR RP1 & RP4

DETAIL - BEARING PLATE FOR 1B1

DETAIL - ANGLE WALL ANCHORS FOR L1, L2 & L3

BEAM BEARING PLATE DETAILS

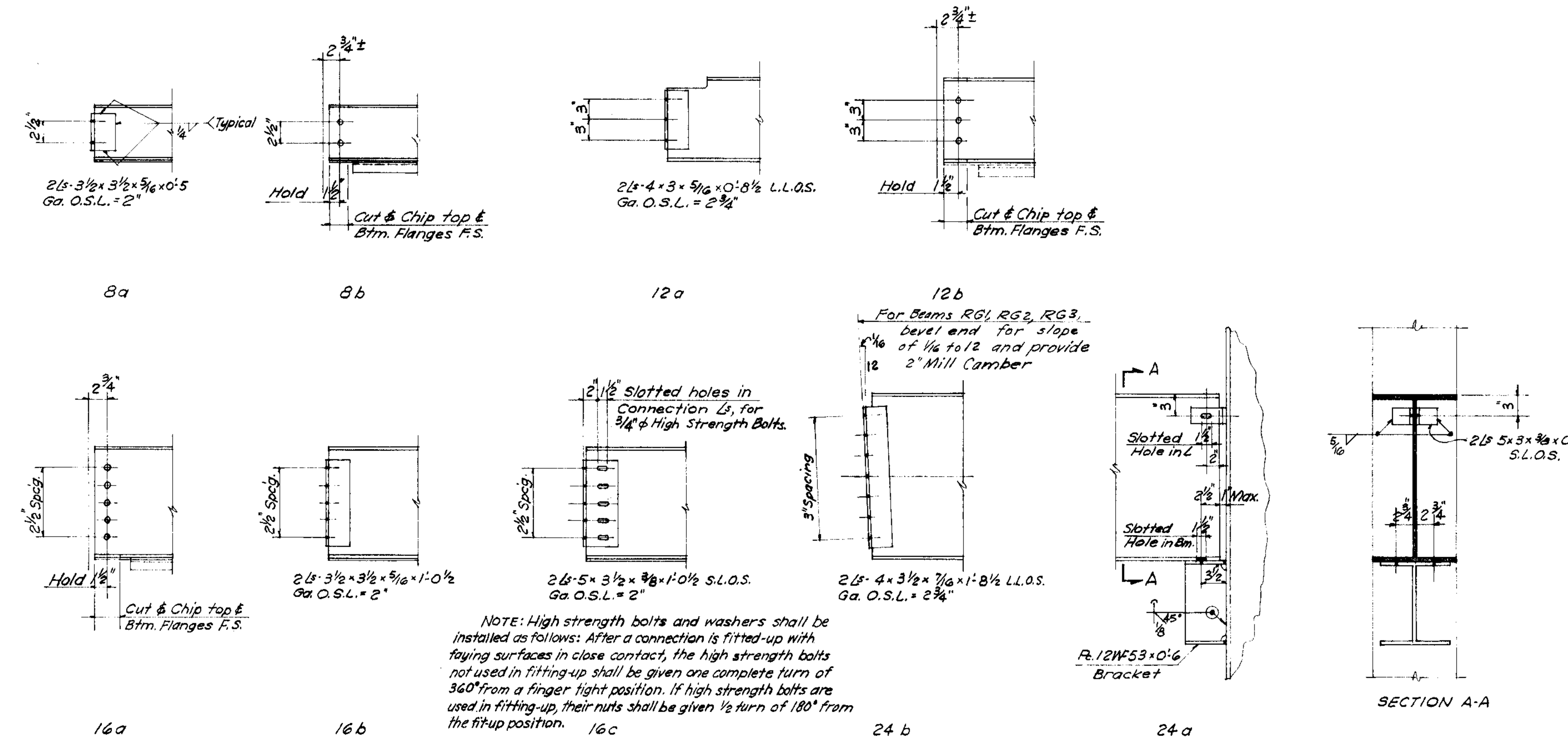
GENERAL NOTE – STRUCTURAL STEEL

All structural steel work shall, in general, conform to the latest standard specifications of the American Institute of Steel Construction. All welding shall conform to the latest Code for Arc and Gas Welding in Building Construction of the American Welding Society.

Connection angles shall be welded as shown. Field connections, unless otherwise detailed, shall be made with ¾" ø machine bolts. Connections not otherwise detailed shall be A.I.S.C. standard B-series connections.

See plans and specifications for door frames, ladders, railings, and other structural steel or miscellaneous ironwork not shown on structural plans. See architectural details for holes or other provisions for attachment of work of other trades.

Scheduled lengths of structural steel are for estimating purposes only. Lengths shall be verified in the field.



8a 8b 12a 12b

16a 16b 16c 24b 24a

NOTE: High strength bolts and washers shall be installed as follows: After a connection is fitted-up with faying surfaces in close contact, the high strength bolts not used in fitting-up shall be given one complete turn of 360° from a finger tight position. If high strength bolts are used in fitting-up, their nuts shall be given ½ turn of 180° from the fitup position.

BEAM CONNECTION DETAILS

DWG_LABEL FM013294

REMODELING OF THE KANSAS POWER AND LIGHT COMPANY'S VAN BUREN STATION AT 7TH AND VAN BUREN STREETS, TOPEKA, KANSAS

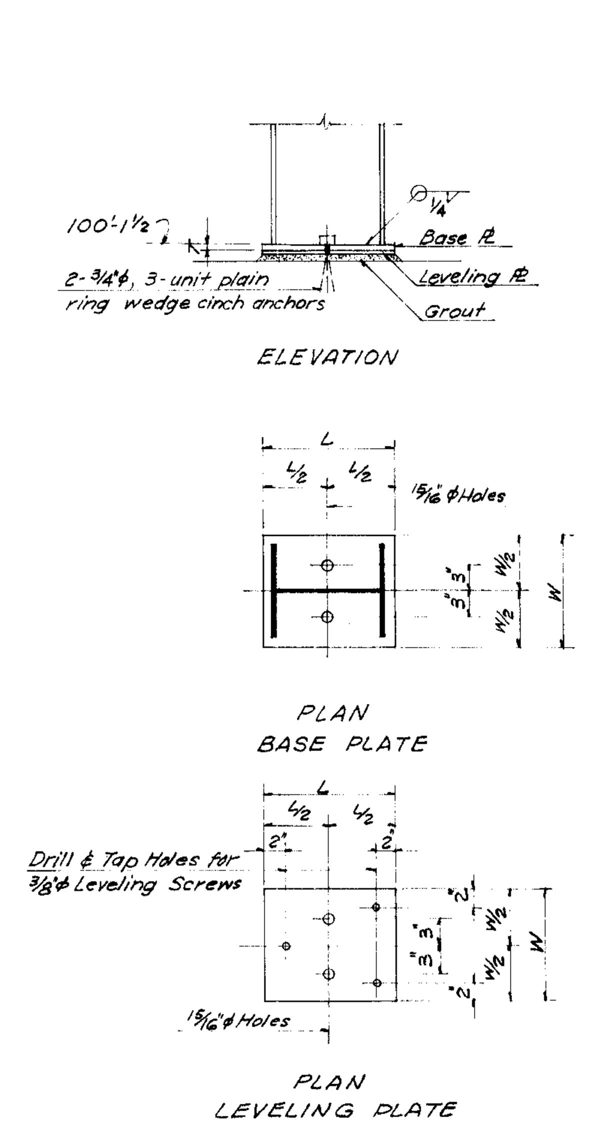
Finney & Turnipseed Consulting Engineers
603 Topeka Ave. Topeka, Kansas

Date - May 21, 1957 SHEET NO. 4 of 5

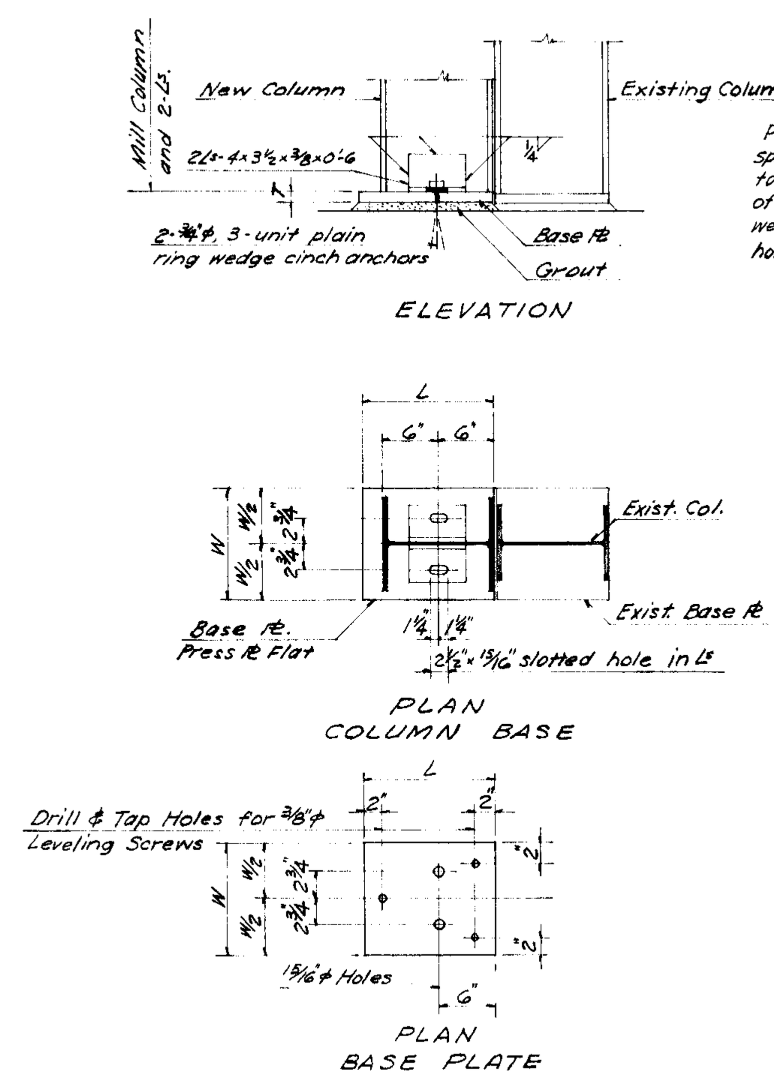
COLUMN SCHEDULE						
FLOOR \ COLUMN MARK		1	2	3,4	5	6
Top of Column Elev. 153'-3½ ±		153'-3½				
		8WF31 × 26'-7			141'-1	141'-1
					12WF53 × 10'-0	12WF53 × 10'-0
		126'-8½			131'-1	131'-1
					12WF53 × 10'-0	12WF53 × 10'-0
					121'-1	121'-1
		8WF31 × 26'-7			12WF53 × 10'-0	12WF53 × 10'-0
			116'-4½	116'-4½	111'-1	111'-1
			8WF31 × 16'-3	8WF31 × 16'-3	12WF53 × 10'-11	12WF53 × 10'-11½
Elev. top of Base ℞		100'-1½	100'-1½	100'-1½	100'-2	100'-1½
Base Plate	L	0'-9	0'-9	0'-10	1'-2	1'-1
	T	5/8"	5/8"	5/8"	1"	3/4"
	W	8"	8"	10"	1'-2	1'-0
Leveling Plate		8"×1/4"×0'-9	8"×1/4"×0'-9	10"×1/4"×0'-10	None	None
Grout		5/8"	5/8"	5/8"	1"	3/4"

Procedure for erecting columns #5 & #6.
1. Remove existing pilaster down to a point just below the bearing of the existing built-up column, approx. Elev. 128'-0.
2. Remove existing built-up column from Elev. 128'-0± to Elev. 141'-1± and replace with new 12WF53 × 10'-0 long column. Field-weld in place as detailed. Erect beams 5B2 & 4B1.
3. Remove approx. 7'-0 more of pilaster down to about elev. 121'-0. Replace with new 12WF53 × 10'-0 long column. Field-weld in place as detailed. Erect beam 3B1.
4. Remove approx. 10'-0 more of pilaster down to about elev. 111'-0. Replace with new 12WF53 × 10'-0 long column. Field-weld in place as detailed. Erect beam 2B1.
5. Remove remaining height of pilaster, and replace with new 12WF53 column of length as required, (10'-11±). Make base plate attachment.

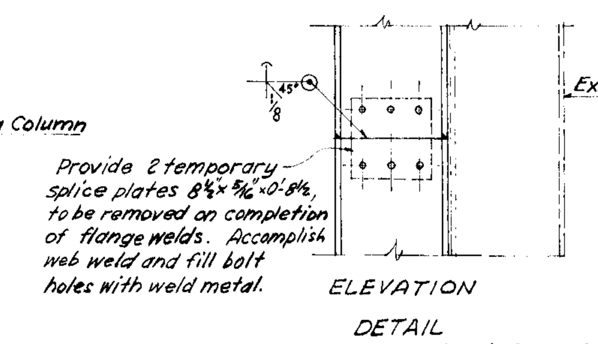
See Detail 14-14, Detail 31-31, and Column details.



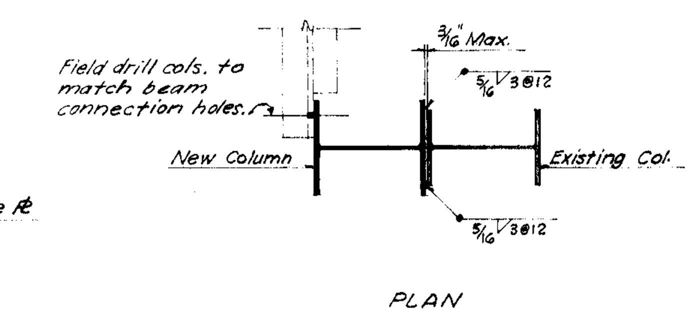
DETAIL - TYPICAL COLUMN BASE PLATE AND LEVELING PLATE FOR COLS. #1, #2, #3, #4



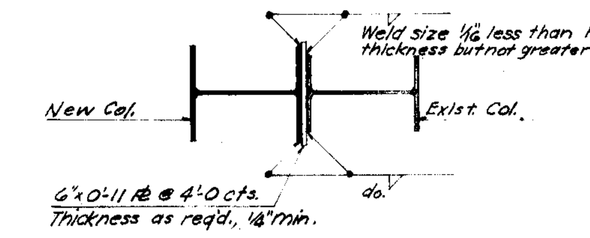
DETAIL - TYPICAL COLUMN BASE PLATE FOR COLUMNS #5 & #6



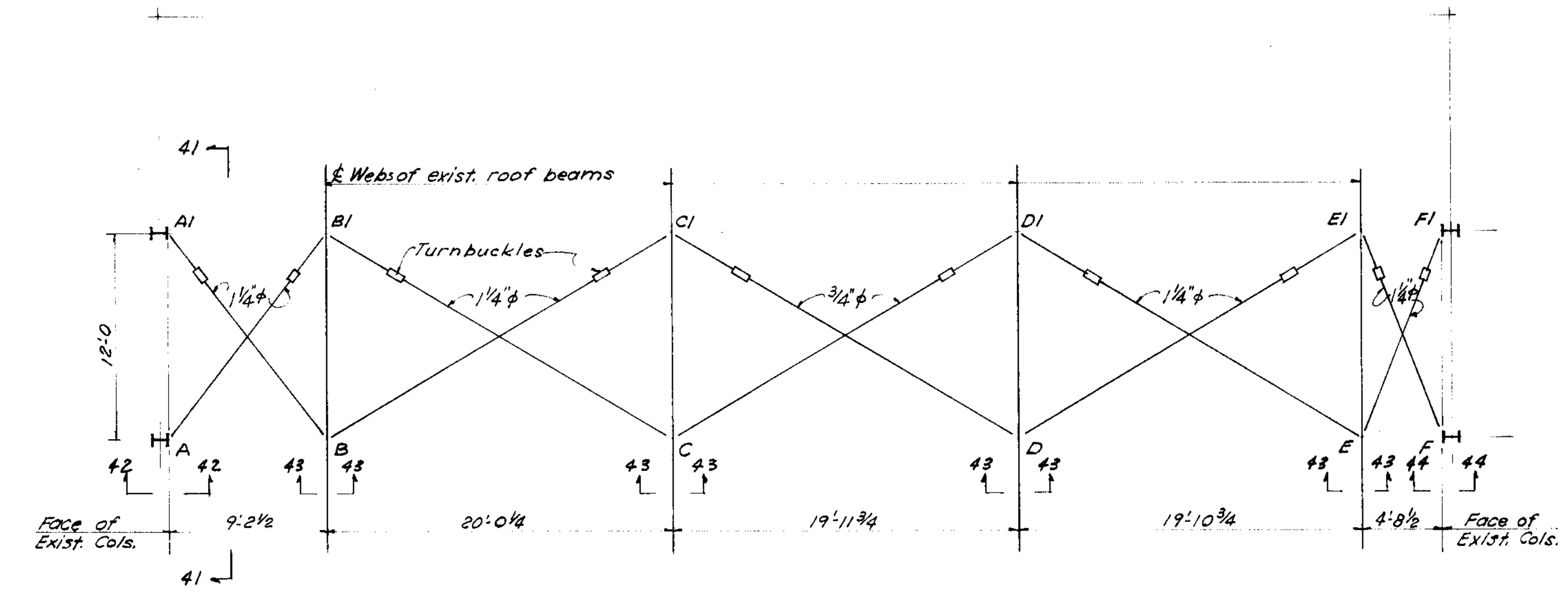
DETAIL TYPICAL COLUMN SPLICE



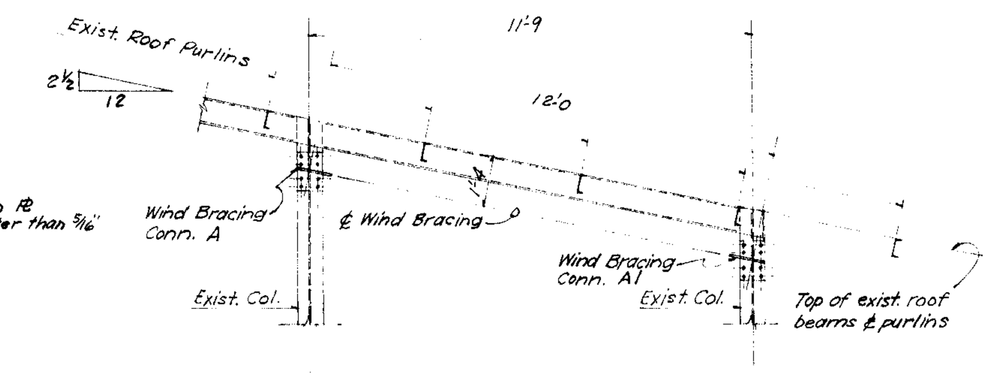
DETAIL - CONNECTION OF NEW COLUMN TO EXISTING COL. (Cols. #5 & #6)



DETAIL - CONNECTION OF NEW COLUMN TO EXISTING COLUMN, WHERE SPACE BETWEEN COLUMNS REQUIRES ℞ FILLER (Cols. #5 & #6)

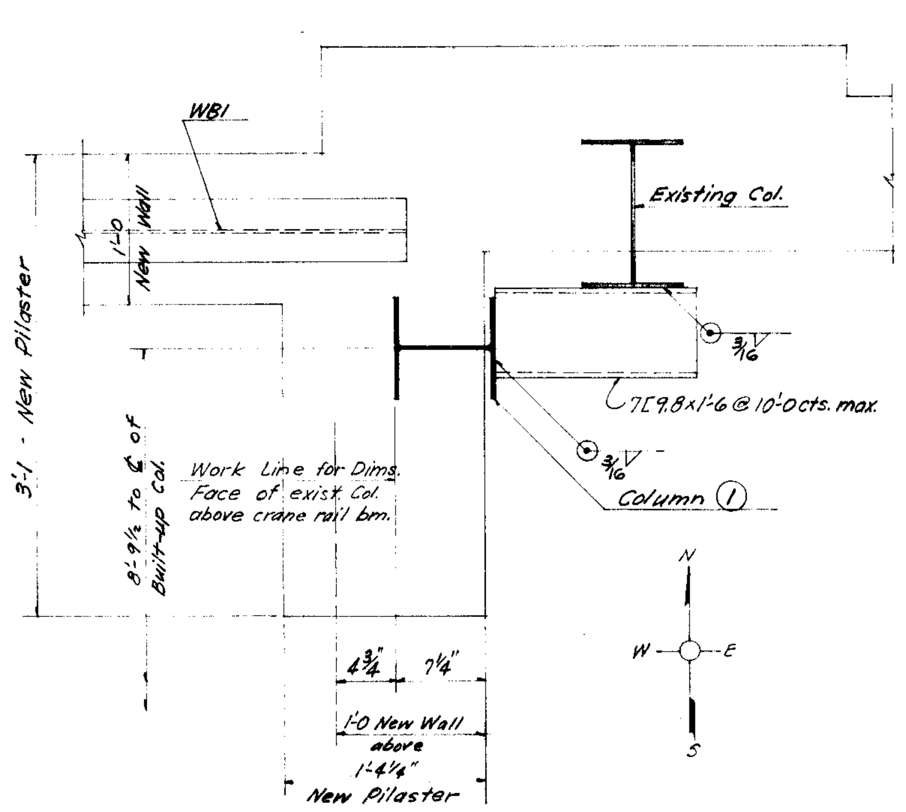


PLAN - NEW WIND BRACING FOR EXISTING BOILER HOUSE ROOF (PARTIAL PLAN IN PLANE OF NEW WIND BRACING)
Scale 1/8"=1'-0.
Note: See Section 11-11, sheet #2.

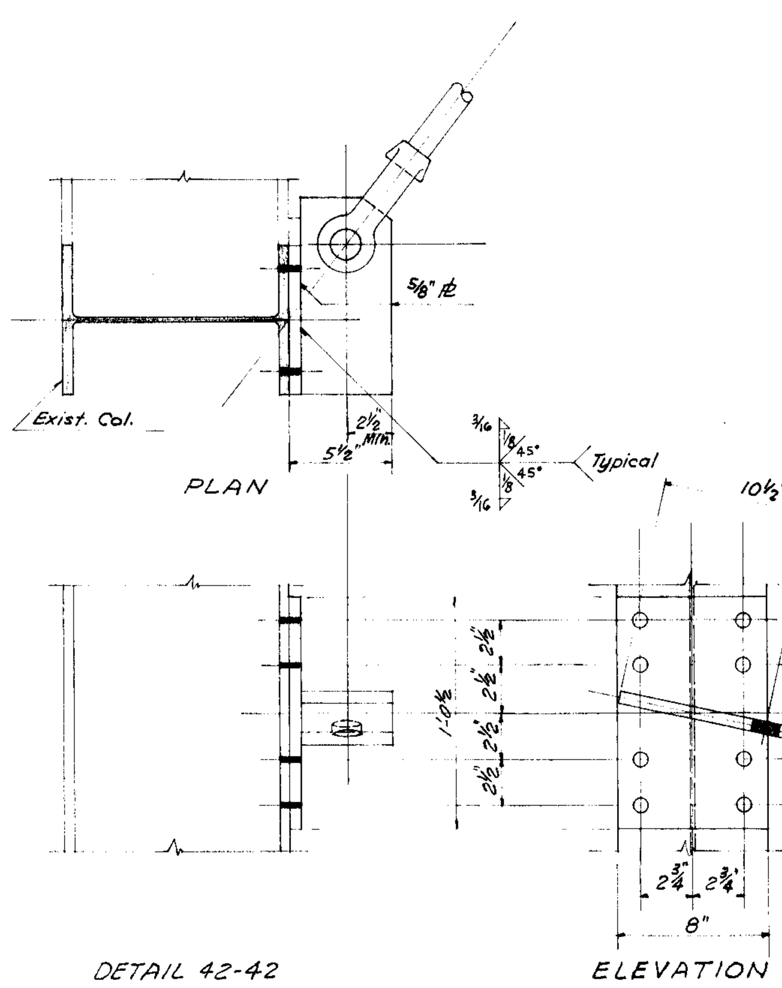


DETAIL 41-41
Scale 1/4"=1'-0

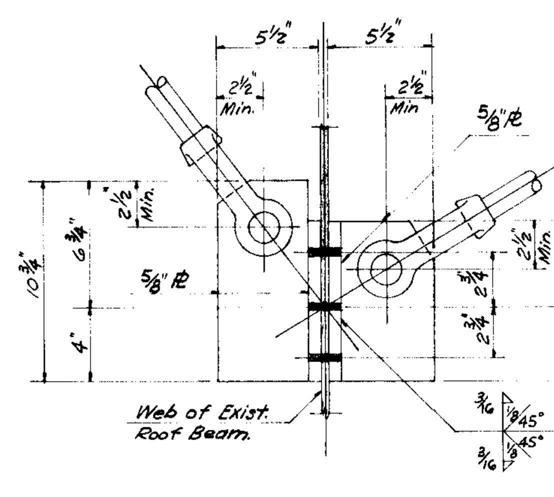
SCHEDULE OF MATERIAL - WIND BRACING							
RODS		TURNBUCKLES		CLEVISES			
NO. REQD.	SIZE	NO. REQD.	DIAM. OF TAP	NO. REQD.	TYPE	DIAM. OF TAP	DIAM. OF PIN.
8	1¼"φ	8	1¼"	16	3	1¼"	1½"φ
2	¾"φ	2	¾"	4	2½	¾"	1"φ



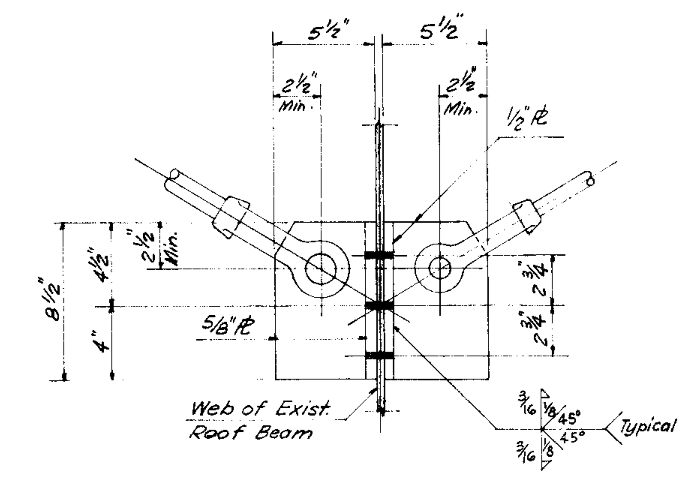
DETAIL - PLAN AT COLUMN NO. 1, AND CONNECTION COL. NO. 1 TO EXISTING COLUMN
Scale 1"=1'-0



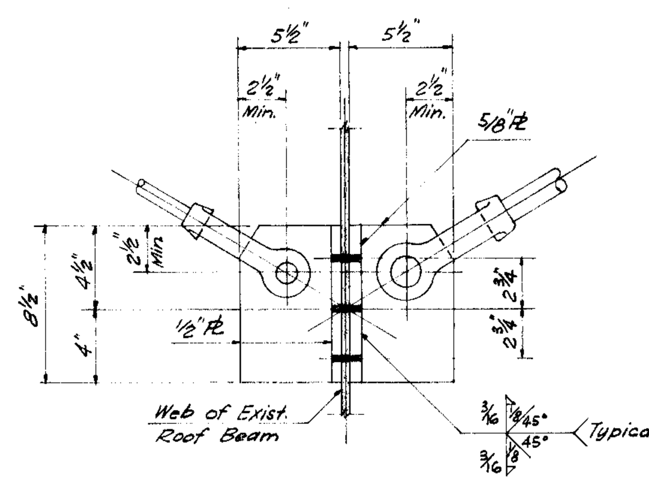
DETAIL - CONNECTION A
CONNECTION A1 SIMILAR



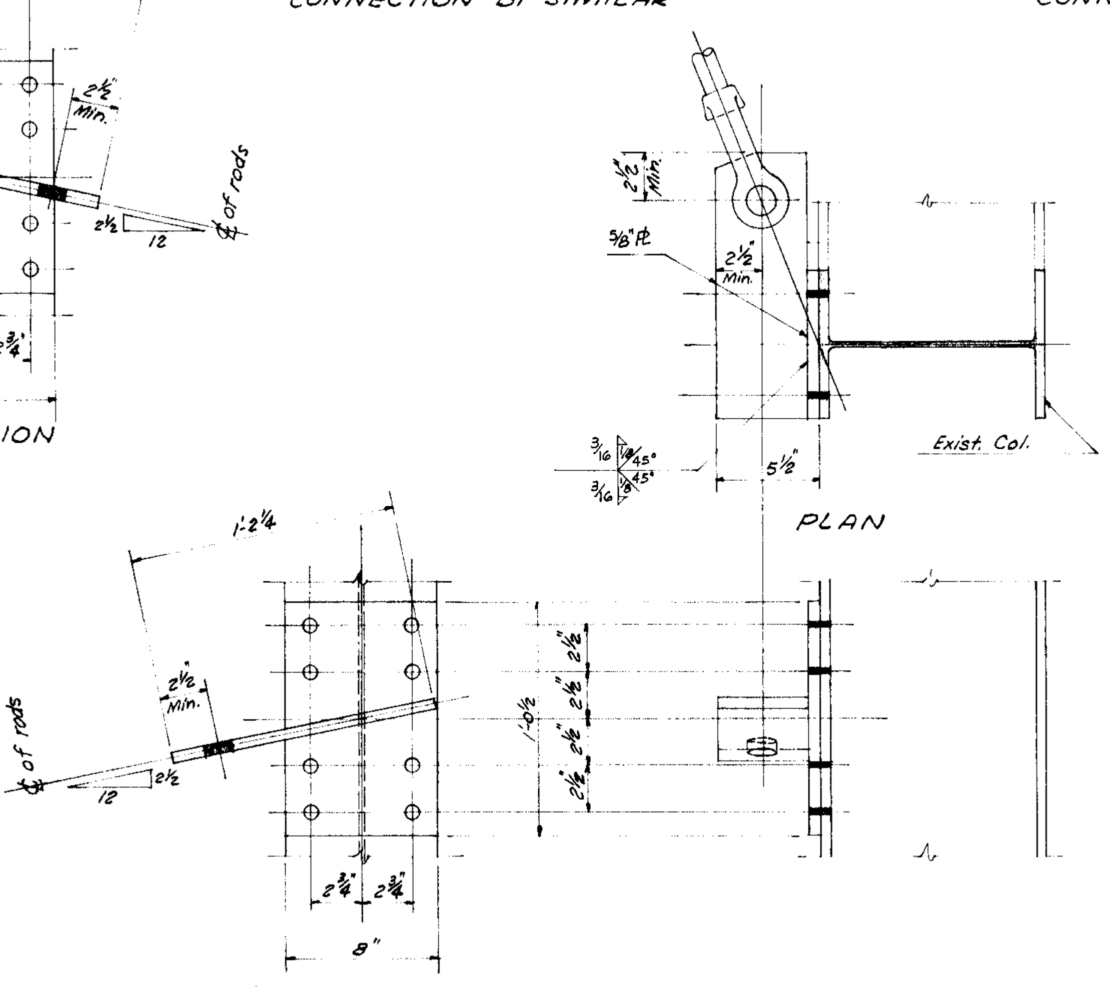
DETAIL - CONNECTION B
CONNECTION B1 SIMILAR



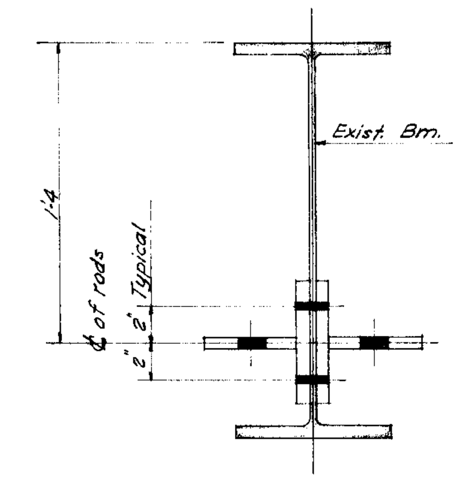
DETAIL - CONNECTION C
CONNECTION C1 SIMILAR



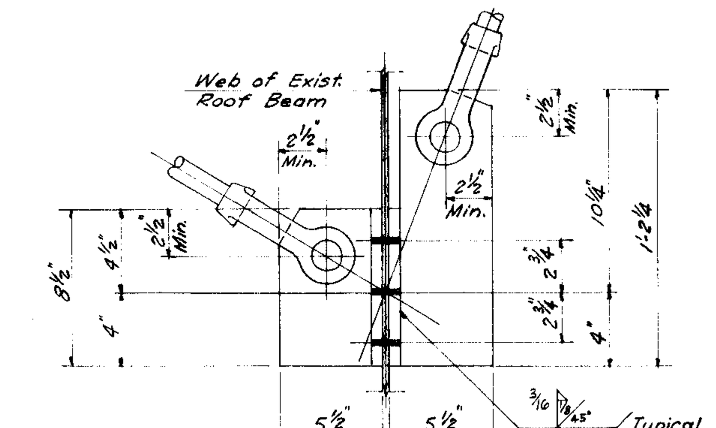
DETAIL - CONNECTION D
CONNECTION D1 SIMILAR



DETAIL - CONNECTION F
CONNECTION F1 SIMILAR



DETAIL 43-43



DETAIL - CONNECTION E
CONNECTION E1 SIMILAR

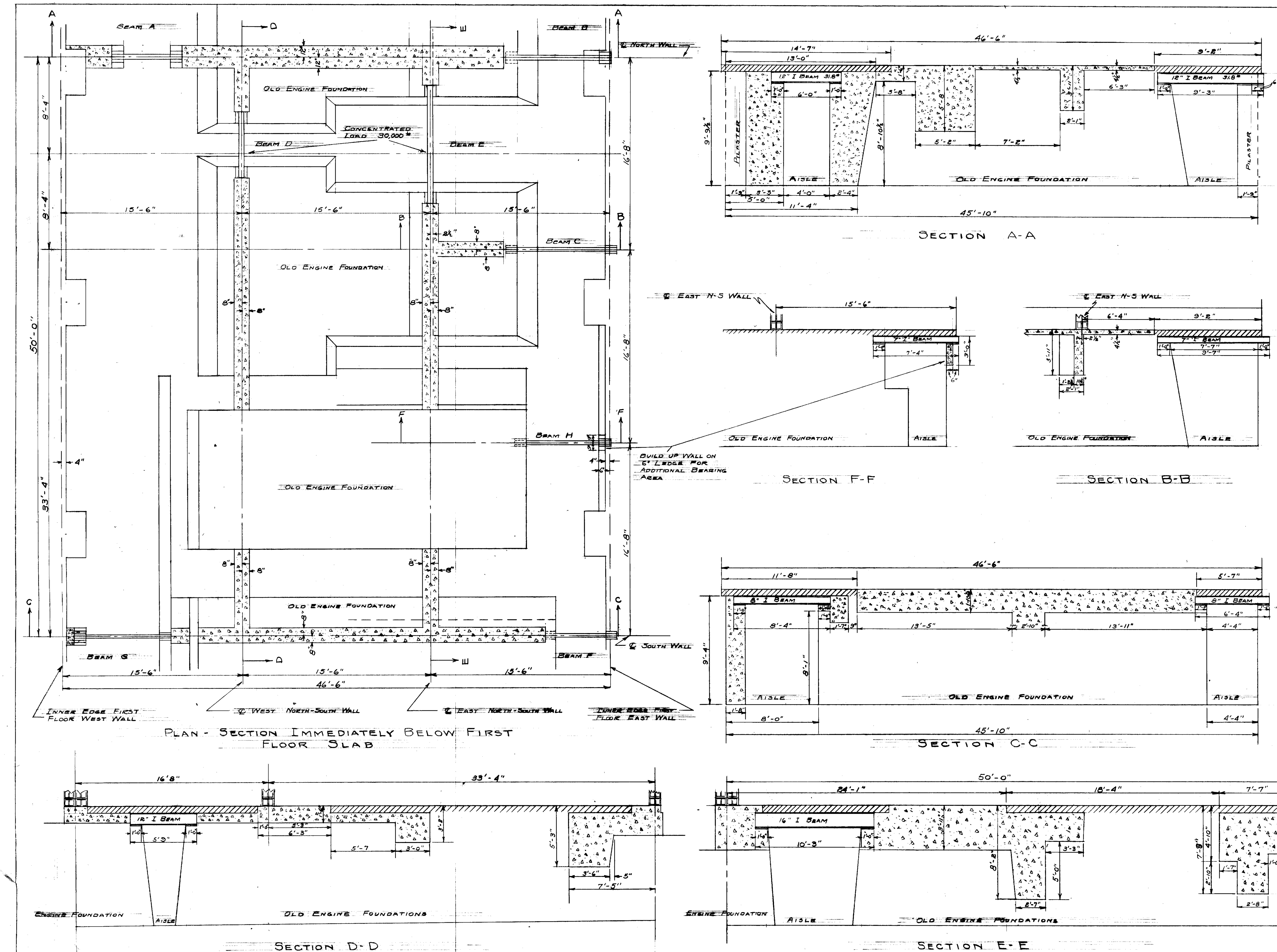
WIND BRACING CONNECTION DETAILS
Scale 1½"=1'-0
Note: Existing columns and beams shall be drilled in the field to match connection holes for ¾"φ M.B.

REMODELING OF THE KANSAS POWER AND LIGHT COMPANY'S VAN BUREN STATION AT 7TH AND VAN BUREN STREETS, TOPEKA, KANSAS

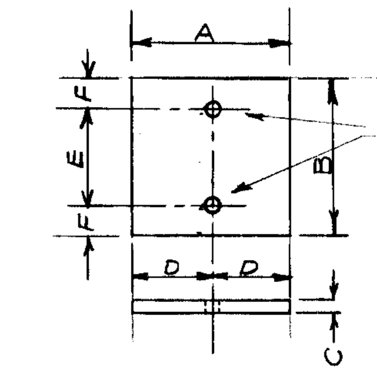
Finney & Turnipseed
603 Topeka Ave.
Consulting Engineers
Topeka, Kansas

Date - May 21, 1957


ALLEY
SEVENTH STREET
ALLEY
VAN BUREN STREET
SCALE 1/8" - 1'0"
21'-9½"
14'-1"
69'-9"
14'-0"
31'-0"
124'-0"
26'-2"
300'-9½"
151'-0½"
26'-8½"
22'-8½"
111'-7½"
21'-10"
74'-0"
66'-8"
51'-2"
48'-9"
98'-10"
32'-8"
22'-3"
15'-4"
15'-8"
15'-8"
11'-0"



Bearing Plate Schedule



Beam	End	"A"	"B"	"C"	"D"	"E"	"F"
"A"	Both	12"	12"	1/2"	6"	8"	2"
"B"	Both	12"	12"	5/8"	6"	8"	2"
"C"	Both	12"	8"	1/2"	6"	6"	1"
"H"	Both	12"	8"	1/2"	6"	6"	1"
"D"	Both	12"	12"	1/2"	6"	8"	2"
"E"	Both	12"	12"	1/2"	6"	8"	2"
"F"	Both	12"	10"	1/2"	6"	7"	1 1/2"
"G"	Both	12"	10"	1/2"	6"	7"	1 1/2"

Beam Schedule

Beam	Depth	Flange Width	Length	Wt. per Ft.	Present Location
"A"	12"	5"	6'-0"	31.8#	Van Buren Plt. Yard
"B"	12"	5"	9'-3"	31.8#	" " " "
"C"	7"	3 1/2"	9'-7"	15.3#	" " " "
"D"	12"	5"	5'-9"	31.8#	" " " "
"E"	16"	5 1/2"	10'-3"	54 #	" " " "
"F"	8"	4"	6'-4"	18.4#	2nd & Adams Whse. Yard
"G"	8"	4"	8'-4"	18.4#	" " " " "
"H"	7"	3 1/2"	7'-4"	15.3#	Van Buren Plt. Yard

Note:

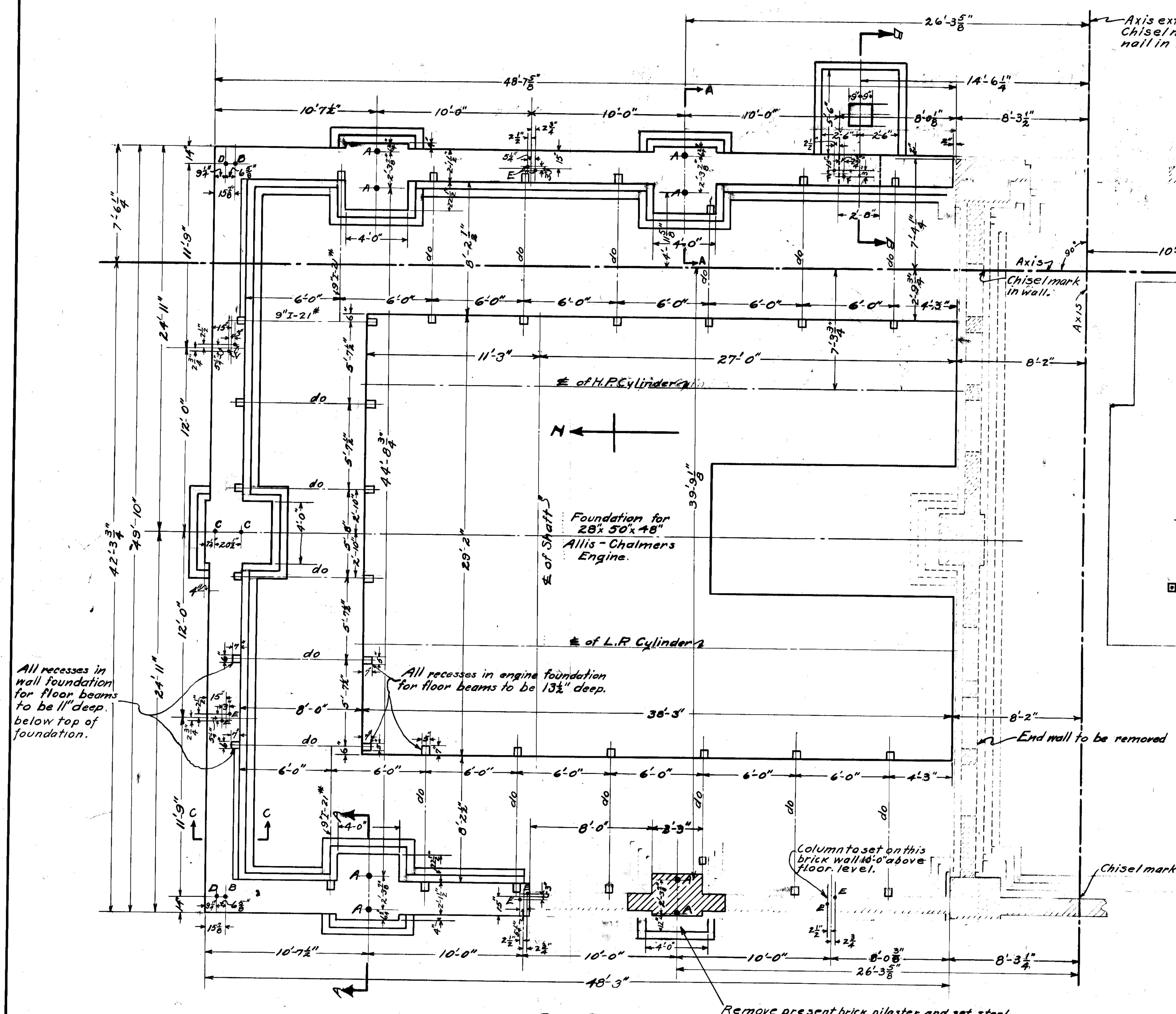
All holes and engine pits in engine room floor to be filled with sand to within six inches of top of present floor and covered with six inch concrete slab.

The Kansas Power and Light Co.
Topeka, Kansas

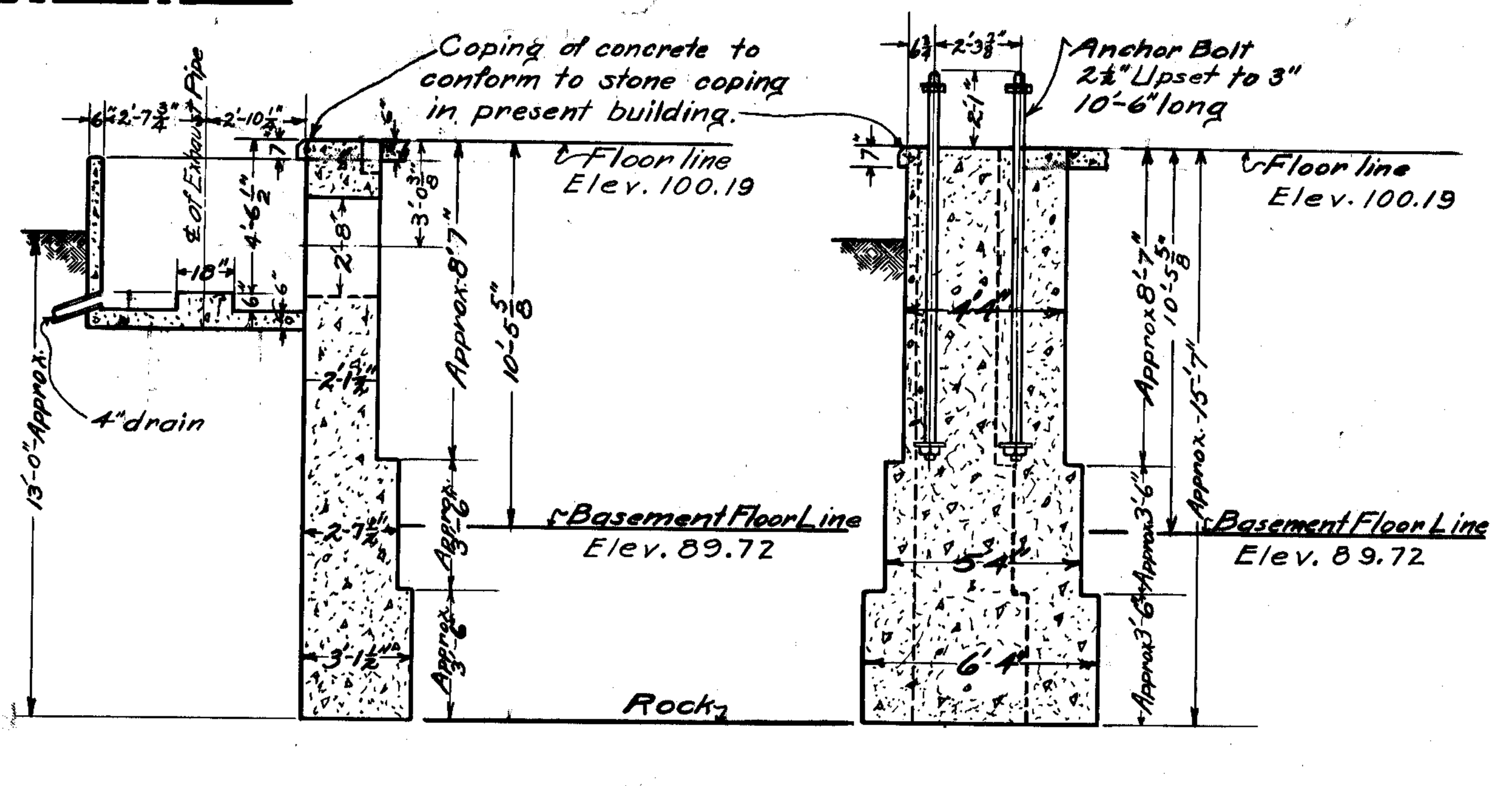
Van Buren Plant
Remodeling for Service
Department Headquarters

DR JDW	CK	Scale 1/8" = 1'-0"
TR	APP	D 7050
CK DPA	APP	
Date Feb. 18, 1943		

DWG No. 5973-F

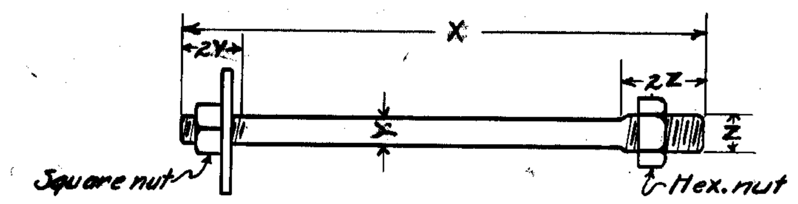


PLAN
Scale ¼" = 1 Ft.

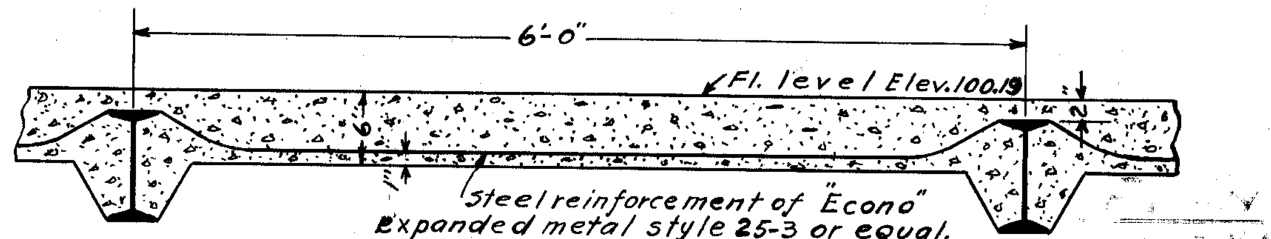


SECTION B-B
Scale ¼" = 1 Ft.

SECTION A-A
Scale ¼" = 1 Ft.

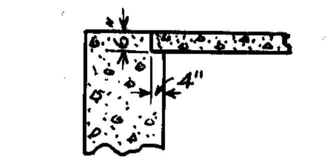


Number Required	Size of Bolt Y	Z	X	Distance of Top above foundation	Location Mark	Washer.
8	2½"	3"	10'-6"	2'-1"	A	6x6x¾"
2	1½"	2"	7'-0"	5½"	B	5x5x½"
2	2¼"	2½"	8'-6"	21"	C	6"x6"x¾"
2	1" Dia. - 4'-0" long			3½"	D	3"x3"x¼"
10	¾" Dia. - 3'-0" long			2⅞"	E	3x3x¼"
2	¾" Dia. - 2'-0" long			2⅞"	F	3"x3"x¼"

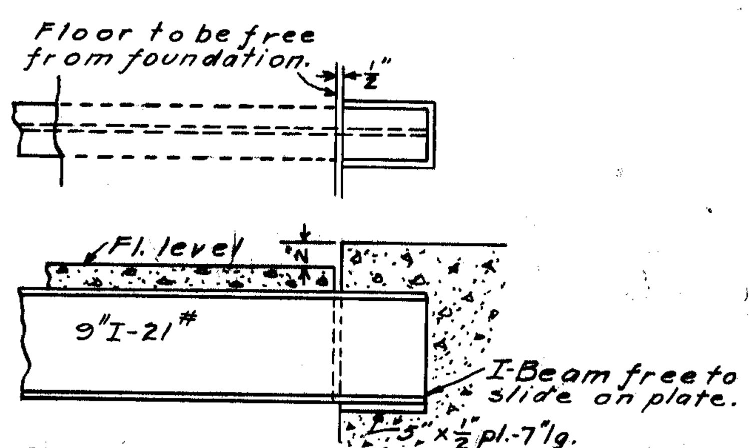


TYPICAL SECTION OF CONCRETE FLOOR
Scale 1" = 1 Ft.

NOTE:- Lap sheets of reinforcing mesh at least 12" at end splices.



SECTION C-C
½" = 1 Ft.



DETAIL OF FLOOR BEAM BEARING ON ENGINE FOUNDATION.
Scale 1" = 1 Ft.

NOTES:-
Heavy lines indicate work covered by this drawing.
Light lines indicate present installation or work not covered by this drawing.
Dimensions from axes take precedence over all others.
Concrete in footings to be 1-2½-5; that in floor 1-2-4 mixture.

REFERENCES:-
For Engine Foundation — See Drwg. C-18567
For Plan of Building — See Drwg. C-18502

FOUNDATION PLAN
ENGINE ROOM EXTENSION
TOPEKA POWER STATION
TOPEKA EDISON COMPANY
TOPEKA, KANSAS

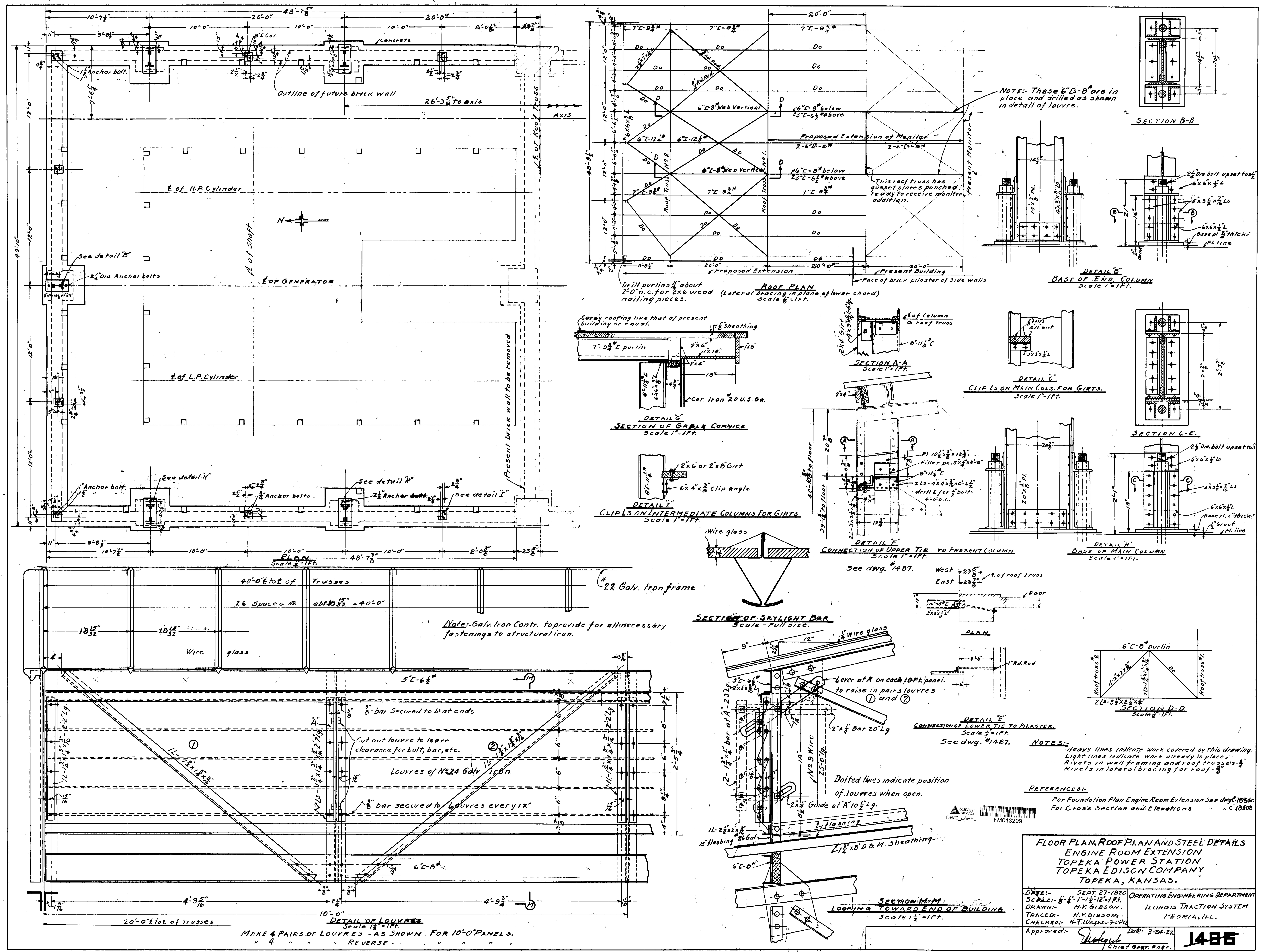
DATE:- AUG. 19, 1920.
SCALE:- ¼" = 1 FT.
DRAWN:- F.B. Saas & H.W. Gibson.
TRACED:- C.R. Shively.
CHECKED:- H.F. Wagner 3-24-22

OPERATING ENGINEERING DEPARTMENT
ILLINOIS TRACTION SYSTEM
PEORIA, ILL.

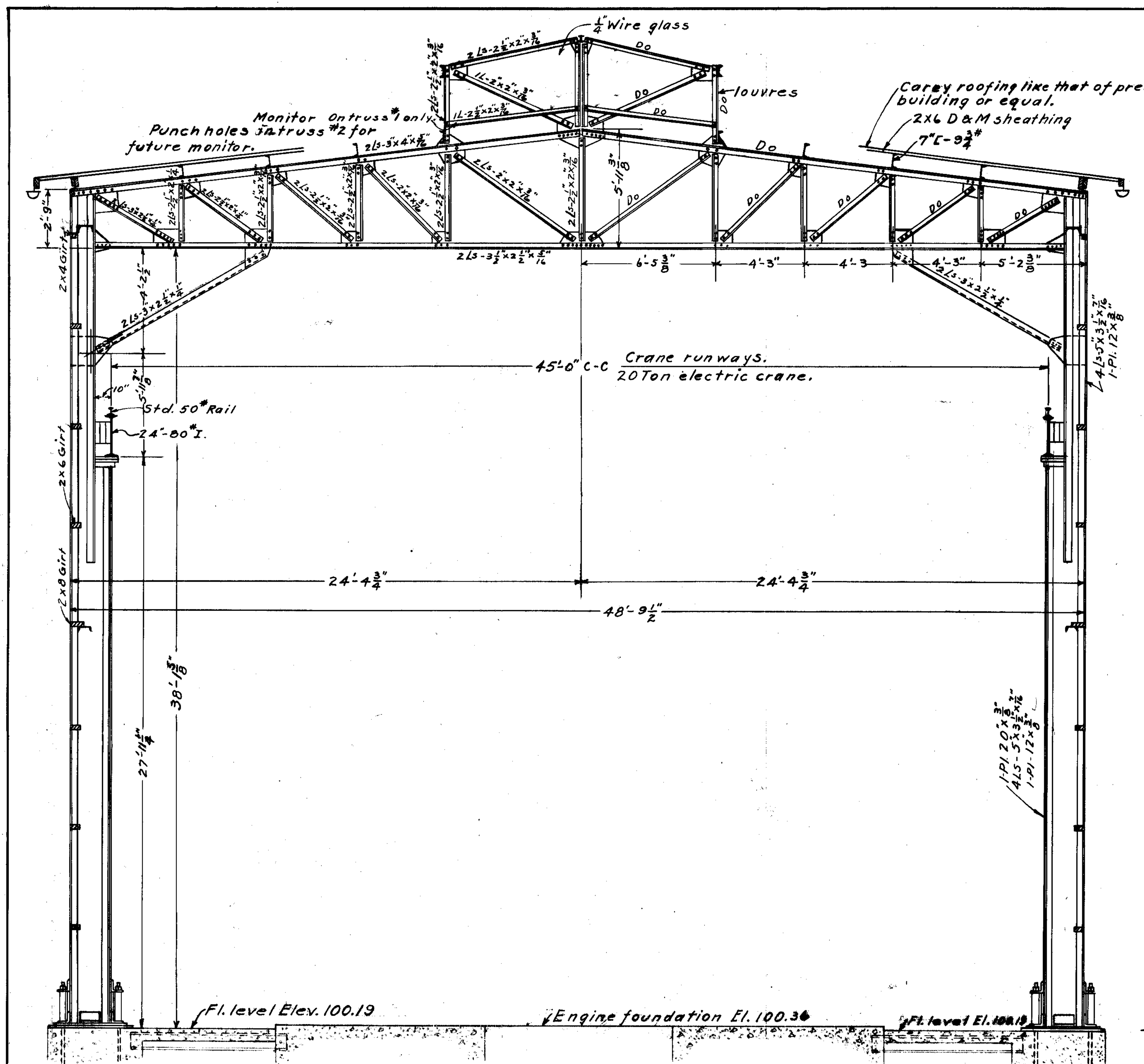
Approved: [signature] Date:- 3-24-22
Chief Oper. Eng.

~~1484~~

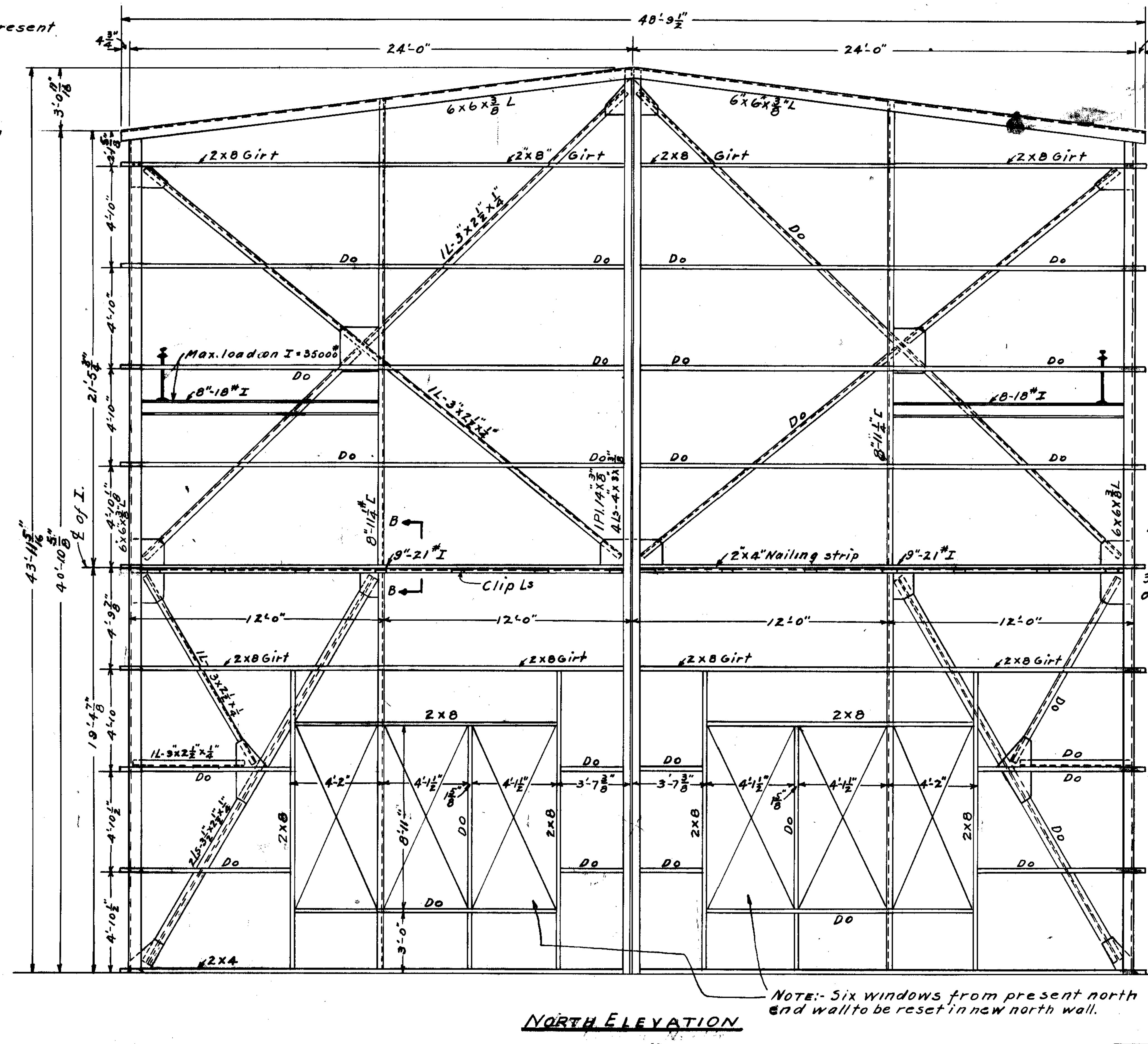
C-18500


PLAN
Scale ¼"=1Ft.
℄ of H.P. Cylinder
℄ of GENERATOR
℄ of L.P. Cylinder
℄ of Shaft
Outline of future brick wall
Present brick wall to be removed
See detail "B"
See detail "H"
See detail "I"
ROOF PLAN
(Lateral bracing in plane of lower chord)
Scale ⅛"=1Ft.
Proposed Extension of Monitor
Proposed Extension
Present Building
Present Monitor
Face of brick pilaster of side walls.
Drill purlins 11/16" about 2'-0" o.c. for 2x6 wood nailing pieces.
This roof truss has gusset plates punched ready to receive monitor addition.
NOTE:- These 6" Ls-8# are in place and drilled as shown in detail of louvre.
SECTION B-B
DETAIL "B"
BASE OF END COLUMN
Scale 1"=1Ft.
DETAIL "G"
SECTION OF GABLE CORNICE
Scale 1"=1Ft.
Carey roofing like that of present building or equal.
SECTION A-A
Scale 1"=1Ft.
DETAIL "C"
CLIP Ls ON MAIN COLS. FOR GIRTS.
Scale 1"=1Ft.
SECTION C-C
DETAIL "I"
CLIP Ls ON INTERMEDIATE COLUMNS FOR GIRTS
Scale 1"=1Ft.
DETAIL "F"
CONNECTION OF UPPER TIE TO PRESENT COLUMN
Scale 1"=1Ft.
See dwg. #1487.
DETAIL "H"
BASE OF MAIN COLUMN
Scale 1"=1Ft.
SECTION OF SKYLIGHT BAR
Scale = Full size.
#22 Galv. Iron frame
Note:- Galv. Iron Contr. to provide for all necessary fastenings to structural iron.
Louvres of No 24 Galv. Iron.
Lever at A on each 10 Ft. panel to raise in pairs louvres ① and ②
Dotted lines indicate position of louvres when open.
DETAIL "E"
CONNECTION OF LOWER TIE TO PILASTER.
Scale ½"=1Ft.
See dwg. #1487.
SECTION D-D
Scale ⅜"=1Ft.
NOTES:-
Heavy lines indicate work covered by this drawing.
Light lines indicate work already in place.
Rivets in wall framing and roof trusses-¾"
Rivets in lateral bracing for roof-⅝"
REFERENCES:-
For Foundation Plan Engine Room Extension See dwg. C-18500
For Cross Section and Elevations " C-18503
DETAIL OF LOUVRES
Scale 1½"=1Ft.
MAKE 4 PAIRS OF LOUVRES - AS SHOWN FOR 10'-0" PANELS.
" 4 " " " REVERSE - " " " .
SECTION M-M
LOOKING TOWARD END OF BUILDING
Scale 1½"=1Ft.
FLOOR PLAN, ROOF PLAN AND STEEL DETAILS
ENGINE ROOM EXTENSION
TOPEKA POWER STATION
TOPEKA EDISON COMPANY
TOPEKA, KANSAS.
DATE:- SEPT. 27-1920
SCALE:- ⅛"-¼"-1"-1½"-12"=1Ft.
DRAWN:- H.Y. GIBSON.
TRACED:- H.Y. GIBSON.
CHECKED:- H.F. Wagner 3-24-22
Approved:-
Chief Engr. Engr.
Date:- 3-24-22
OPERATING ENGINEERING DEPARTMENT
ILLINOIS TRACTION SYSTEM
PEORIA, ILL.
1486
FM013299

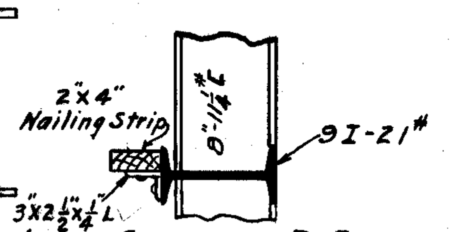
C-18502



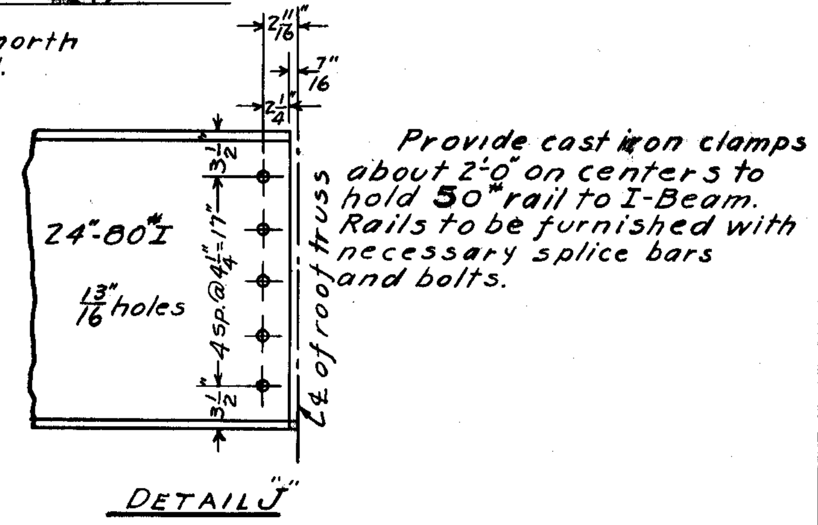
CROSS SECTION
Scale 1/4"=1Ft.



NORTH ELEVATION
Scale 1/4"=1Ft.

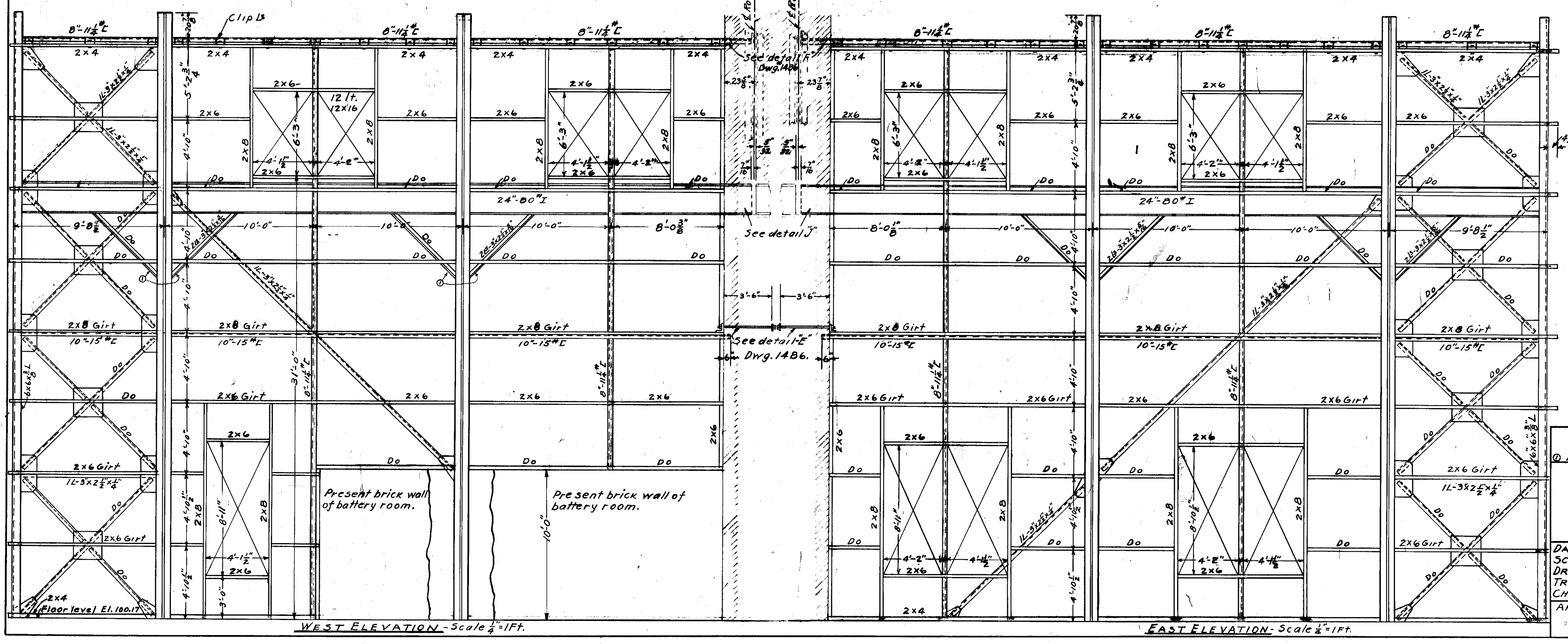


SECTION B-B
Scale 1"=1Ft.



Provide cast iron clamps about 2'-0" on centers to hold 50# rail to I-Beam. Rails to be furnished with necessary splice bars and bolts.

DETAIL "J"
DRILLING FOR END OF CRANE RUNWAY GIRDER
Scale 1"=1Ft.



WEST ELEVATION - Scale 1/4"=1Ft.

EAST ELEVATION - Scale 1/4"=1Ft.

NOTES:-
Heavy lines indicate work covered by this drawing.
Light lines indicate work already in place.
All lateral bracing to be in the plane of inside flanges of 8" [columns.
All rivets to be 3/4". Gusset plates 3/8".
Field connections to be riveted.
Sides to be covered with corrugated steel #20 U.S. Ga. 4" end lap and one corrugation side lap.

REFERENCES:-
For Foundation Plan See Dwg. C-18500.
For Plans and Steel Details See Dwg. C-18502.

DWG_LABEL FM013300

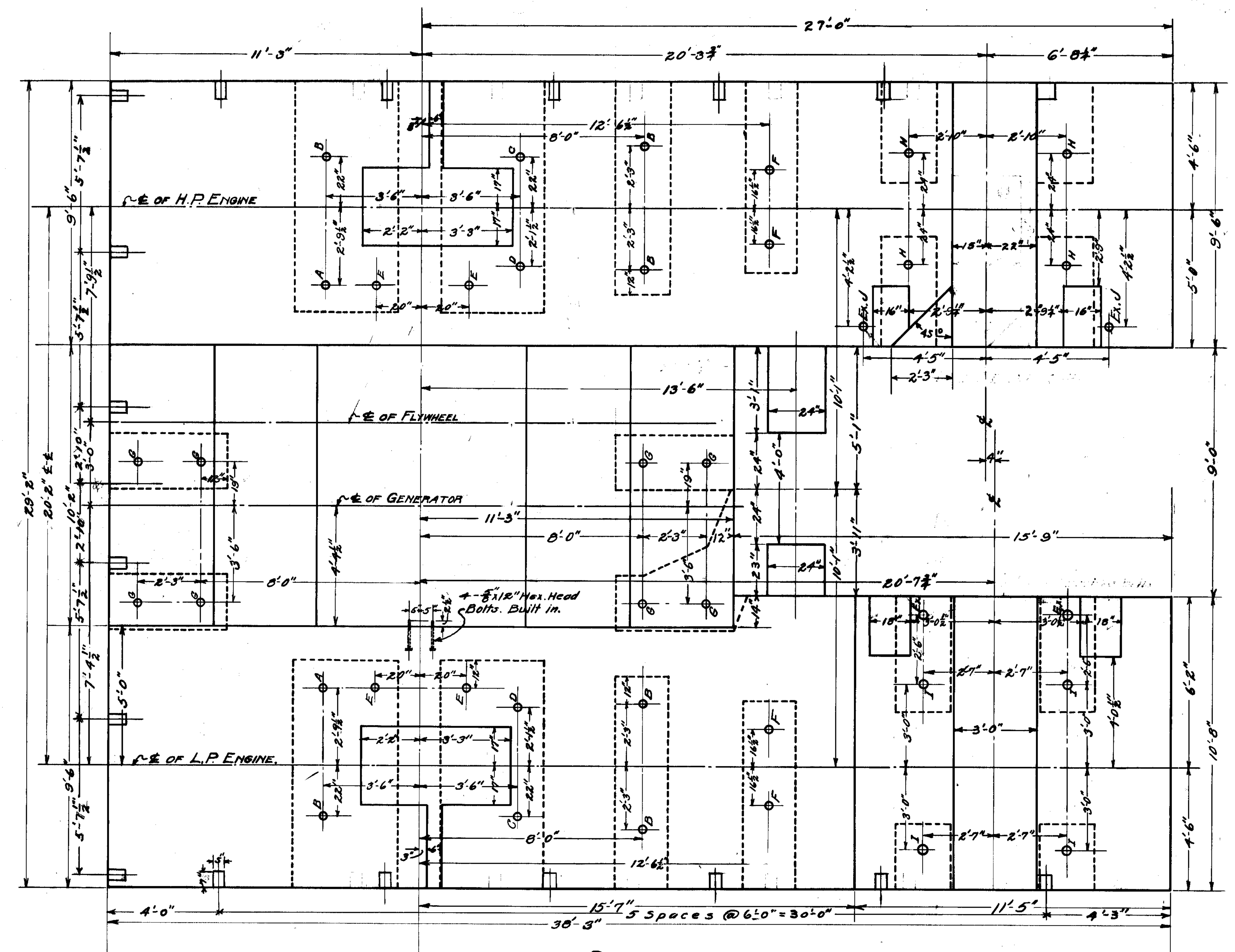
① Added braces 4-27-22 W.K.C. H.T.W.

CROSS SECTION AND ELEVATIONS
ENGINE ROOM EXTENSION
TOPEKA POWER STATION
TOPEKA EDISON COMPANY
TOPEKA, KANSAS.

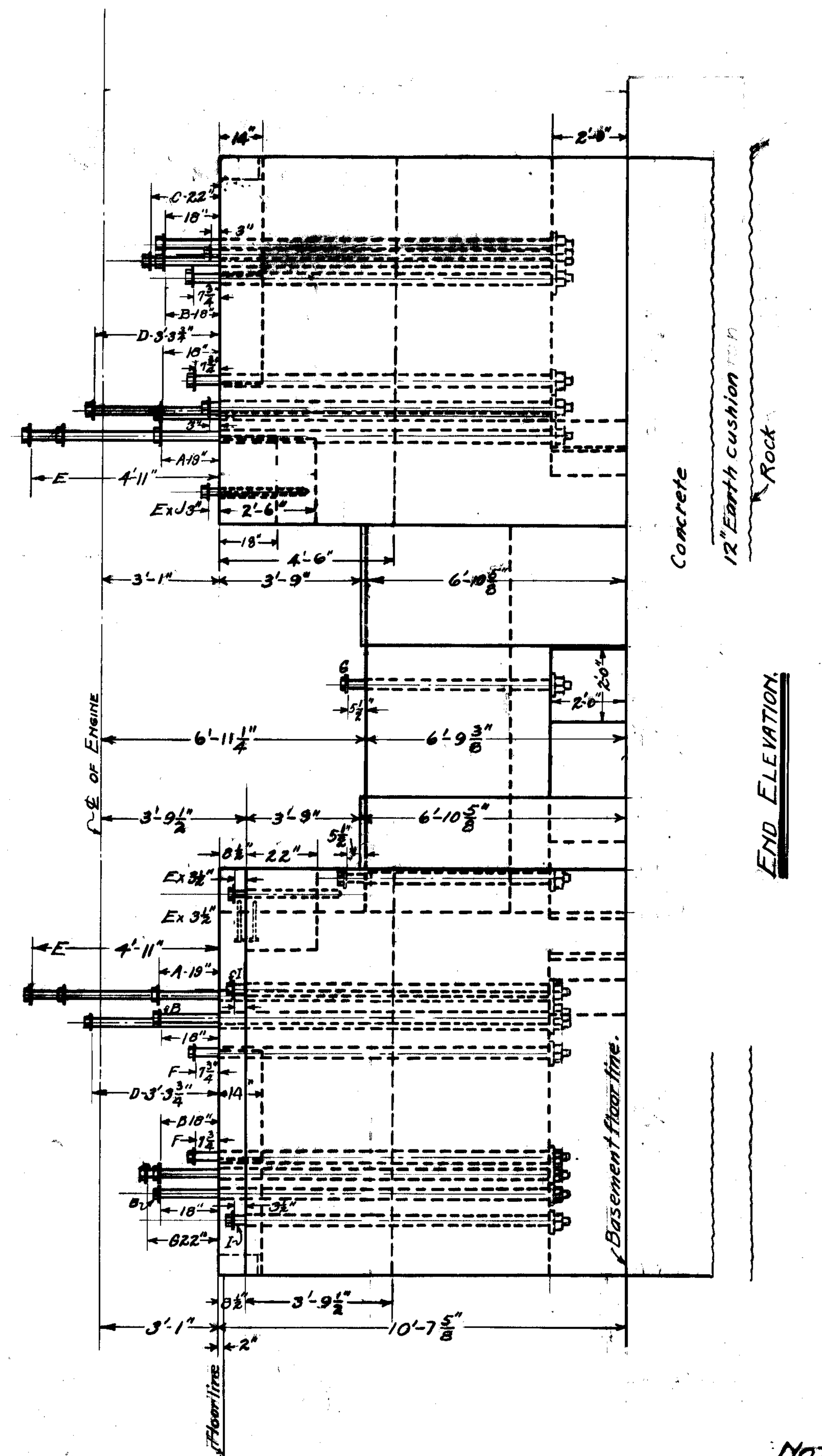
DATE:- SEPT. 9-1920 SCALE:- 1/4"=1FT. DRAWN:- F.B. SAAS, H.V. GIBSON. TRACED:- H.V. GIBSON. CHECKED:- H.F. Wagner 3-24-22	OPERATING ENGINEERING DEPARTMENT ILLINOIS TRACTION SYSTEM PEORIA, ILL.
APPROVED:- [signature] Chief Oper. Engr.	Date:- 3-24-22

1487

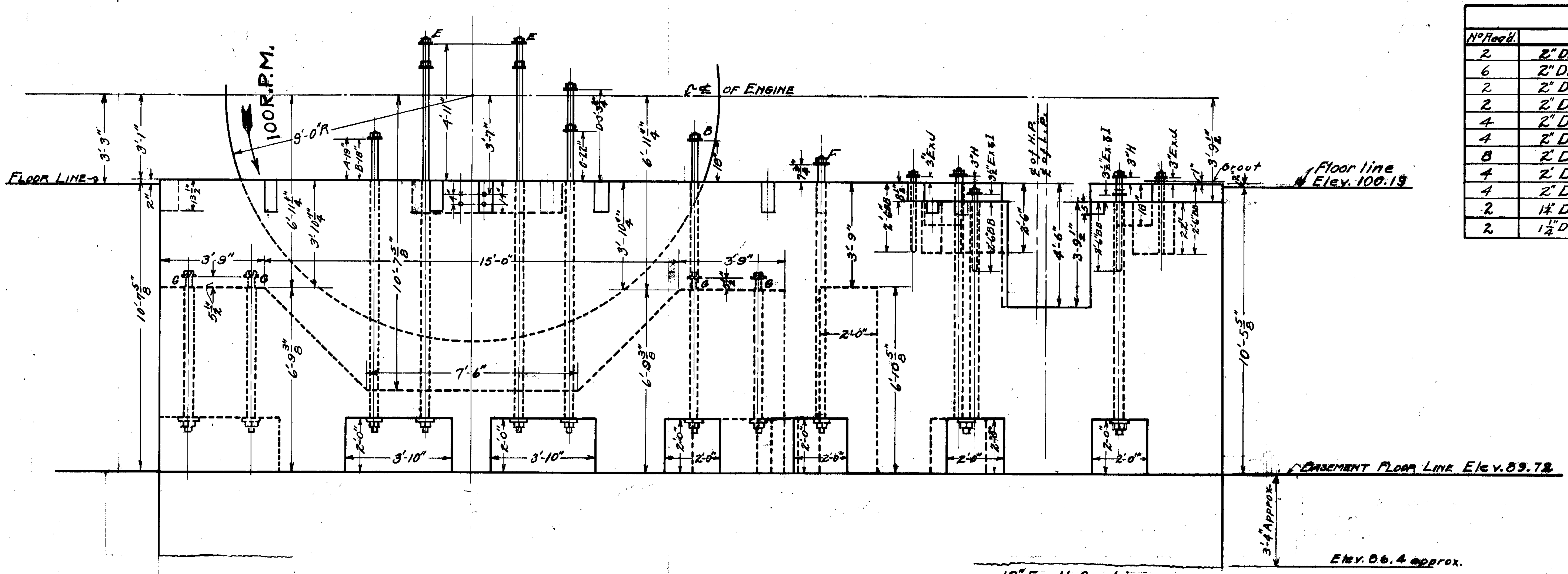
C-18503



PLAN.



END ELEVATION.



SIDE ELEVATION

FOUNDATION BOLTS		
Nº Req'd.	Size of Bolts	Location Mk.
2	2" Dia. x 10'-11" Long	A
6	2" Dia. x 10'-10" Long	B
2	2" Dia. x 11'-2" Long	C
2	2" Dia. x 12'-7 3/4" Long	D
4	2" Dia. x 14'-3" Long	E
4	2" Dia. x 9'-11 3/4" Long	F
8	2" Dia. x 5'-11 1/4" Long	G
4	2" Dia. x 9'-7" Long	H
4	2" Dia. x 8'-11" Long	I
2	1 1/4" Dia. x 3'-0 1/2" Bruised Bolt	Ex
2	1 1/4" Dia. x 3'-0" " "	ExJ

NOTES:-

One inch has been allowed between top of foundation and bed plate for grout.

All bolts threaded 6" both ends, except those marked E, thread one end 12" and the other end 6".

Bruised bolts threaded 4" one end only.

Use 6"x6"x1/2" sq. washers at lower end of 2" foundation bolts.

All bolts to be set in 3" pipe casings, except bruised bolts.

Concrete to be 1-2 1/2-5.

REFERENCES:-

Foundation Plan Engine Room Extension - See Dwg. C-18500
Building Plan " " C-18502

FOUNDATION
28" & 50" x 48" ALLIS-CHALMERS ENGINE
TOPEKA POWER STATION
TOPEKA EDISON COMPANY
TOPEKA, KAN

DATE:- JULY 24, 1920.
SCALE:- 3/8" = 1 FT.
DRAWN:- F.B. SAAS
TRACED:- C.R. SHIVELY.
CHECKED:- H.V. Gibson

OPERATING ENGINEERING DEPARTMENT.
ILLINOIS TRACTION SYSTEM.
PEORIA, ILL.

APPROVED: [signature] DATE:- 3-24-22
Chief Oper. Eng.

~~1485~~

C-18501


ALLEY - NORTH & SOUTH
NEW SHED - NOW CONSTRUCTED
66'-0"
OIL TANK
STACK
DOOR
DOOR
ALTERNATE CORNER
PROPOSED TOILET & WASH ROOM FOR PLANT PERSONNEL
33'-4"
30'
BOILER ROOM
20'-0"
85'-0"
GARAGE (PROPOSED)
ALLEY - EAST & WEST
DOOR
DOOR
121'-6"
128'
76'-6"
93'
20'
SUBSTATION AREA
29'-0"
EXISTING WASH & TOILET
A
A
OLD SHEDS TO BE REMOVED
25'
12'-0"
12'-0"
DOOR
DOOR
OVERHEAD DOORS
BRICK IN WALL
SIDEWALK
SIDEWALK
302'
94'-0"
30'-0"
20'-0"
DRIVE
DRIVE
TOWER BASE
30'-6"
CURB
VAN BUREN ST.
NORTH
VAN BUREN ST. SUBSTATION
1955
SCALE: 1/8"
Duane D. Goodrich
PROPOSED SITE PLAN

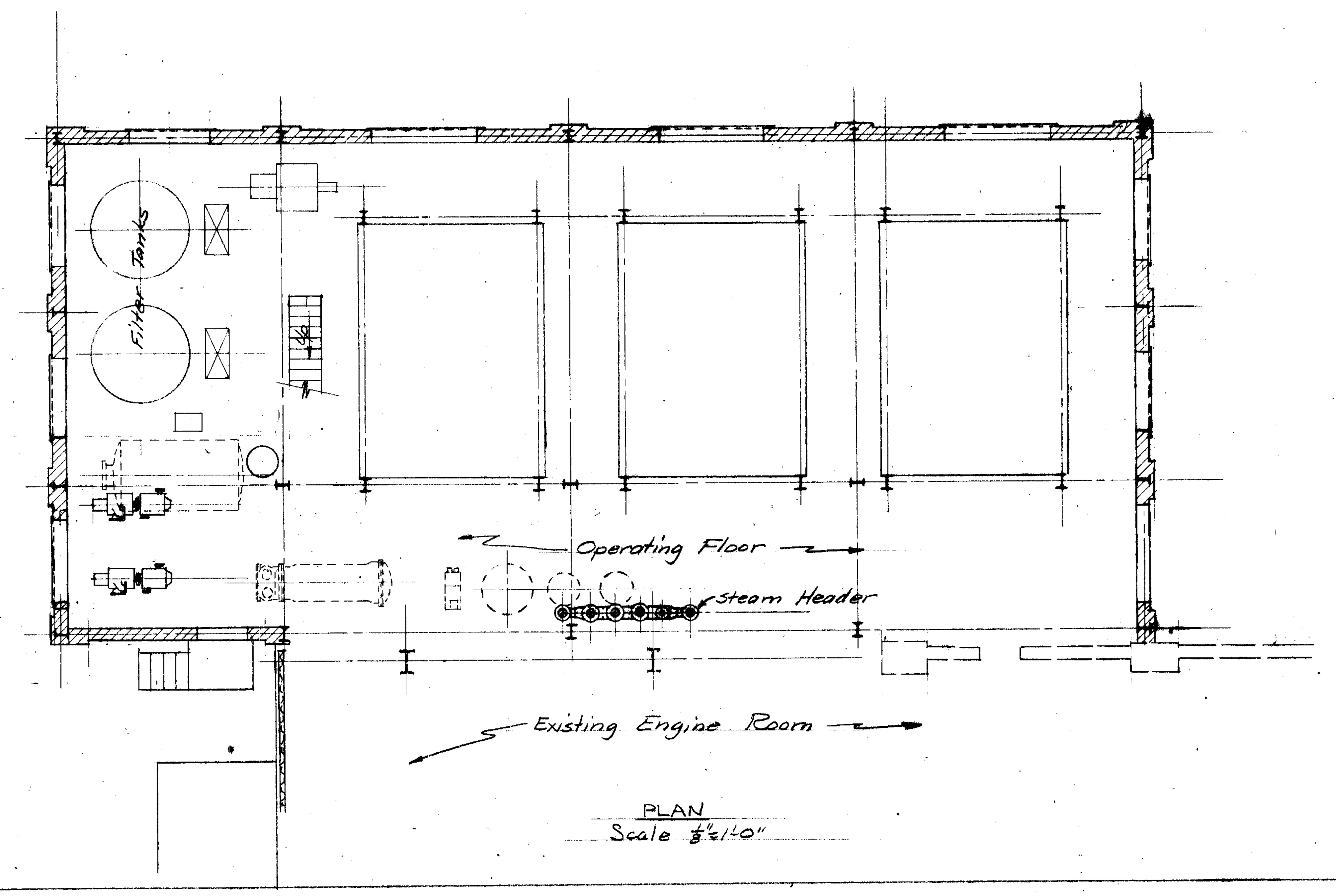

STACK
UP
D.O.
D.O.
D.O.
D.O.
D.O.
D.O.
20'-0"
151'-0½"
150'-7½"
300'-9½"
KPL
PROPOSED
VAN-BUREN STREET SUB-STATION
BUILDING IMPROVEMENTS <1/8"=1'-0">
30 MAR 56


UNDERGROUND OIL STORAGE TANK
OIL STORAGE
STACK
MANHOLE
WATER TANK
WATER TANK
CORRUGATED METAL STORAGE SHED
33/13.8 KV TRANSFORMER
TRANSFORMER
TRANSFORMER
TRANSFORMER
REGUL.
TOWER BASE
TOWER BASE
N
UP
UP
SEVENTH STREET
VAN BUREN STREET
21'-10"
20'-4"
20'-3"
20'-4"
20'-4"
20'-4"
20'-4"
21'-10"
26'-8½"
105'-6"
22'-8½"
22'-2¼"
19'-6½"
19'-6½"
19'-6"
20'-10½"
149'-4"
21'-3½"
14'-1"
23'-3"
23'-3"
23'-3"
14'-0"
31'-0"
150'-7½"
150'-2"
300'-9½"
Scanning America
DWG_LABEL
FM013304
THE KANSAS POWER AND LIGHT COMPANY
TOPEKA, KS.
GENERAL PLOT PLAN - VAN BUREN PLANT AND SUBSTATION - BETWEEN 7TH & 8TH STREETS ON VAN BUREN STREET
Scale - 1/8" = 1'-0"
REC - 10/7/50

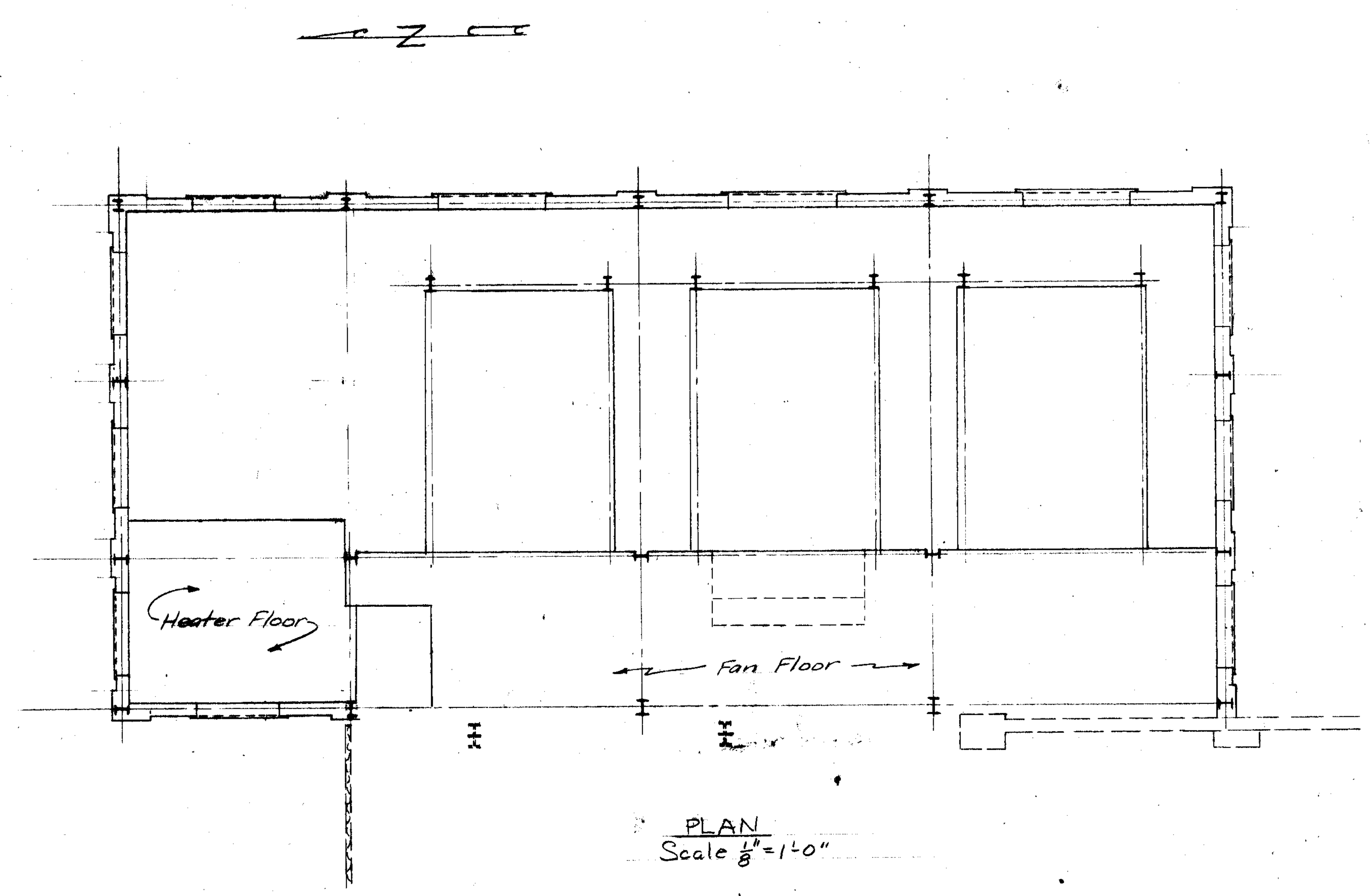
DWG LABEL FM013305

THE KANSAS POWER AND LIGHT COMPANY TOPEKA, KANSAS	
PIPE SHED VAN BUREN PLANT	
DRAWN BY: M.L.G.	DATE DRAWN: 11-12-54
CHECKED BY:	
APPROVED BY:	SCALE: VARIOUS


Existing Stack
Heat Exchanger
Filters
Transfer Pumps
Up
Ladder
El. 115.0'
El. 116.0'
Oil Pump
Boiler Panel
Boiler Feed Pumps
SECTION A-A
Scale 1/8"=1'-0"
Upper Surge Tank
El. 145.5'
El. 132.5'
El. 115.0'
El. 103.0'
Rock
SECTION D-D
Scale 1/8"=1'-0"
Flash Tank
El. 145.5'
El. 132.5'
I.D. Fans
Water Col.
Economizer
Upper Surge Tank
Ladder
Limits of Equipment
De-aerating Heater
Existing Engine Room
SECTION B-B
Scale 1/8"=1'-0"
Existing Stack
℄ Ventilators
SECTION C-C
Scale 1/8"=1'-0"
3-11-41
PRELIMINARY
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

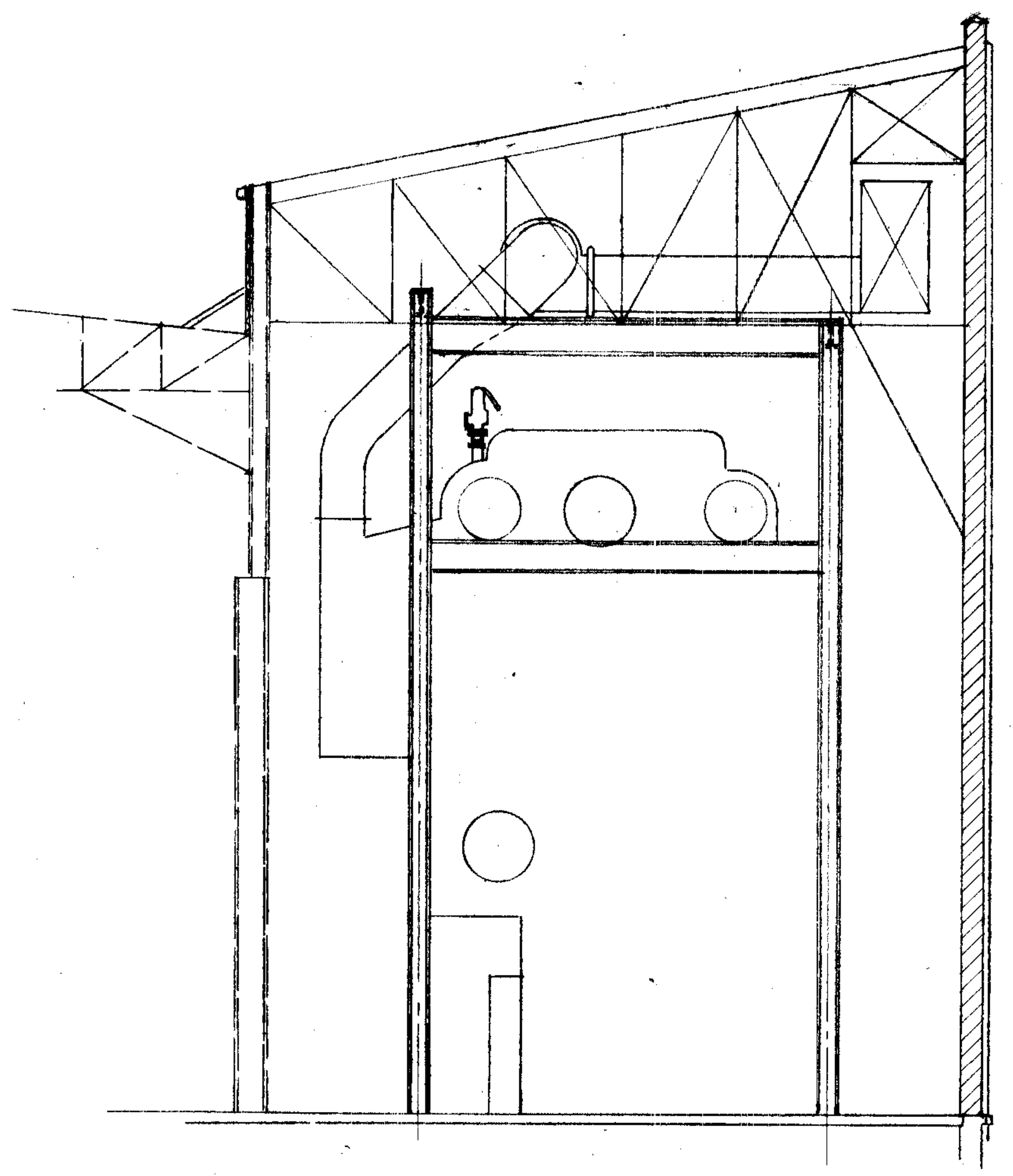


PLAN
Scale 1/8" = 1'-0"

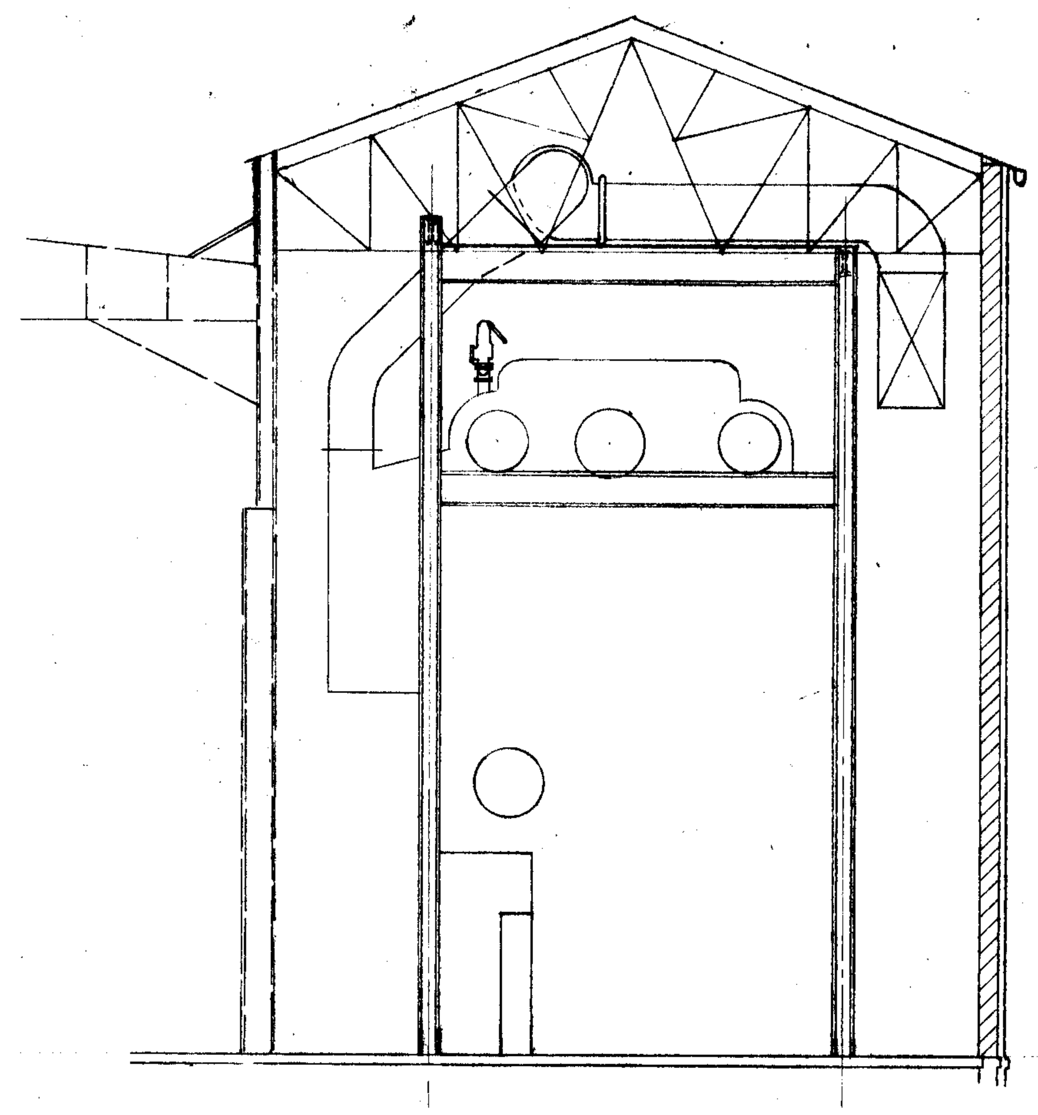


PLAN
Scale 1/8" = 1'-0"

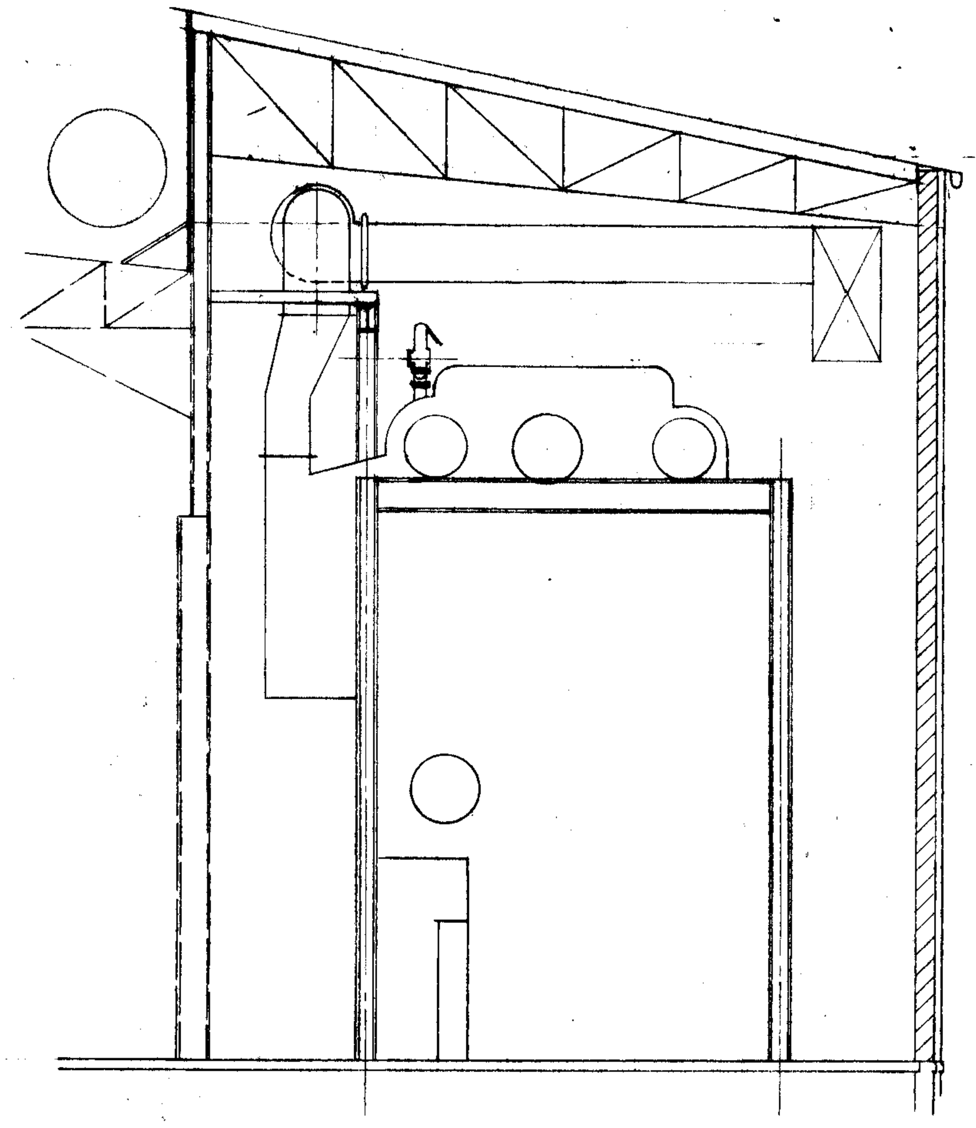
K.P.&L.
Black & Veatch
Kansas City, Mo.
1941



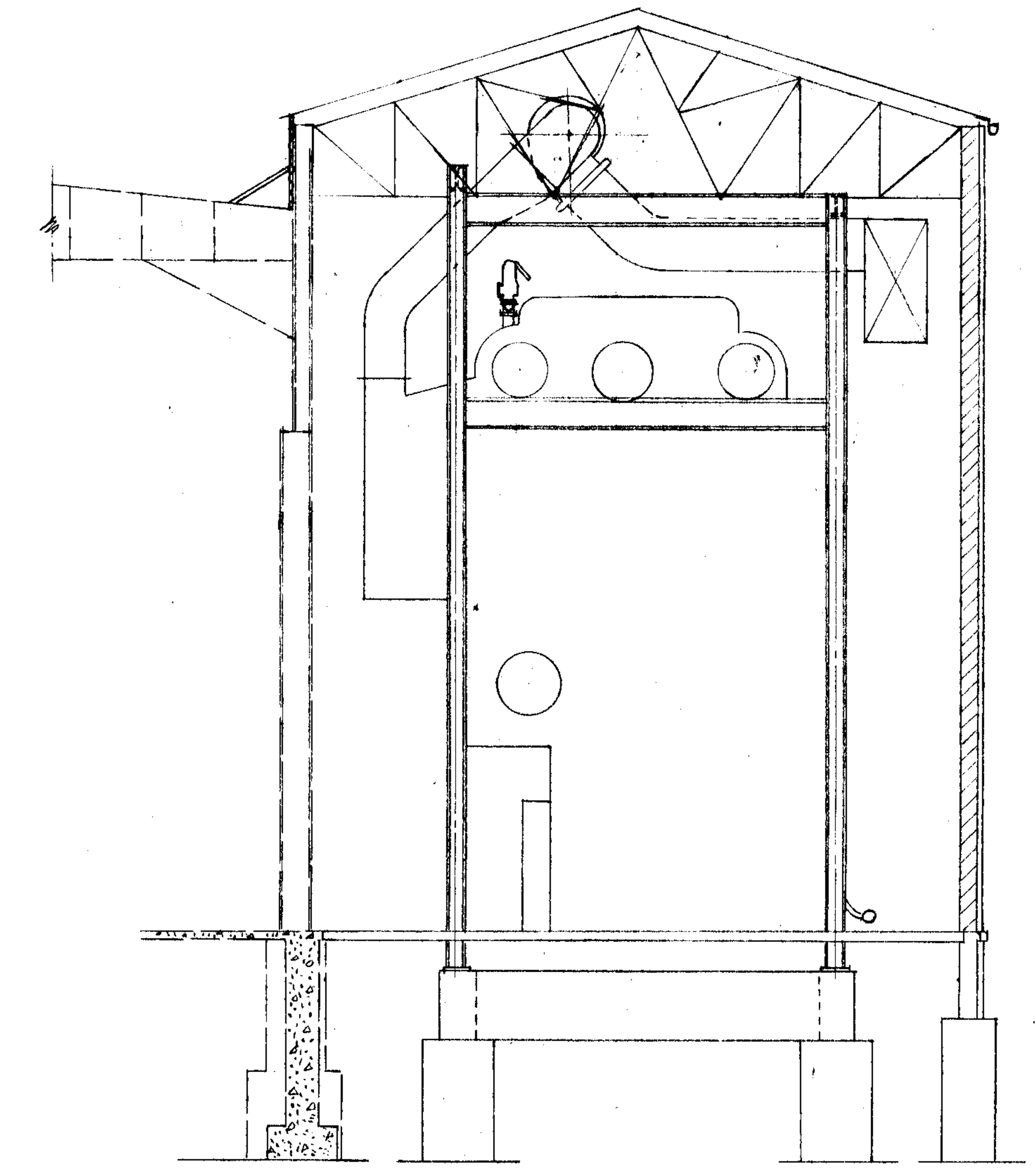
ARRANGEMENT "A"
Scale: 1/8" = 1'-0"



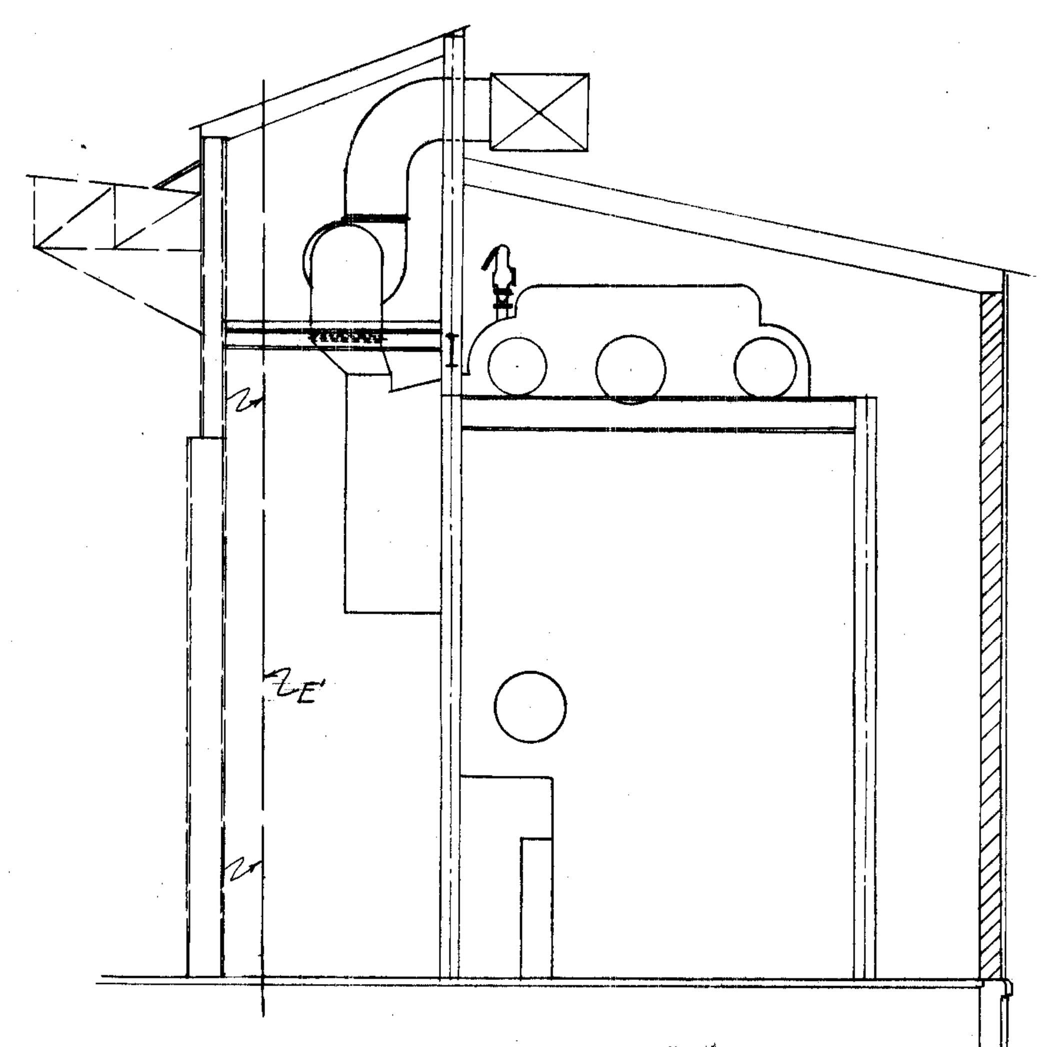
ARRANGEMENT "B"
Scale: 1/8" = 1'-0"



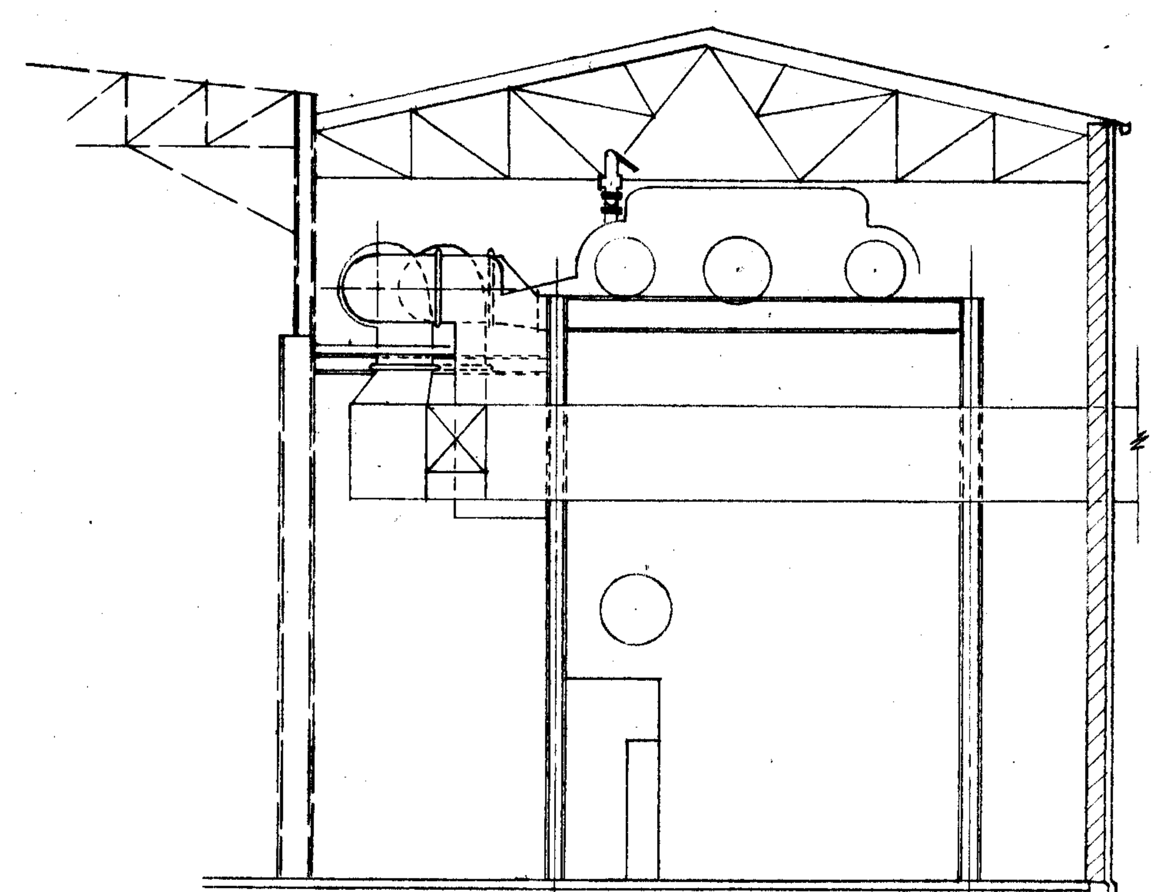
ARRANGEMENT "C"
Scale: 1/8" = 1'-0"



ARRANGEMENT "D"
Scale: 1/8" = 1'-0"



ARRANGEMENT "E"
Scale: 1/8" = 1'-0"

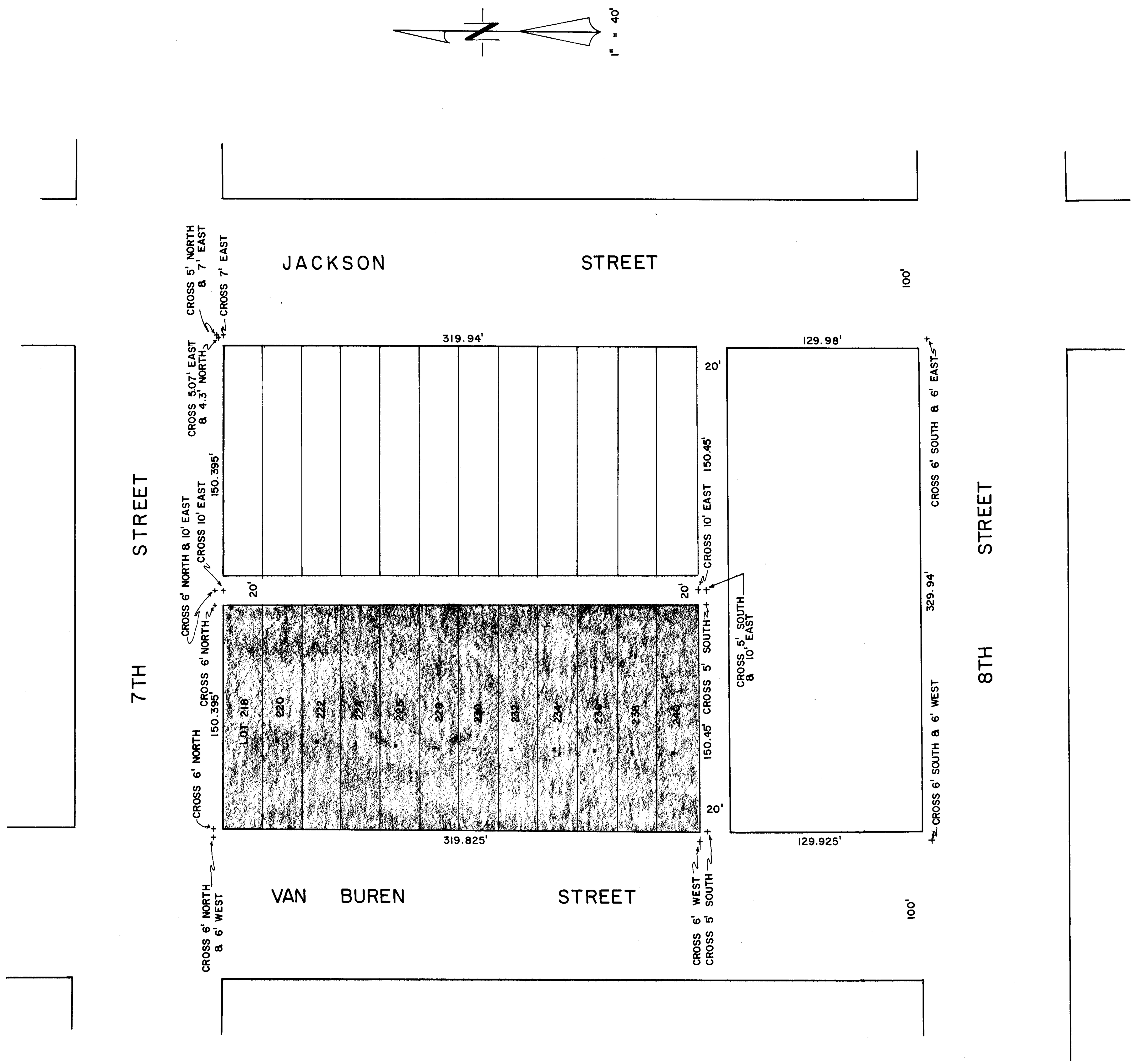


ARRANGEMENT "F"
Scale 1/8" = 1'-0"

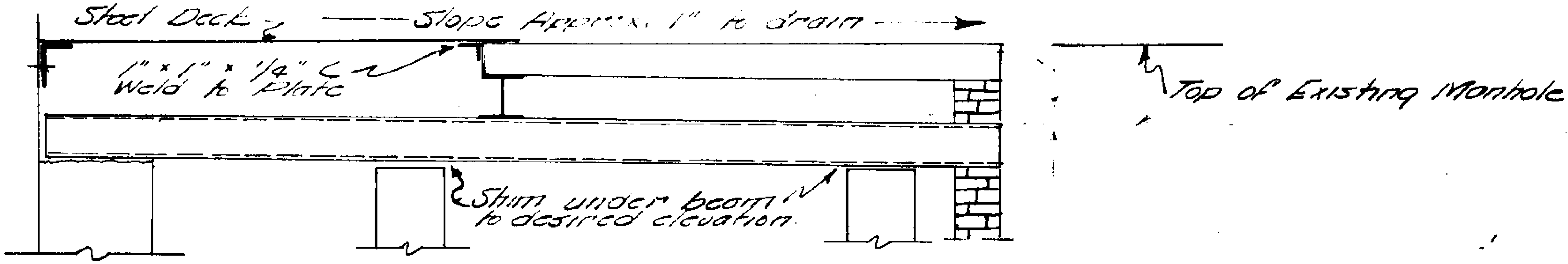
SUGGESTED ARRANGEMENTS
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941


PLAN
SECTION C-C
Scale ⅛" = 1'-0"
Heater Floor
SECTION E-E
Scale ⅛" = 1'-0"
SECTION F-F
Scale ⅛" = 1'-0"
North Boiler Room
Economizer
Filter Room
PLAN
SECTION D-D
Scale ⅛" = 1'-0"
PLAN
SECTION B-B
Scale ⅛" = 1'-0"
SECTION A-A
Scale ⅛" = 1'-0"
K. P. & L.
Black & Veatch
K.C. Mo.
1941

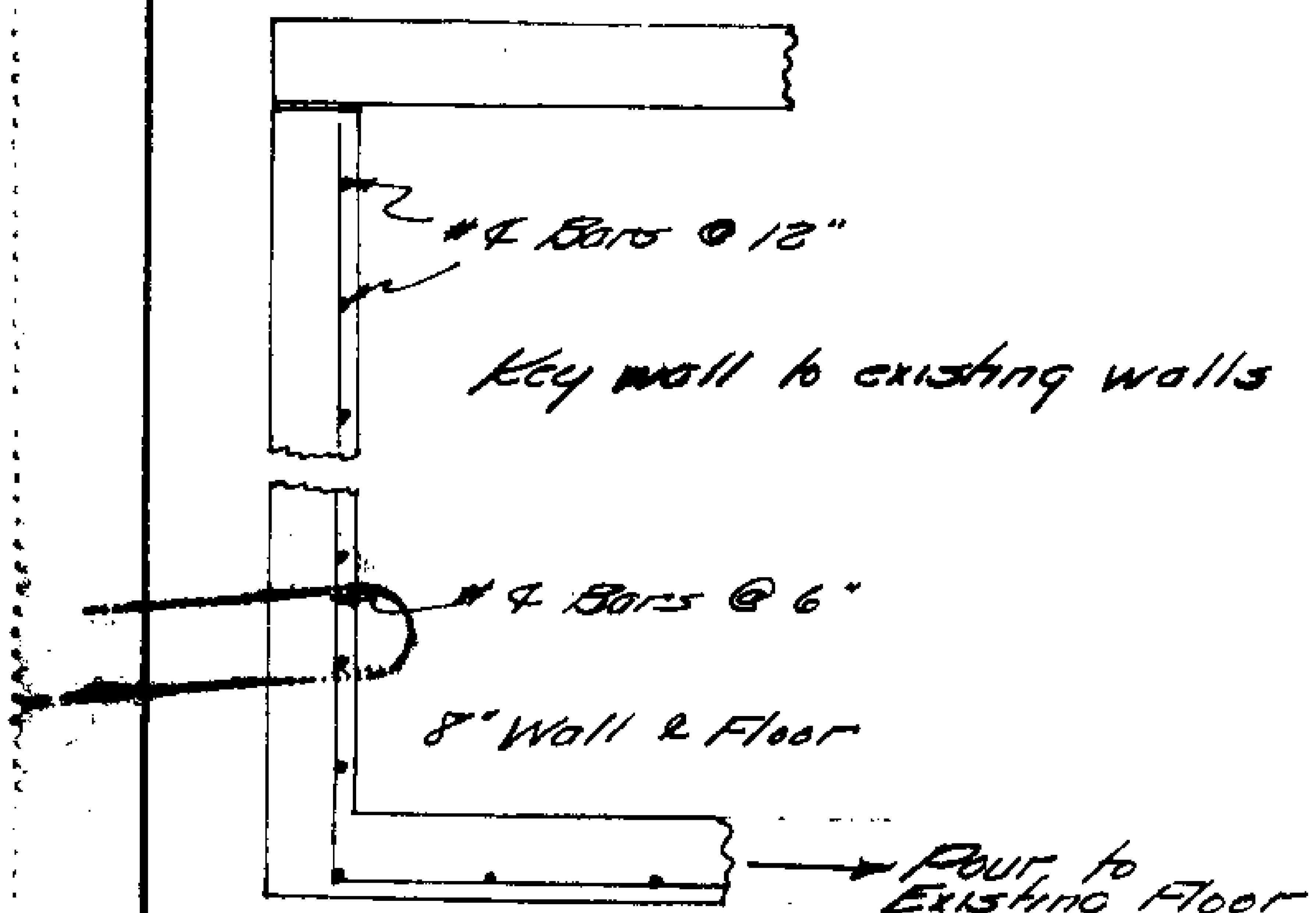

Filter Room
Metal Wall Between Engine Room and Boiler Room
6" Weld El
9'-3"
Filter Room Floor
Install 6" Valves
6" Flanged El
6" Weld El
Header Pipe From City Water Meter
6" to 5" Reducer Bushing
26"
Existing Storage Tank Header System
North Elevation
Discontinue Piping at This Point Until Softener Installation Plans Are Complete
Note: All Piping From Outlet of Zeolite Softener to Storage Tank Header to Be 6" Pipe
Sheet Metal Wall
Header Pipe From City Water Meter
Weld
26"
2'-1"
3'-9"
2'-3"
2'-0"
Existing Storage Tank Header System
Plan
Piping for Zeolite Water Softener for Boiler Feedwater Van Buren Heating Plant
Weld El 6"
9'-3"
To Filter
To Storage Tanks
Existing Storage Tank Header System
West Elevation
DWG LABEL
FM013310
The Kansas Power and Light Co.
Topeka, Kansas
Piping for Zeolite Water Softener - Van Buren Plant
DR JDW
CK
TR
APP
CK
APP
DATE 8-8-42
SCALE 3/8"=1'-0"
D-7035



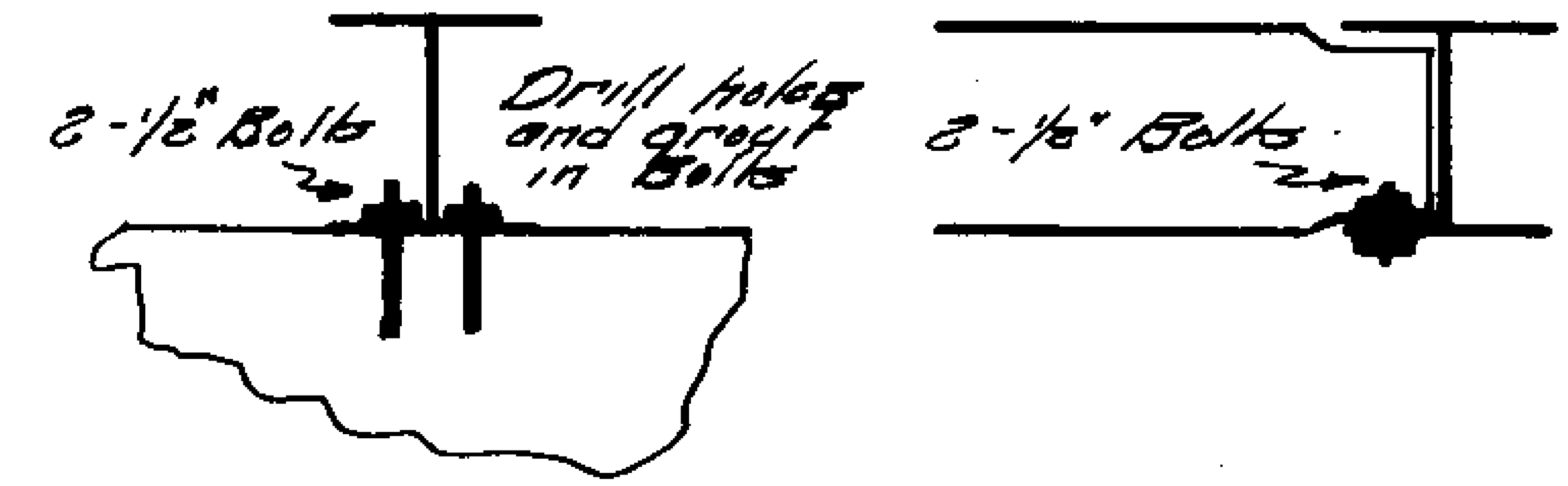
THE KANSAS POWER AND LIGHT COMPANY TOPEKA , KANSAS		
PROPERTY PLAT OF VAN BUREN PLANT SITE		
DATE 7-31-57	DRAWN BY L.R.	
SCALE 1" = 40'		



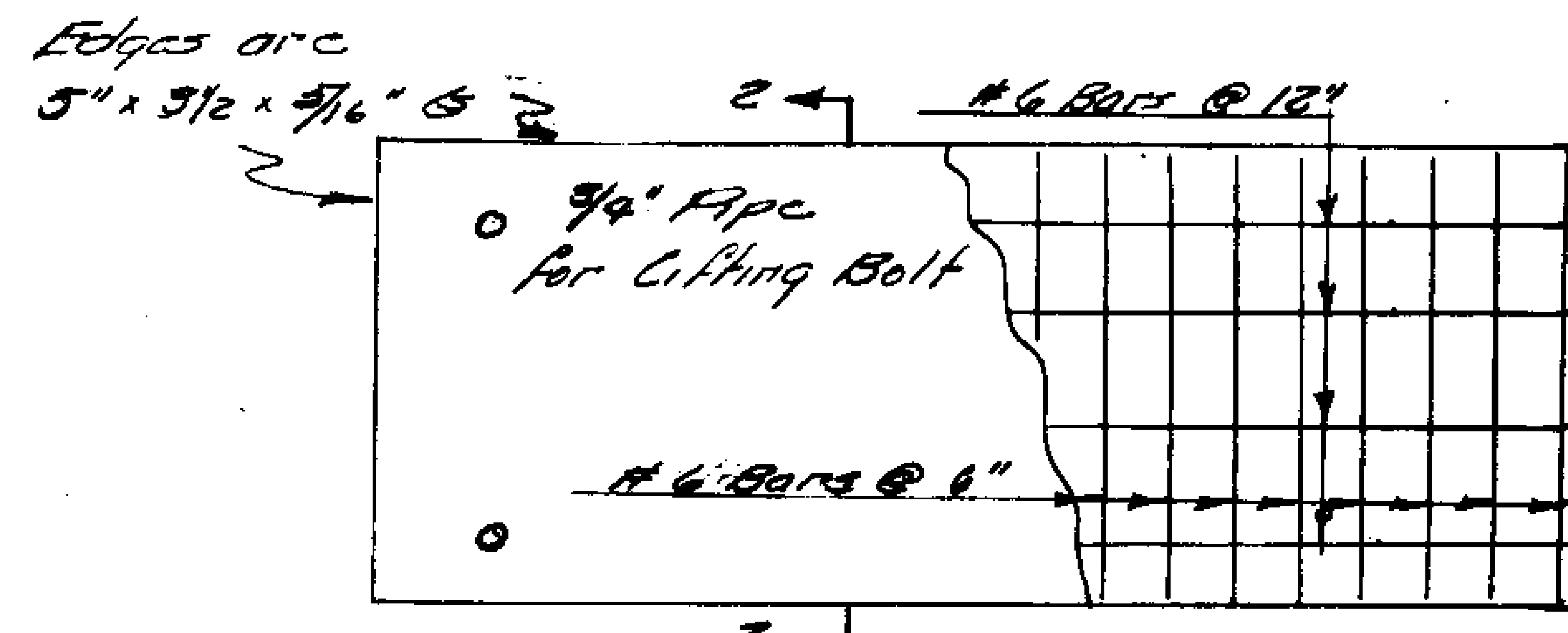
Section 1-1



Typical Wall & Floor Section



Typical Beam Connections



Typical Precast Slab

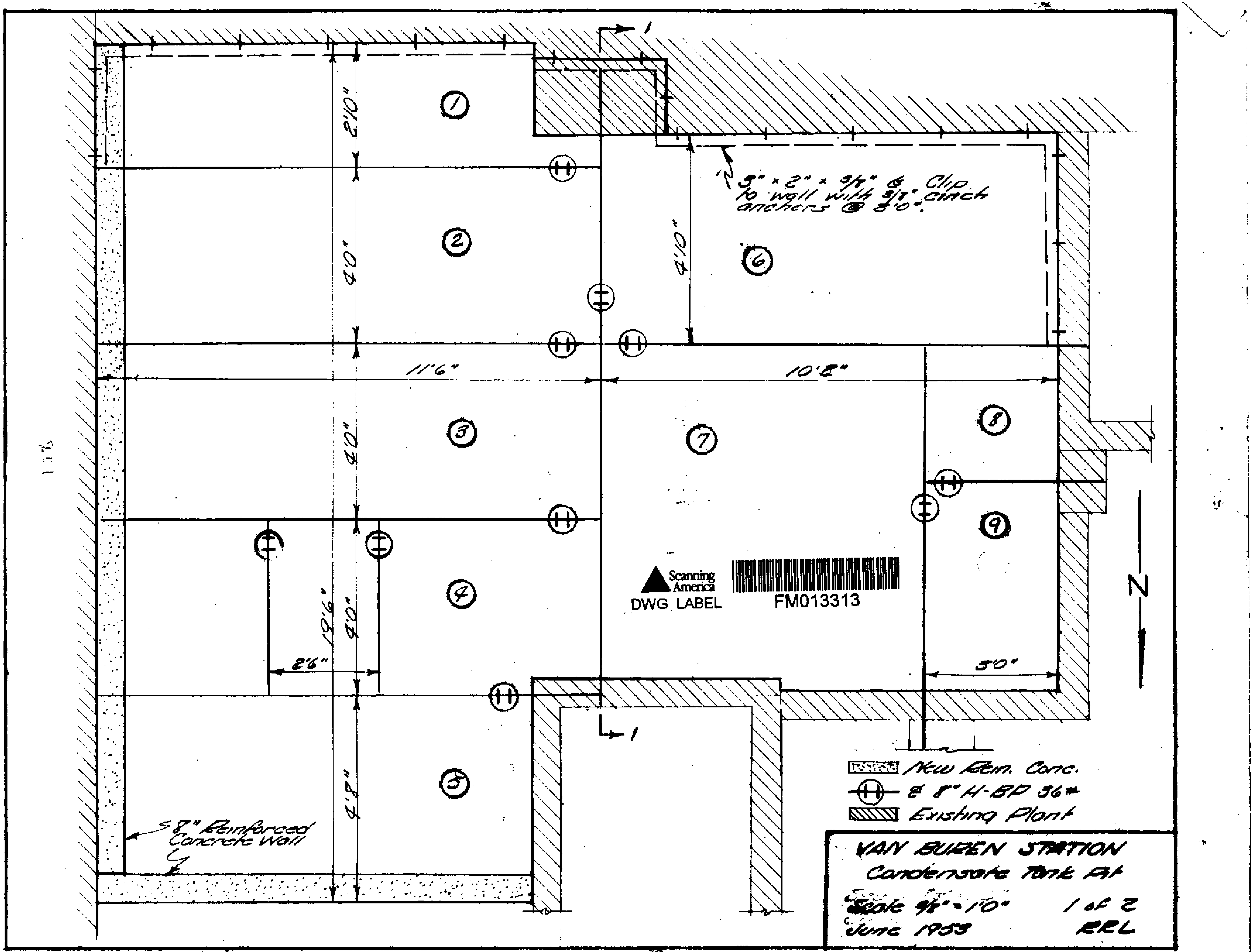
Section 2-2

Notes -

All dimensions given are only approx.
and must be verified in the field.
Sections 1 & 6 are Steel Deck.
Sections 2, 3, 4, & 5 are precast slabs
Sections 7, 8 & 9 are poured in place slabs.
Poured in place slab to have same
reinforcing as precast.
Precast slab 4 to have manhole assemby
over tank opening. Bend Re-bars around
the manhole assembly.
Leave 1/2" Clearance around all edges of
precast slabs.

VAN BUREN STATION
Condensate Tank Pit

Scale 3/8" = 1'0" 2 of 2
June 1958 RKL

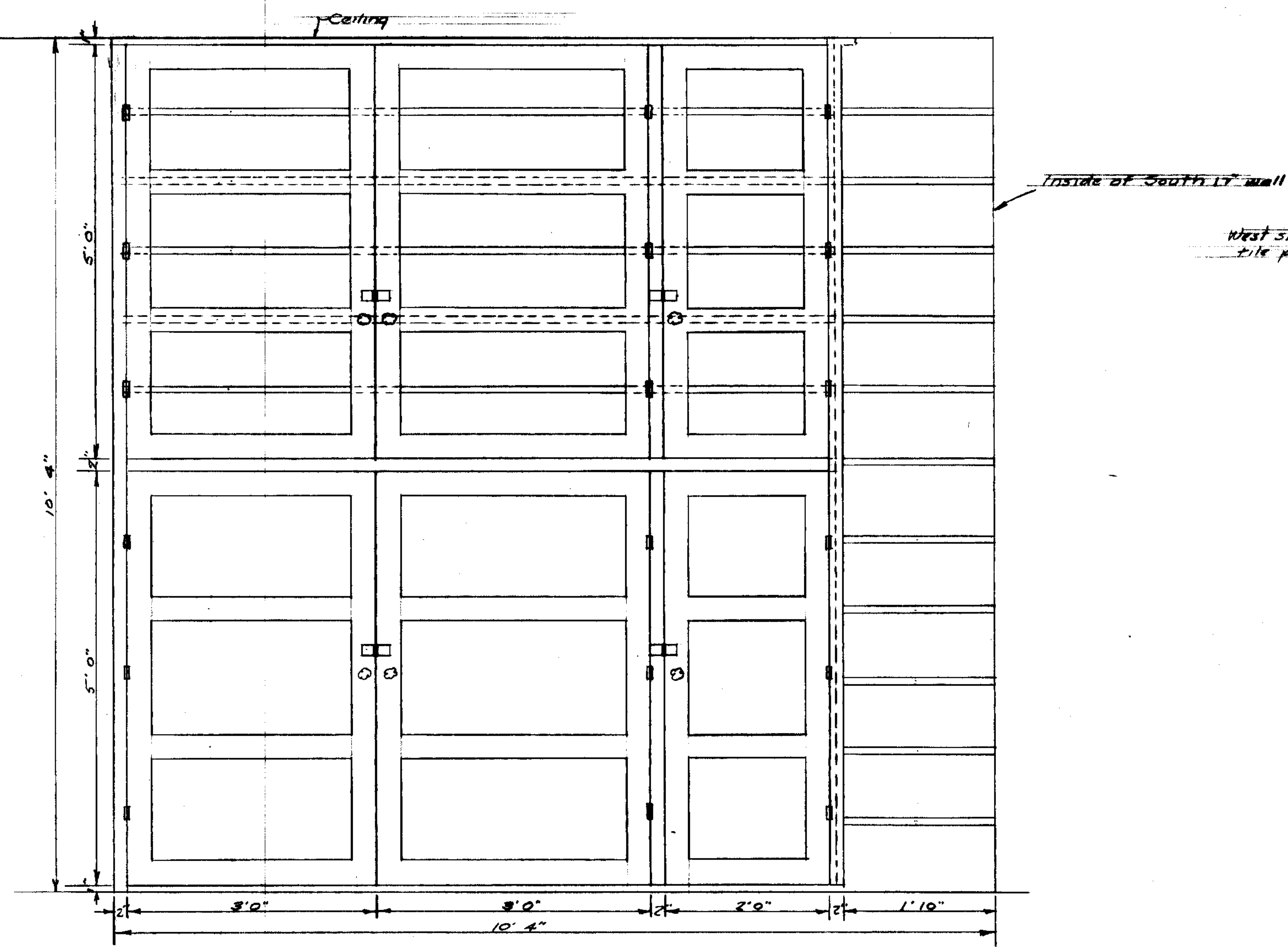

1
3" x 2" x 3/8" ∠ Clip to wall with 3/8" cinch anchors @ 3'0".
2'10"
4'0"
4'10"
11'6"
10'8"
4'0"
19'6"
4'0"
2'6"
4'8"
5'0"
1
2
3
4
5
6
7
8
9
8" Reinforced Concrete Wall
New Rein. Conc.
℄ 8" H-BP 36#
Existing Plant
N
VAN BUREN STATION
Condensate Tank Pit
Scale 1/8" = 1'0"
1 of 2
June 1953
RRL
Scanning America
DWG LABEL
FM013313

PLAN
NOTE BOOK
NO.
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
BY
DATE

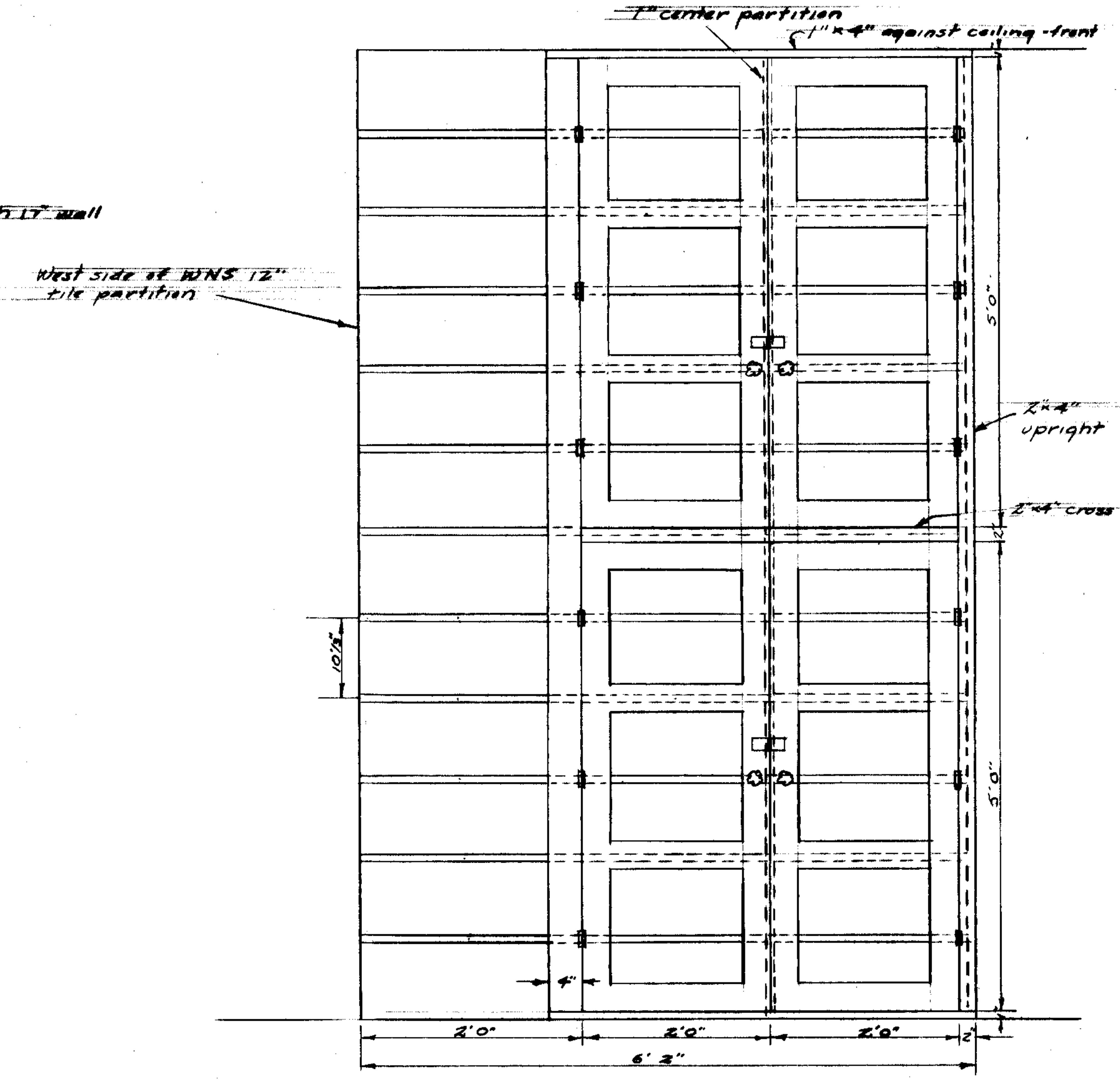
PROFILE
NOTE BOOK
NO.
SURVEYED
PLOTTED
GRADES CHECKED
B. MS. NOTED
STRUCTURE NOTATIONS CHK'D
BY Moffitt & Boisvert
DATE 8-24-45

PLATE 1 - PLAN - PROFILE ... STANDARD
KEUFFEL & ESSER CO. NEW YORK

3/4" = 1'0"



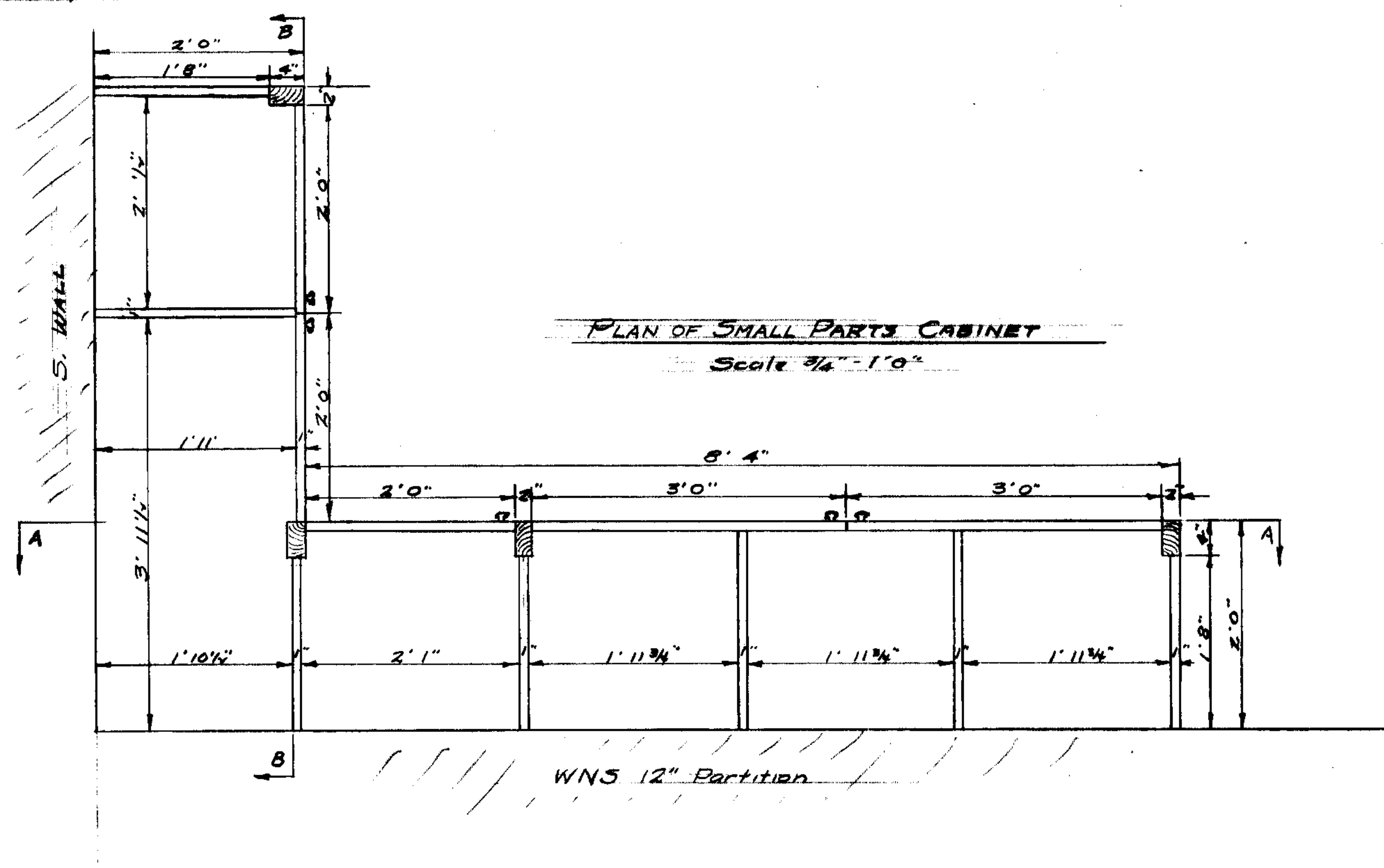
W. ELEVATION THRU A-A
Scale 3/4" - 1'0"



N. ELEVATION THRU B-B
Scale 3/4" - 1'0"

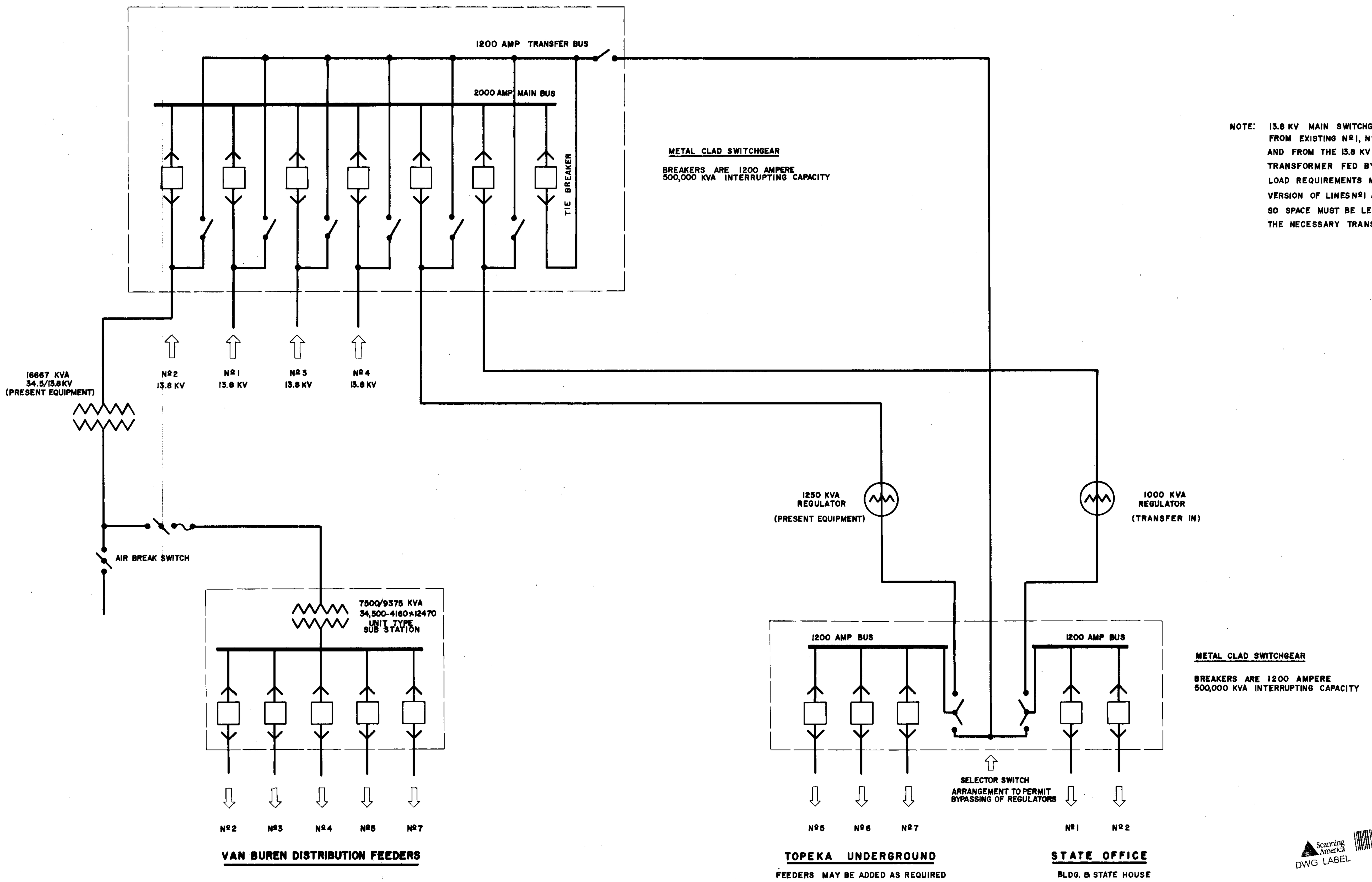
Note: All 10 doors are of 1"×4 material with 1"×4" cross members. Door panels to be Hail-screen 1/2" mesh. Three hinges to each door. Shelves and partions to be 1" material. Lock latches to be of 1 1/4" strap.

PLAN OF SMALL PARTS CABINET
Scale 3/4" - 1'0"



Scanning America DWG_LABEL FM013315

The Kansas Power and Light Company.		
Proposed Plan of Small Parts Cabinet to be Made for Service Department Headquarters at V. Buren Plant.		
Dr.- Hill	CK-	Scale - 3/4" = 1'0"
Tr-	OK-	C - 7064
Date- March 30 1943		

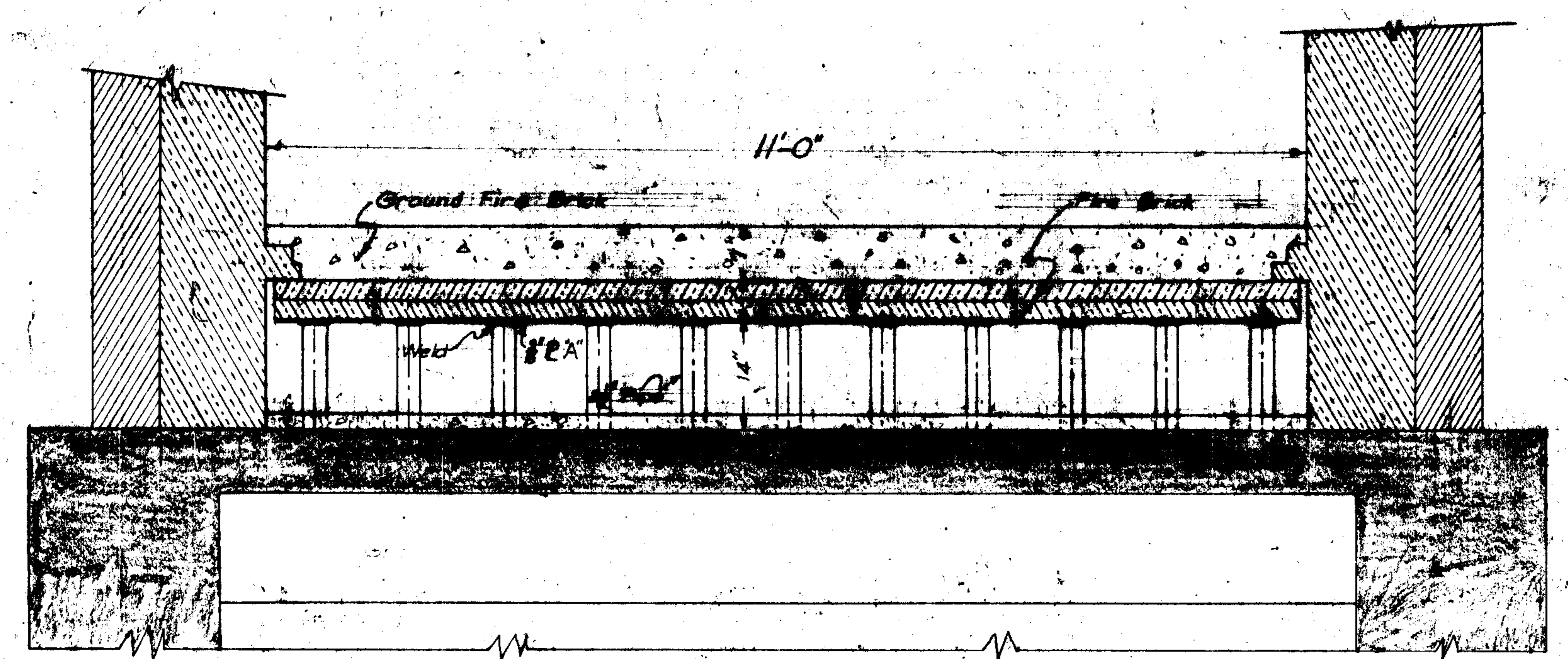


NOTE: 13.8 KV MAIN SWITCHGEAR WILL BE ENERGIZED FROM EXISTING Nº1, Nº3 AND Nº4 13.8 KV LINES AND FROM THE 13.8 KV SIDE OF 16667 KVA TRANSFORMER FED BY Nº2 33 KV LINE. FUTURE LOAD REQUIREMENTS MAY NECESSITATE THE CONVERSION OF LINES Nº1 AND Nº3 TO 33 KV OPERATION, SO SPACE MUST BE LEFT IN THE PLANT YARD FOR THE NECESSARY TRANSFORMER EQUIPMENT.

THE KANSAS POWER & LIGHT COMPANY
TOPEKA - KANSAS

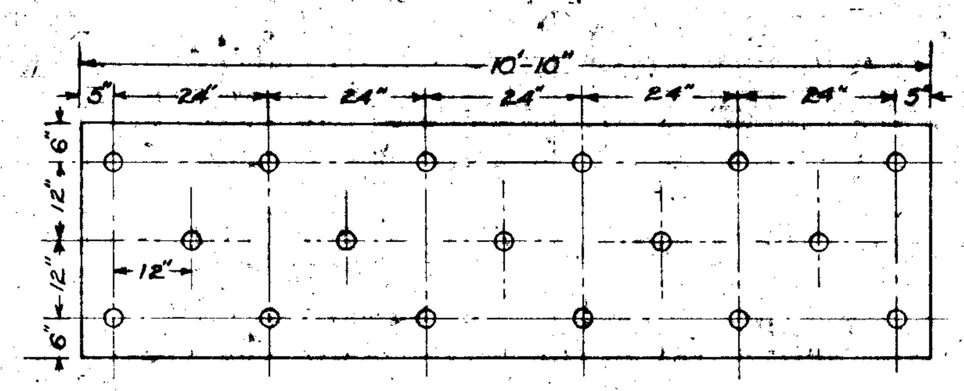
VAN BUREN PLANT SWITCHGEAR

DATE	7-20-55
DRAWN	N.T.

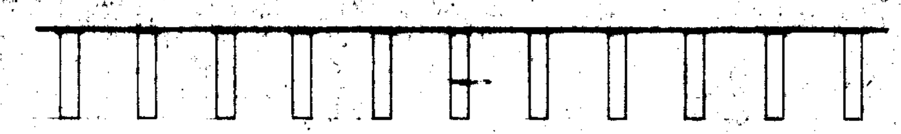


SECTION A-A

Scale ¾" = 1'-0"



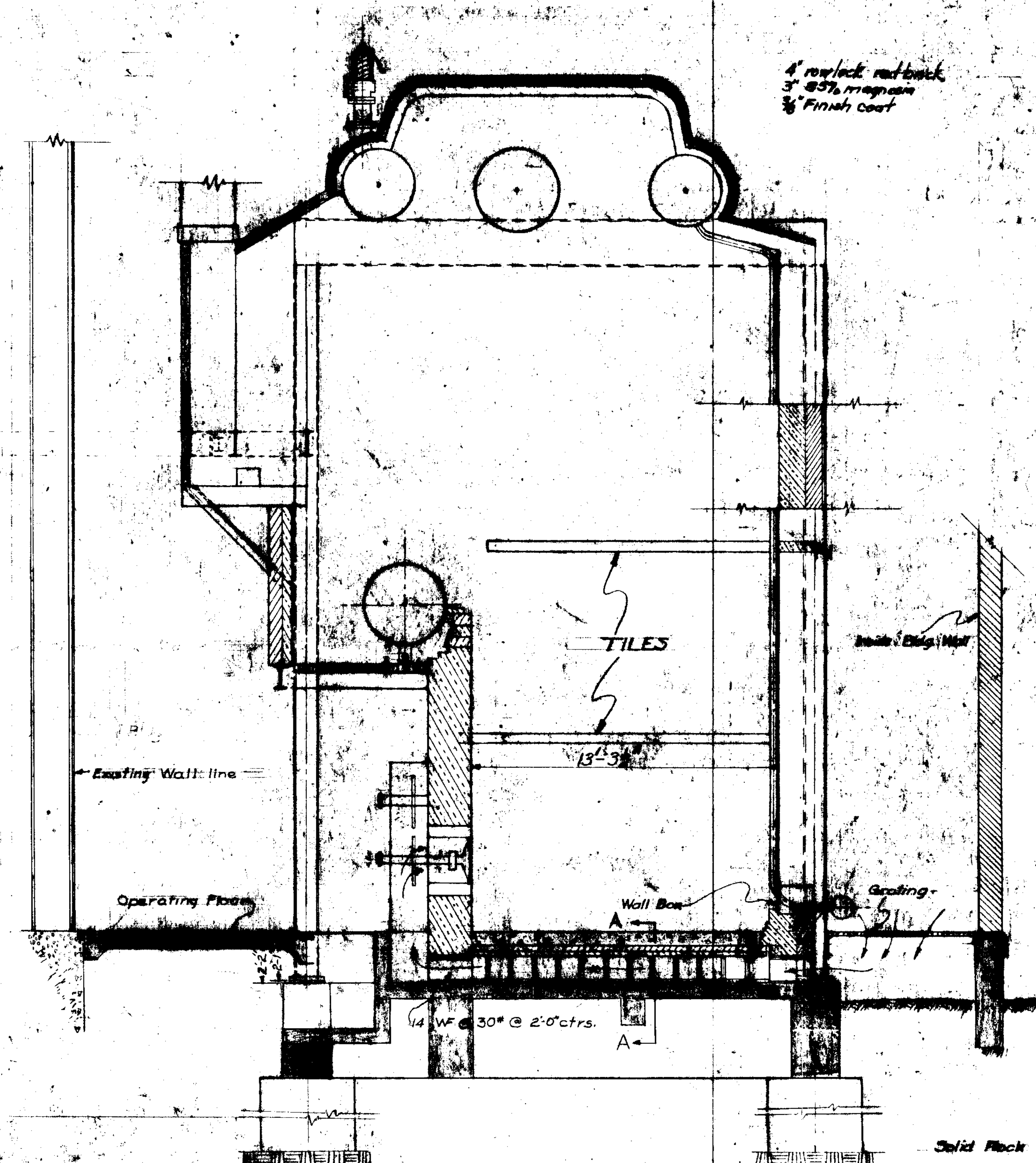
PLAN



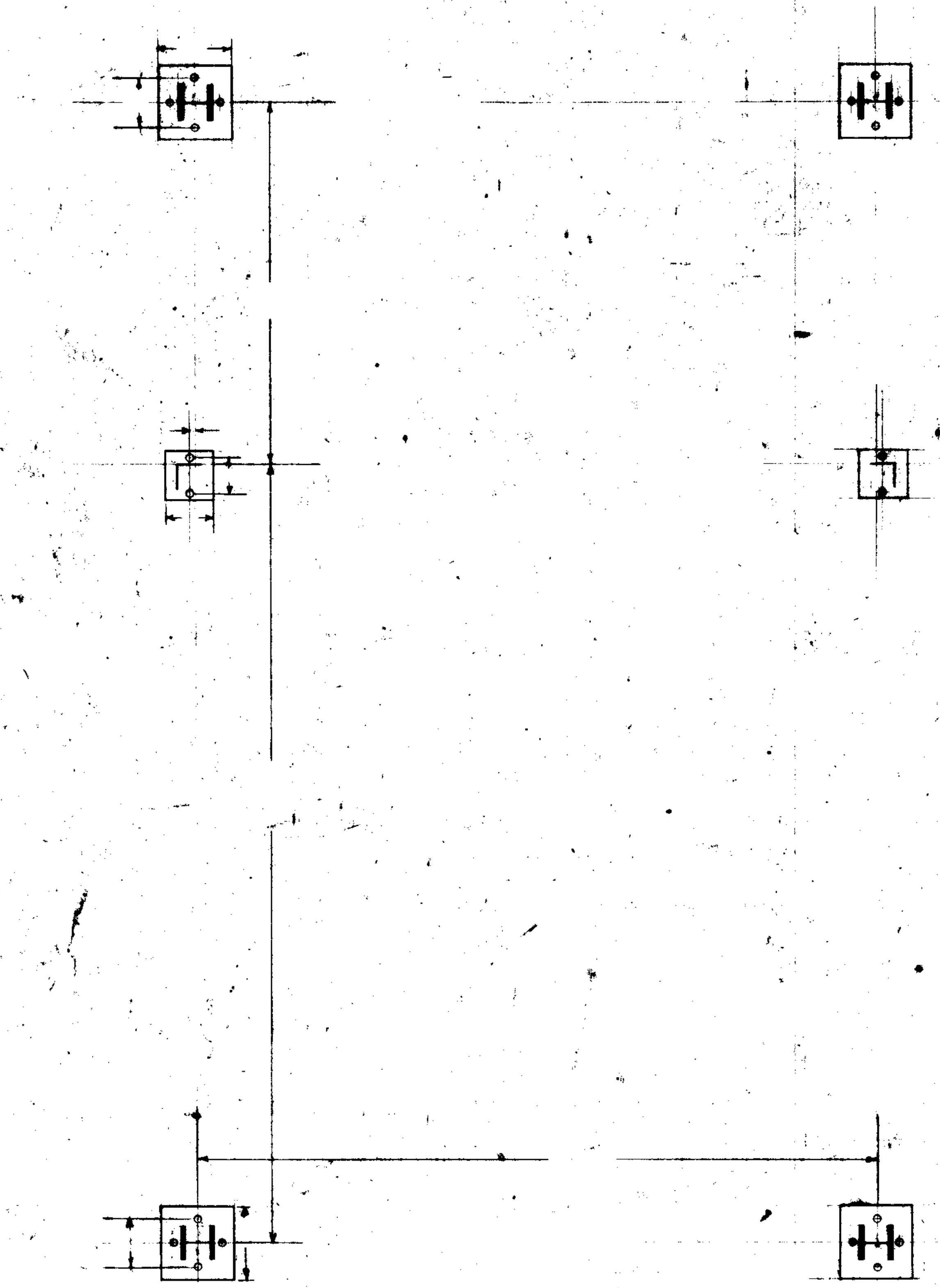
ELEVATION

Detail Floor Plate "A"

Scale ½" = 1'-0"



	Total	Fire Brick
Front Wall	22½"	13½"
Back Wall	13"	4½"
Side Wall	22"	13½"
Bridge Wall	18"	18"



Boiler Supporting Steel

DWG LABEL FM013317

PRELIMINARY
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

Revised Per Letter Aug 15-41

3-11-41

A

GENERAL LAYOUT

Scale 1/8" = 1'-0"

Aug. 6, 1941
July 31, 1941

GENERAL LAYOUT
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

14

FLOW DIAGRAM
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

Sept. 3, 1941
July 31, 1941

2
14

BASEMENT FLOOR PLAN

Scale $\frac{3}{8}$" = 1'-0"

Note:
All welding elbows are long radius except where noted "S.R." for short radius.
Specials, pipe, valve and hanger designations refer to Item Number in the "Power Piping Materials".

Sept. 26, 1941
Aug. 14, 1941
Aug. 7, 1941
July 31, 1941

DWG LABEL FM013320

BASEMENT FLOOR PLAN

POWER PLANT IMPROVEMENTS

KANSAS POWER & LIGHT CO.

TOPEKA, KANSAS

BLACK & VEATCH

CONSULTING ENGINEERS

KANSAS CITY, MO.

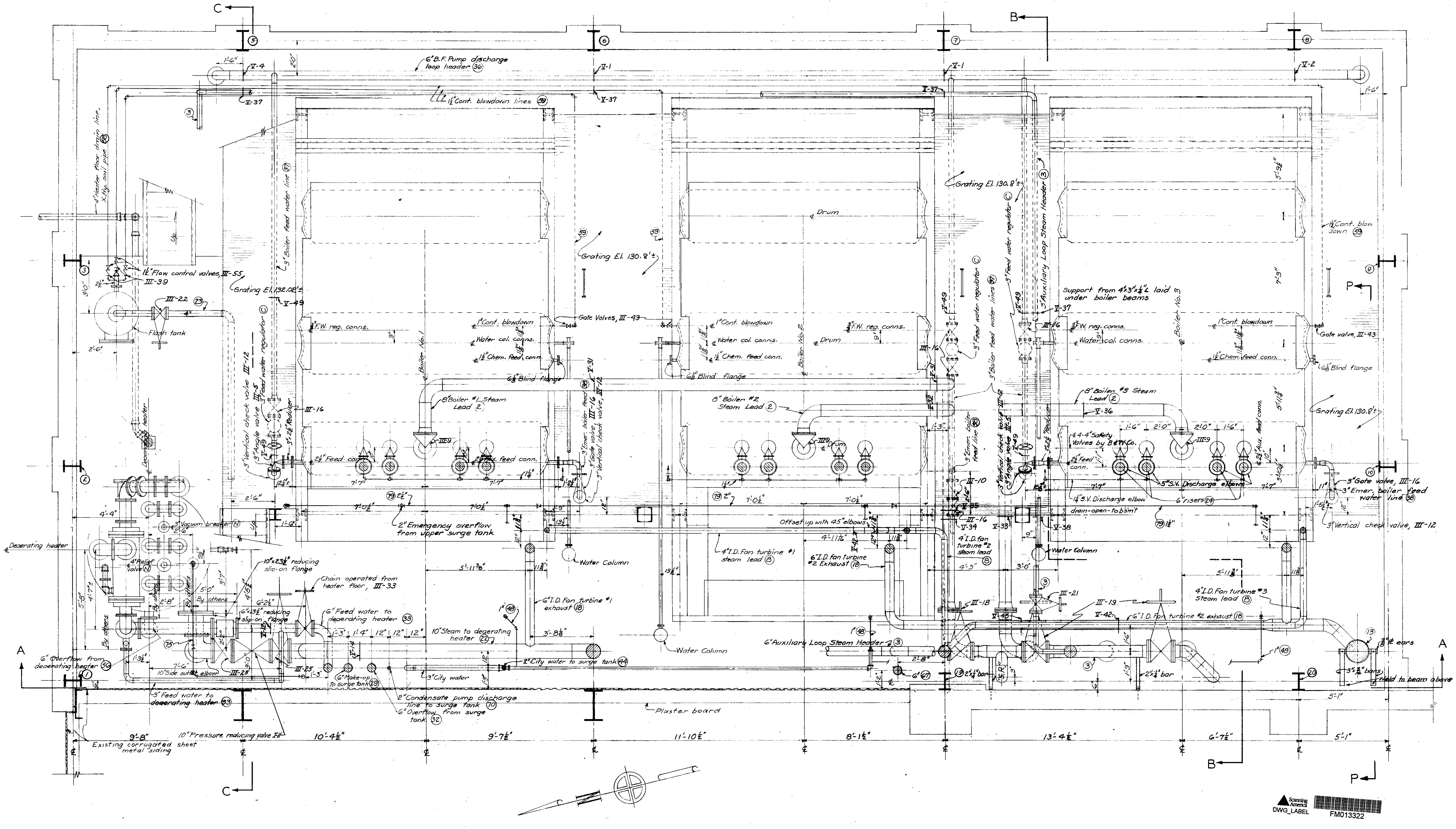
1941

Note:
All welding elbows are long radius except where noted "S.R." for short radius.
Specials, pipe, valve and hanger designations refer to Item Number in the "Power Piping Materials".

Sept. 26, 1941
July 31, 1941

PLAN SECTION S-S
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

4
14



PLAN SECTION R-R AT ELEV. 137'-0"

Scale 3/8" = 1'-0"

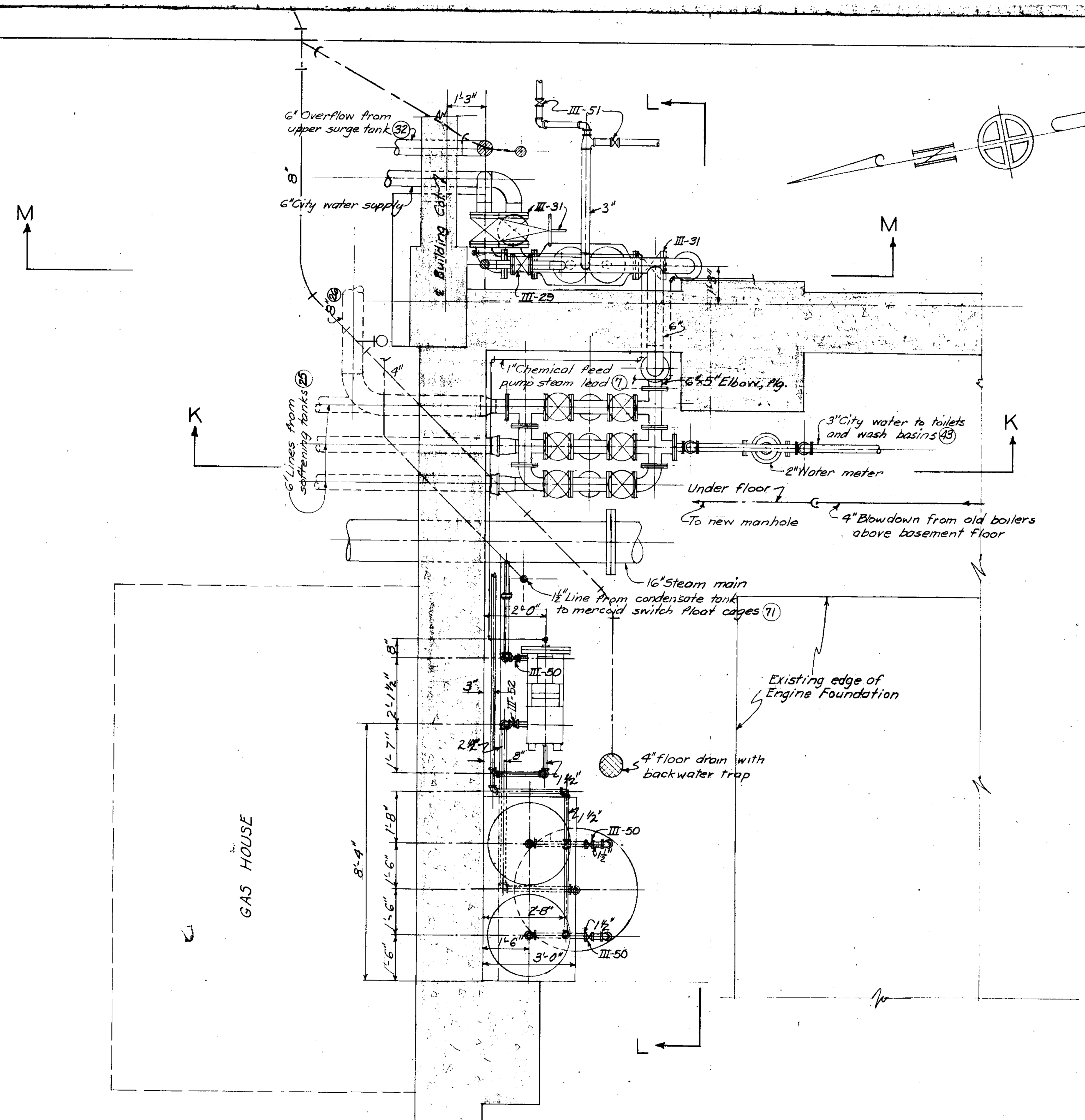
Note:
All welding elbows are long radius except where noted "S.R." for short radius.
Specials, valves and hanger designations refer to Item Number in the "Power Piping Materials".

Sept. 26, 1941
July 31, 1941

PLAN SECTION R-R
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

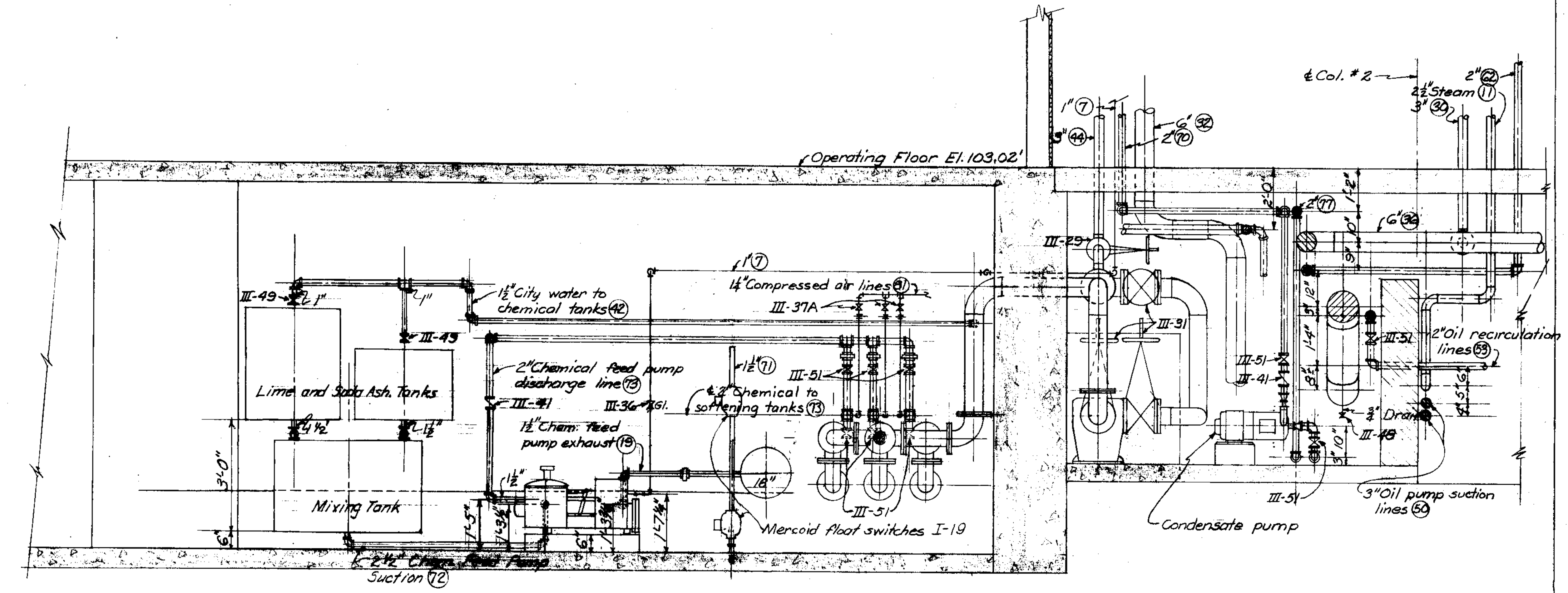
FILTER ROOM PIPING
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

Sept. 26, 1941
Aug. 6, 1941
July 24, 1941



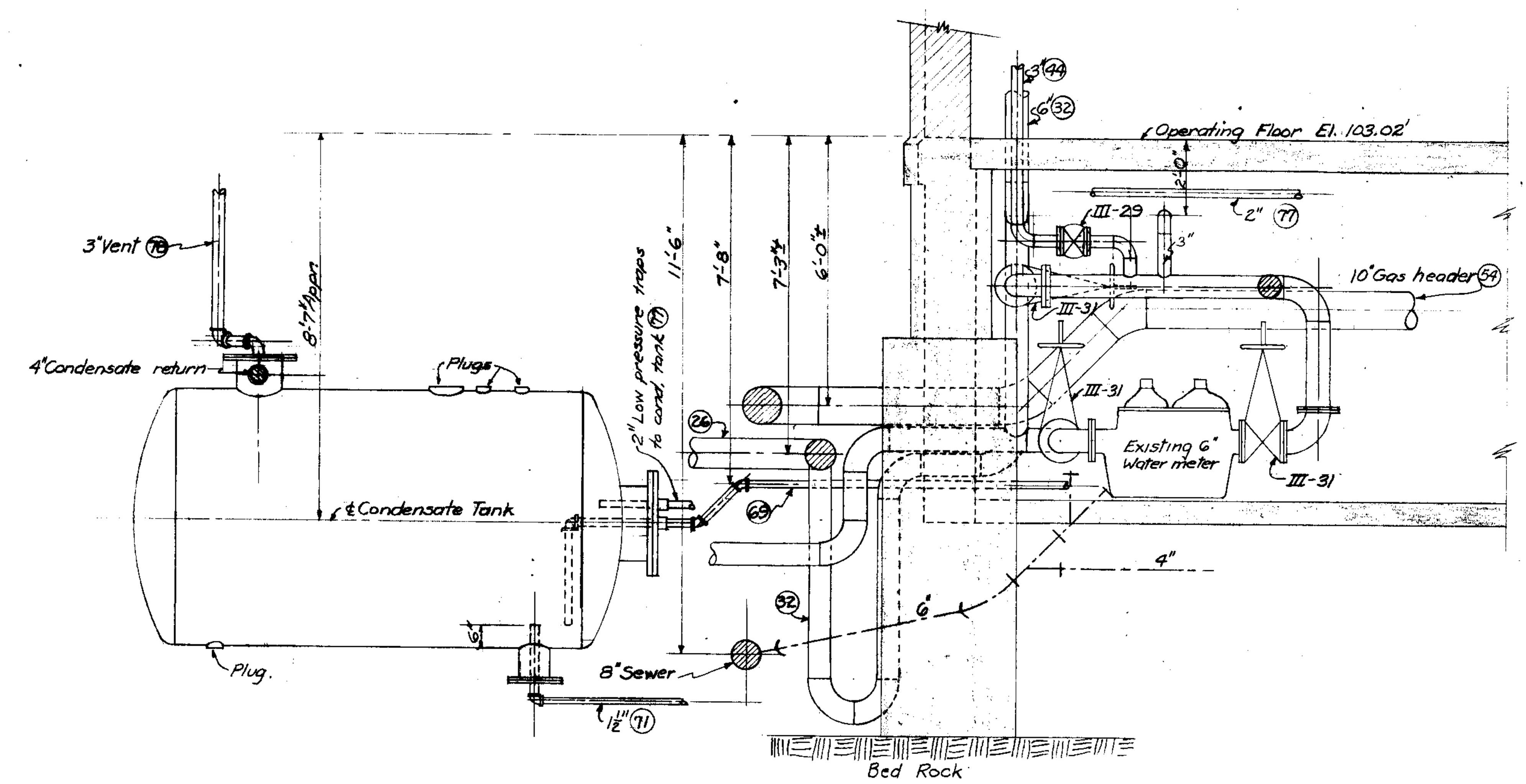
WATER & CHEMICAL PIPING PLAN

Scale $\frac{3}{8}"=1'-0"$



SECTION L-L

Scale $\frac{3}{8}"=1'-0"$

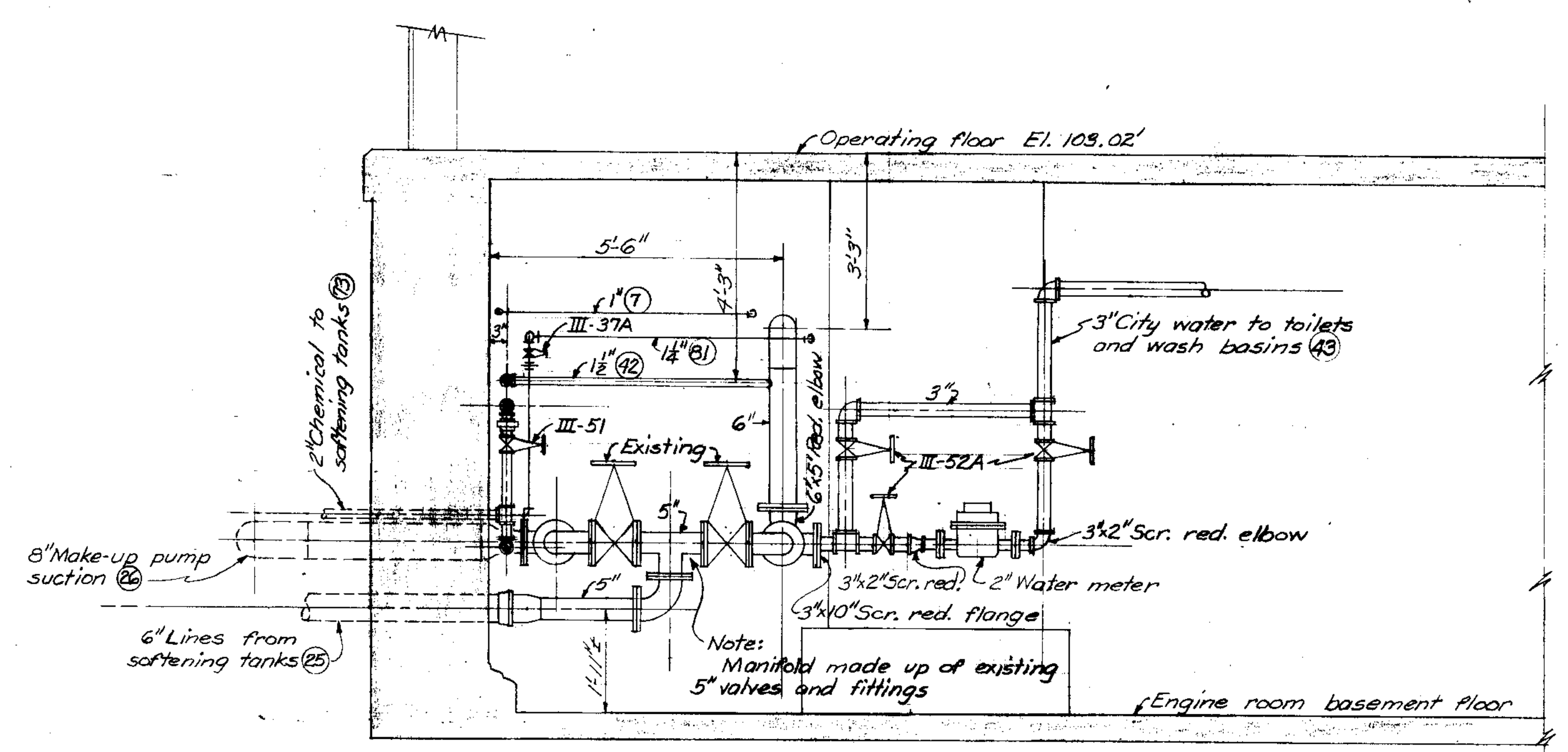


SECTION M-M

Scale $\frac{3}{8}"=1'-0"$

Note:
All welding elbows are long radius except where noted "S.R." for short radius.
Valve designations refer to Item Number in the "Power Piping Materials".

Note:
Set upper mercoid float switch & 9" below top of condensate tank. Set lower mercoid float switch as close to bsmt. floor as practical.



SECTION K-K

Scale $\frac{3}{8}"=1'-0"$

WATER SUPPLY & CONDENSATE DETAILS
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

Aug. 6, 1941
July 25, 1941

7

SECTION A-A
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY MO.
1941

SECTIONS B-B & C-C
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

Sept. 26, 1941
July 31, 1941

9/14

SECTION T-T
Scale 1/8"=1'-0"
Boiler Column
4" Pipe Col.
SECTION Z-Z
Scale 3/8"=1'-0"
Blow down tank
9" Blind flg.
1" Drain
El. 95.02
SECTION O-O
Scale 1/8"=1'-0"
Oper. Floor Elev. 103'-0 1/2"
Angle bracket
Blow-down Tank
Basement Floor Elev. 95'-0 1/4"
Extend 3'-0" above roof
Existing 20" butterfly valve
Swedge 20" pipe to 16"
3" Motor Operated Throttle Valve
Fan
Line 79-Provide open funnel for bearing drains & blow-offs for sight feed
Steel L Brackets
Grating Elev. 130'-11 3/8"
1/2" Pl. ears
3" Emergency boiler feed water
3/4" U-Clamp
"S.R."
Grating Elev. 114'-0 1/4"
Existing 20" Valve
10" Gas to Existing Boiler Room
Oper. Floor Elev 103'-0 1/4"
4" Pipe Col.
SECTION P-P
Scale 1/4"=1'-0"
PLAN
Scale 3/4"=1'-0"
Boiler Feed Pump
5" Suction
5" Exhaust
3" Steam Inlet
3" Discharge
SECTION Y-Y
Scale 3/4"=1'-0"
SECTION X-X
Scale 3/4"=1'-0"
Note: Set all anchor bolts by template.
DETAILS FOR TURBINE DRIVEN
BOILER FEED PUMP FOUNDATIONS
2 REQ'D.
PLAN OF WATER
WALL HEADER GUIDE
SAME FOR EACH BOILER
Scale 3/8"=1'-0"
Water Wall Header
Grating El. 103.02'
12" C's @ 20.7#
SECTION 9-9
Scale 3/8"=1'-0"
Weld angles to channel
MISCELLANEOUS DETAILS
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941
Sept. 26, 1941
Aug. 26, 1941
Aug. 14, 1941
July 31, 1941
DWG_LABEL
FM013327


END VIEW
ELEVATION
UPPER SURGE TANK
Scale 1/8"=1'-0"
4-3/4" Welded couplings
Gauge glasses
Heater supply
Tank support
Drain
Over-flow
10" Float cage
2" Tank flange
Breather pipe
18" Access manhole with 1/4" plate cover & rubber gasket
Condensate
8" Float cage
1" Welding couplings
City water
1/4" tk. shell
1/4" tk. standard dish heads
This end South when erected
5'-0" I.D.
6" Tank flange
2" Tank flange
6" Tank flange
2" Tank flanges
16'-0"
GAS BURNER SADDLE BOLTS: DRILL 8-1 1/8" D. HOLES SPACED AS SHOWN.
TILE HOOKBOLTS DRILL 14-3/4" HOLES SPACED AS SHOWN.
OPENING & DRILLING IN REAR 3/8" PL
END VIEW
14" WF@30#
1" Holes
3" Slip-on Flg. Ser. 30
6" Slip-on Flg. Ser. 15
3/8" Tk. standard dish heads
3/8" Tk. shell
10"x16" Manhole complete with saddle, fittings and gasket
4" Slip-on Flg. Ser. 15 Overflow
Drain
1" Welding coupling
4" Slip-on Flg. Ser. 15
Blow-down
Vent
Clean out
ELEVATION
BLOW DOWN TANK
Scale 1/2"=1'-0"
Note:
Dish heads shall be not less than thickness indicated. Welds shall be made in a workman manner, and shall be at least the full thickness of the metal with no pockets left for sediment or corrosion.
The completed tanks shall be subjected to hydrostatic tests and made tight at the following pressures:
Tank — Hydrostatic Test Pressure
Upper surge tank — 10 p.s.i. gauge
Blow down tank — 50 p.s.i. "
Flash tank — 25 p.s.i. "
6" Slip-on Flg. Ser. 15
1/4" Tk. standard dish heads
Inlet
2'-6" I.D.
2 1/2" Slip-on Flg. Ser. 30
1/4" Tk. shell
C.I. Blind Flg.
2" Welding coupling
ELEVATION
PLAN
VIEW A-A
FLASH TANK
Scale 1/2"=1'-0"
1/2" Insulation
3/8" Plate
1/4" Plate
2 1/2"x1 1/2"x1/4" L
4"x3"x1/4" Ls
SECTION B'-B'
Scale 1"=1'-0"
BOILER ROOM FLOOR
11'-0"
3/8" Plate
5-2"x2"x1/4" Stiffner angles. Weld damper hinges to these angles.
1/4" End plate
1/4" End plate, weld to rear plate
ONE 3/8" METAL PLATE BOLTED TO BRICK WORK
1" DIA. HOLES FOR 3/4" HOOK BOLTS
BOILER ROOM FL.
WINDBOX REAR 3/8" PL A-A'
SCALE 1"=1'-0"
STIFFENERS 2"x1 1/2"x1/4" Ls
BOLTS 5/8" D. SPACED AS SHOWN WITH HEADS WELDED. BOLTS TO PROJECT 1 1/2" FROM OUTER SIDE OF PL.
WINDBOX-FRONT-1/4" PL
SCALE 1"=1'-0"
BONDING TILE
Weld
Angle 14'-0" long
1/4" Front plate
Insulation
INSIDE DIM.
Weld head to plate
WELD
OUTLETS GAS
2" PIPE
FLANGE 2" REAM OUT THREADS
WALL
hook bolt
CINCH ANCHOR 1/2" TWO UNIT THREADED RING WEDGE
WIND BOX SECTION ELEVATION
SCALE 1"=1'-0"
HINGES FIVE
PINS 3/8"
OPERATING BAR STRAP 1 1/2"x1/2"
GUIDE STRAPS 1 1/2"x3/8"
3/8" HOLES
EYE BOLT 1/2" & 10' CHAIN
PIN 1/2"x6"
WINDBOX TOP DAMPER OPERATING BAR
ONE AT EACH END OF DAMPER
SCALE 1"=1'-0"
DWG. LABEL
FM013328
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941
Note: Furnished by K.P.&L. Co., installed by Setting Contractor.
Sept. 5, 1941
August 20, 1941
August 8, 1941
July 15, 1941

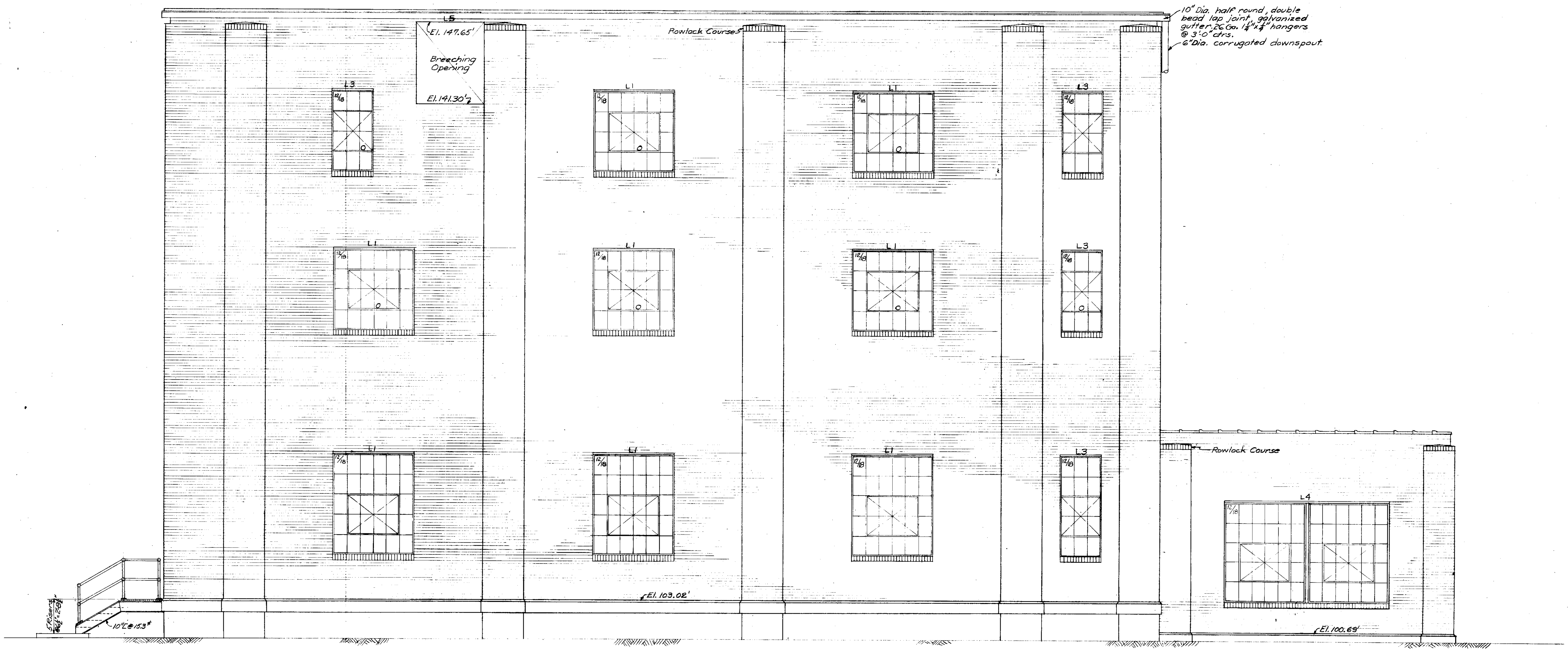
DETAIL OF DRILLING AT GAS OUTLET. (BLR. NO. 2 ONLY)
Scale 1/2"=1'-0"
43 Sps. @ 3" = 10'-9"
11'-0" Inside
9/16" ϕ Holes
New stack opening
Cut stack opening 4'-6"
Field Check
Exist. bldg. opening 5'-2"×6'-4"
Access Opening
Note~ Breeching material 3/16" Plate~Angles punched for hanger rods to be 3×2 1/2×1/4 ~ other angles 3×2×1/4"~3" leg O.S.-tack weld 2" long @ 8" ctrs. staggered heel & toe to 3/16" Pl.-weld frame corners
2-7/8" ϕ hanger rods~ all others 3/4" ϕ~extend thru bottom angle
Vanes~See detail "E"
Baffle Plates
Surge Tank by others
Fan Discharge
PLAN OF BREECHING ABOVE FAN FLOOR
Scale 1/4"=1'-0"
Top of Breeching Elev. 147.48'
Vanes~See detail "F"
Access Opng. See note H
See note J
Elev. Fan Floor 138.27
Expansion joints
Coil Spring
Dampers by Breeching Contractor #2 boiler only
Economizer Outlet 11'-0" inside
Cable operator to oper. floor-elev 103.02' See detail
Spring hangers
ELEVATION A-A
2-4" [@ 5.4 provided in roof structure for breeching hangers~use slope Pl. welded to [for rod nut bearing
Elev. top of col. 148.78
Weatherstrip-see detail
Exist. building Roof
See Note "H"
5/8"×12"×5'-0" Bearing Pl. with 3/4" ϕ bar welded on back-wedge & grout in place
Elev. 190.14'
Grout Frame in stack opening
See note J
SECTION B-B
Scale 1/4"=1'-0"
Rail lintels 6'-0" long bricked in place
Pack with 1" ϕ Asbestos Rope all sides
FRAME DETAIL
SECTIONS C-C
PLAN VIEW D-D
Damper controls by breeching contr. See detail
Damper box by Boiler Contractor #1 & #3 boilers only
By Breeching Contractor
BREECHING DETAIL "E"
Scale 3/8"=1'-0"
Vanes to be 10 gage
DETAIL "F"
Note "G"~ If vanes are welded in place, make one vane in each section of detail E bolted & removable for access
Note "H"~ 14"×18" Manhole opening with 3/16"×18"×22" Pl. cover & gasket bolted~weld bolt heads inside
Note "J"~ Make up section~Field check and fabricate to fit
OUTER STACK FRAME DETAIL
Scale 1/4"=1'-0"
Hoop bars around stack
1 1/8" Tank lugs 6 required
3 Sections top & bottom~1" ϕ bar with 1 1/8" ϕ bolt ends-6" thrd. butt welded-length 24'-2" each o.a.
OUTLET
INLET
PLAN OF FAN CONNECTIONS
Scale 3/4"=1'-0"
3/16" ϕ Flexible steel cable-connect thru pulleys to damper arm
Boiler Col.
Field weld
1" Std. pipe
Spade handle 4'-0" ± above elev. 103.02
DAMPER CONTROL DETAIL
No scale
TYPICAL EXPANSION JOINT DETAIL
Scale 3"=1'-0"
Bldg. lintel or stack opening lintel
#16 ga. galv. weatherstrip at sides & top of breeching in bldg. and stack openings-tack weld in place-one toe only
WEATHERSTRIP DETAIL
Note~Modify this detail thus for fan connections
SPECIAL DETAIL "N"
General Notes
Breeching sections to be built small enough to enter building or fabricated in place. Paint inside & out one coat heat resisting paint to 600°F. All bolted joints to be coated with plastic gasket-Eagle Picher Hi-temp "Stalastic" or equal.
Weld 3/8" square nuts at 2' ctrs. on all vertical surfaces for insulation anchors.
June 17, 1941 July 12, 1941 Aug. 22, 1941
May 22, 1941 June 25, 1941 Aug. 18, 1941
BREECHING DETAILS
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY MO.
1941
DWG_LABEL FM013329

Scanning America
DWG_LABEL
FM013330

Aug. 26, 1941

DETAILS OF
STEAM HEADER SUPPORT
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY MO.
1941

13/14



EAST ELEVATION

Scale ¼" = 1'-0"

NOTE: Ventilators marked "O" equipped with operators

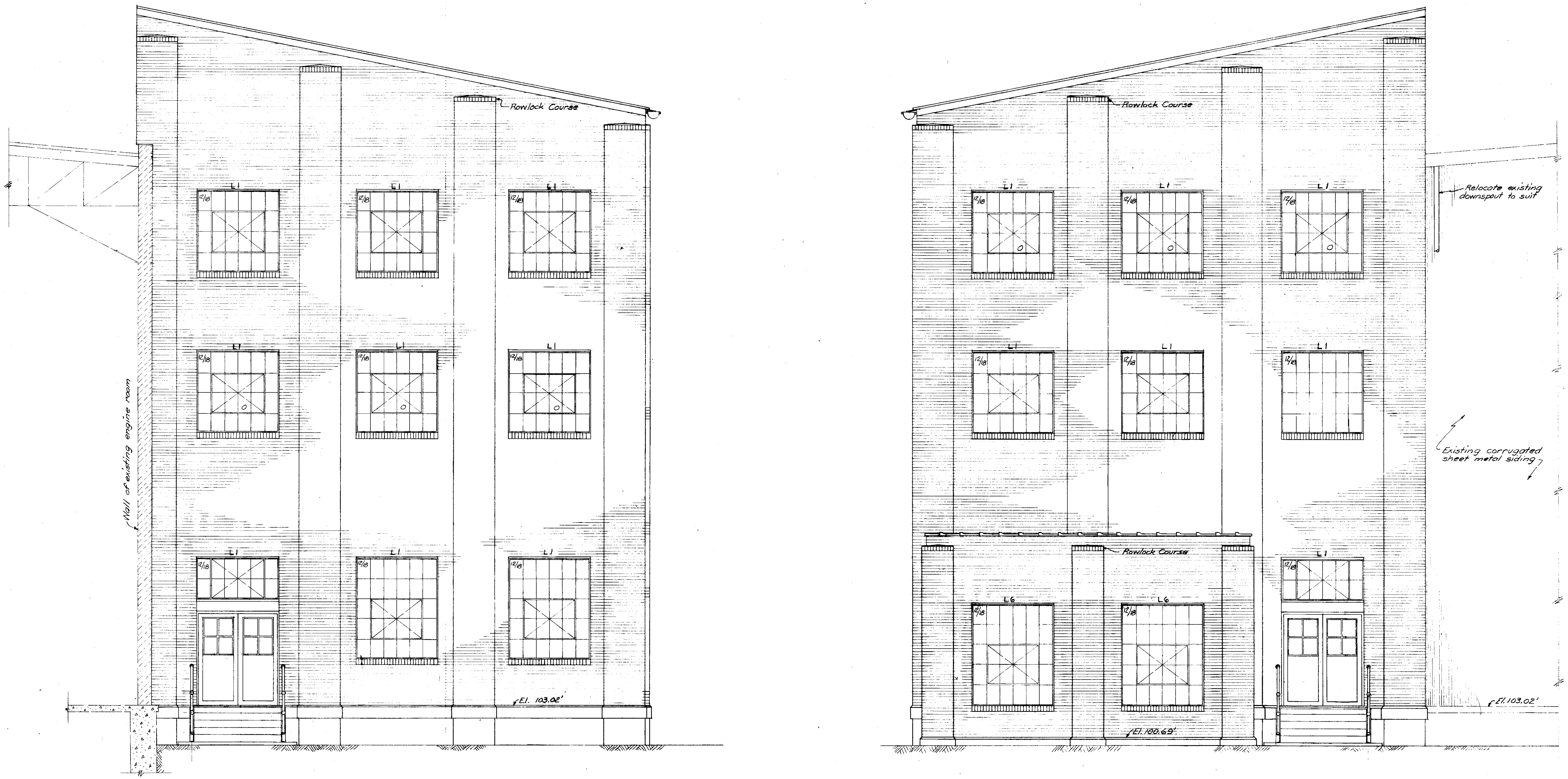
DWG_LABEL FM013331

EAST ELEVATION
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

May 1, 1941
April 25, 1941

1/10



SOUTH ELEVATION
Scale 1/8"=1'-0"

NOTE: Ventilators marked "O" equipped with operators

NORTH ELEVATION
Scale 1/8"=1'-0"

BUILDING ELEVATIONS
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

May 1, 1941
April 25, 1941

2/10

PLAN-CORNER DETAIL
12"[ ]
4×3×3/8 L post
L clip
ctsk rivets or weld
1/4" Gusset ℞ at bottom of L post to col.
Col #1
8"[
WINDOW FRAME DETAIL
3×3×1/4" head L-punch 3/8"φ holes @ 18 ga. for clamps
L clip-F.S.
block L
Window frame
2½×2½×¼ L window jamb posts
Punch 3/8"φ holes @18 ga. about 18" ctrs. for window clamps
2½×2½×¼ L Girt
¼" ℞ filler
Flashing
JAMB DETAIL
Girt
Jamb post
½" bolts-hooked in 2 courses @2'-0" ctrs. to fasten Trim
6×6" transite trim
Embed 3/4"φ anchor bolts in wall & provide flashing for corrugated siding
12"×18" glass
Double T mullions by window contractor
12"[@ 20.7"
3"×3"×¼ L
Corr. transite
2½×2½×¼ L, window posts
12"[
2½×2½×¼ L Girts
2½×2½×¼ L
16" pipe
8" pipes
20 ga. galv. corr. steel
6" pipe
3×3×¼ L
8" pipes
6"[@8.2"
4×3×3/8 L~4"leg O.S.
¼" Gusset ℞~L to Col #1
Existing brick wall
Existing corr. steel wall
Boiler No.3
Boiler No.2
Boiler No.1
Brick up vent fan opening
Fan Floor El. 138'-3¾"
Remove existing windows and repair walls at these window openings
Existing East Wall.
Heater Floor El. 123'-0¼"
Remove existing brick wall, cut back, plaster & tool to match existing wall
Existing 3×7 door.
Existing
New
Existing
New
New 3×7 door
Operating floor Elev. 103.02
ELEVATION SECTION U-U
EAST WALL OF EXISTING BUILDING
Scale ¼" = 1'-0"
Weld bar to [flange using spacers to match roof slope. Weld 2" @ 12"
4" lead flashing
Transite roof, slope 2½:12
3"×3/16" bar Elev. 136.31
12"[@ 20.7"
shop weld
5/8"φ sag rods
3"×3"×¼" L fasten windows with std. clips.
Shop weld bracket cut from 10"-8"CB
Run shaft thru holes in web of cols #19 & 20
Surge tank center 5'-2" from ℄ col.
Elev. 131.21
Weld 3" @ 12" ctrs.
Window opening
Fasten window operating mechanism to each column and vertical mullion.
3"×3"×¼ L
4" lead flashing
200 w. Ellip. L. @ Elev. 118.4±
6"[@ 8.2
20 ga. galv. corr. steel
2½×2½×3/8
6"[@ 8.2", connect to columns cope [flanges at columns
Frame gutter with wood planks, block into position as necessary Remove existing trough
Flashing
Existing roof
Butt weld new col. to exist. col.~Field check length
Existing steel wall
Elev. 144.09±
Existing col.
SECTION F—F
Scale 1" = 1'-0"
DWG_LABEL FM013333
ELEVATION SECTION U-U
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941
Aug. 16, 1941
June 17, 1941
May 27, 1941
May 1, 1941
April 25, 1941
10


SECTION G — G
Scale 1/2" = 1'-0"
NOTE:
For corner steel details see A-D Below.
Note ~ See sheet #9 for column anchor bolt details
Note ~ See Sheet 5/9 for floor openings & dowels in Filter Room Floor
Boiler foundation piers 3'-0" square except as noted
3 Pockets 1'-6" deep for floor beams
Blowdown Tank overflow 4" x heavy C.I. Soil pipe to Sewer manhole
4'-0" I.D. Brick Manhole with 8" walls & 8" concrete fdn., with Std. Manhole ring and cover, with C.I. manhole steps @ 18" ctrs.
Basement 6" Concrete Floor Slab Elev. 95.02'
Existing Building Foundation
Reference Line ~ face of existing steel Columns
FOUNDATION PLAN
Scale 1/4" = 1'
Cut back exist. foundation wall to depth of 3'-6" & install 5/8" φ hooked dowels @ 12" ctrs with 3 unit cinch anchors
Use weatherboard siding to form tapered slot about 3/8" wide by 1" deep After removing forms ~ spar varnish slot & caulk with gun grade caulking compound
SECTION a-a
SECTION b-b
SECTION B — B
Scale 1/2" = 1'
SECTION C-C AS NOTED
SECTION Y-Y OPP. HAND
Scale 3/8" = 1'-0"
Note ~ Piers to be Class "C" concrete ~ no reinforcing
Note ~ Openings for pipes in Sec. C-C only ~ Continue reinforcing steel thru opening & form keyway around opening to hold grout thus
Tapered keyway 2" x 1"
SECTION D — D
Scale 3/8" = 1'
BASEMENT & FOUNDATION PLAN
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941
June 24, 1941
June 20, 1941
Add boiler foundations 5-6-41 W.T.C.
May 1, 1941
April 25, 1941
4/10
FM013334

DWG_LABEL FM013335

OPERATING FLOOR PLAN
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

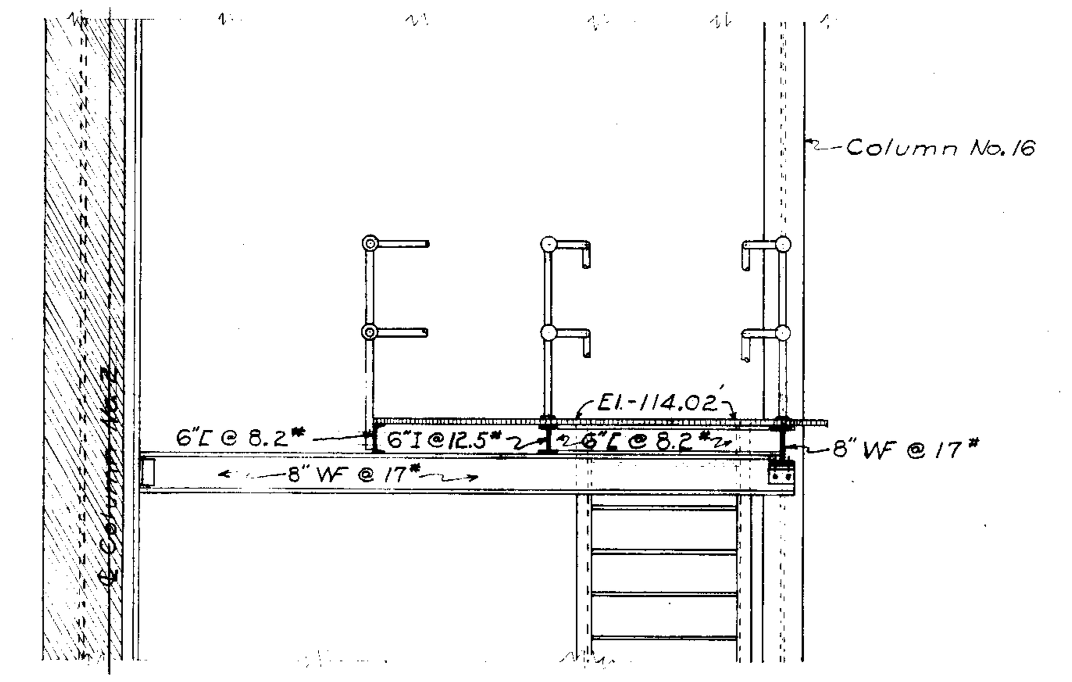
Aug. 16, 1941
June 20, 1941
May 1, 1941
April 25, 1941

Scanning America DWG_LABEL FM013336

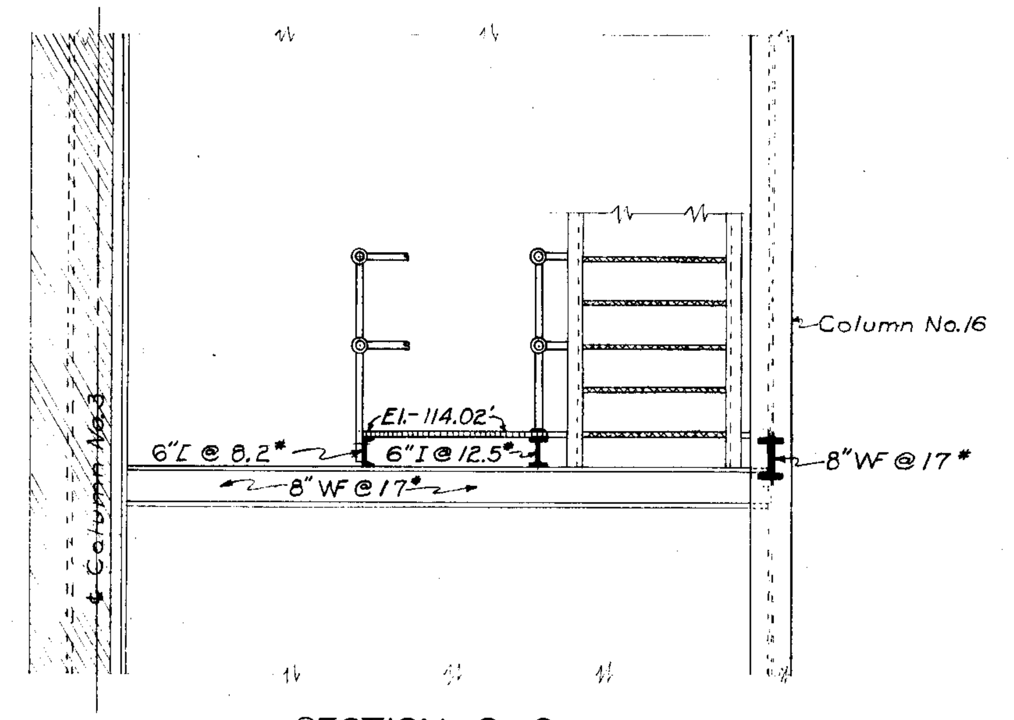
PLAN
FAN FLOOR
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

Aug. 16, 1941
May 27, 1941
May 1, 1941
April 25, 1941

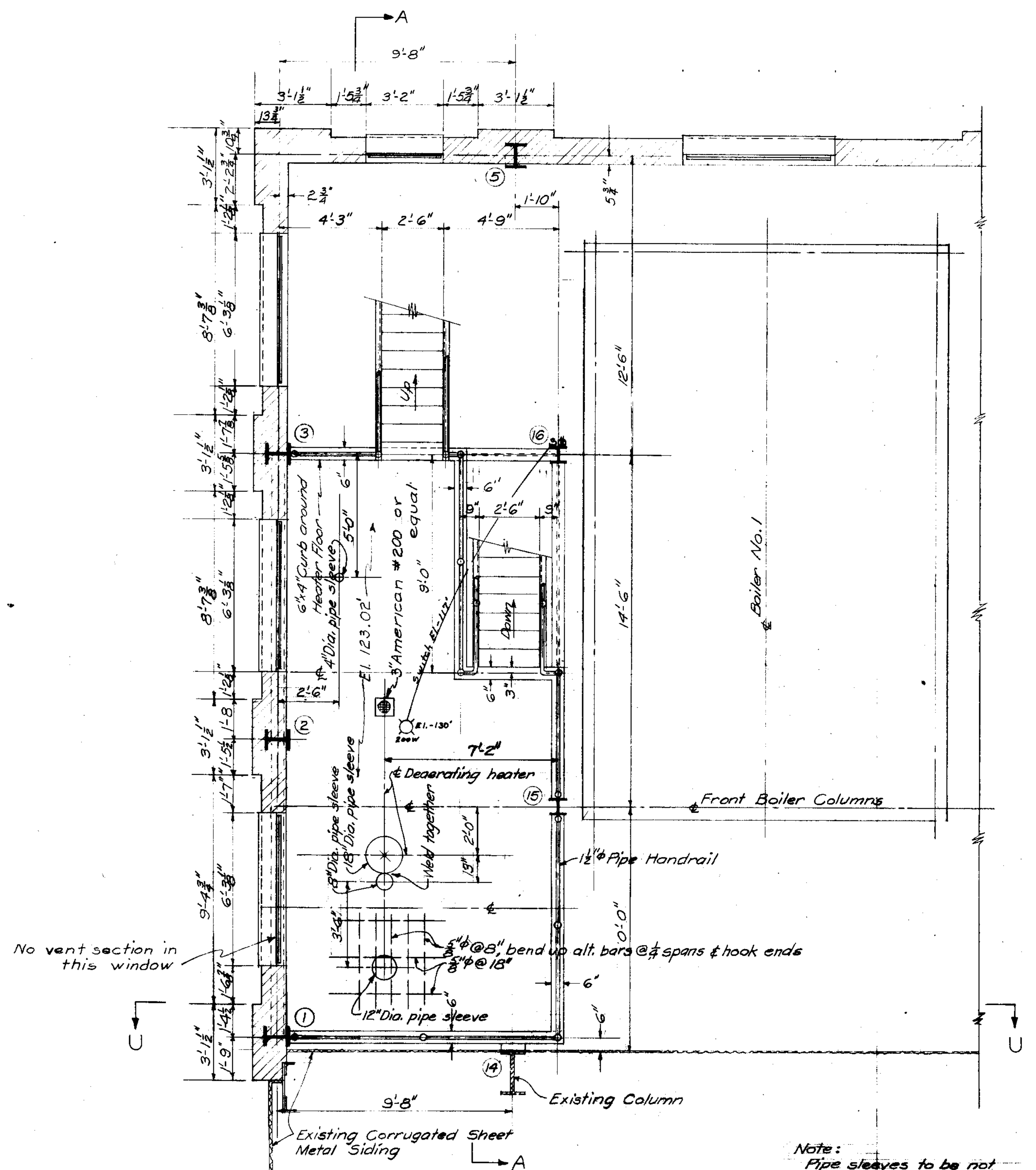
7/10



SECTION N-N
Scale 1/8" = 1'-0"

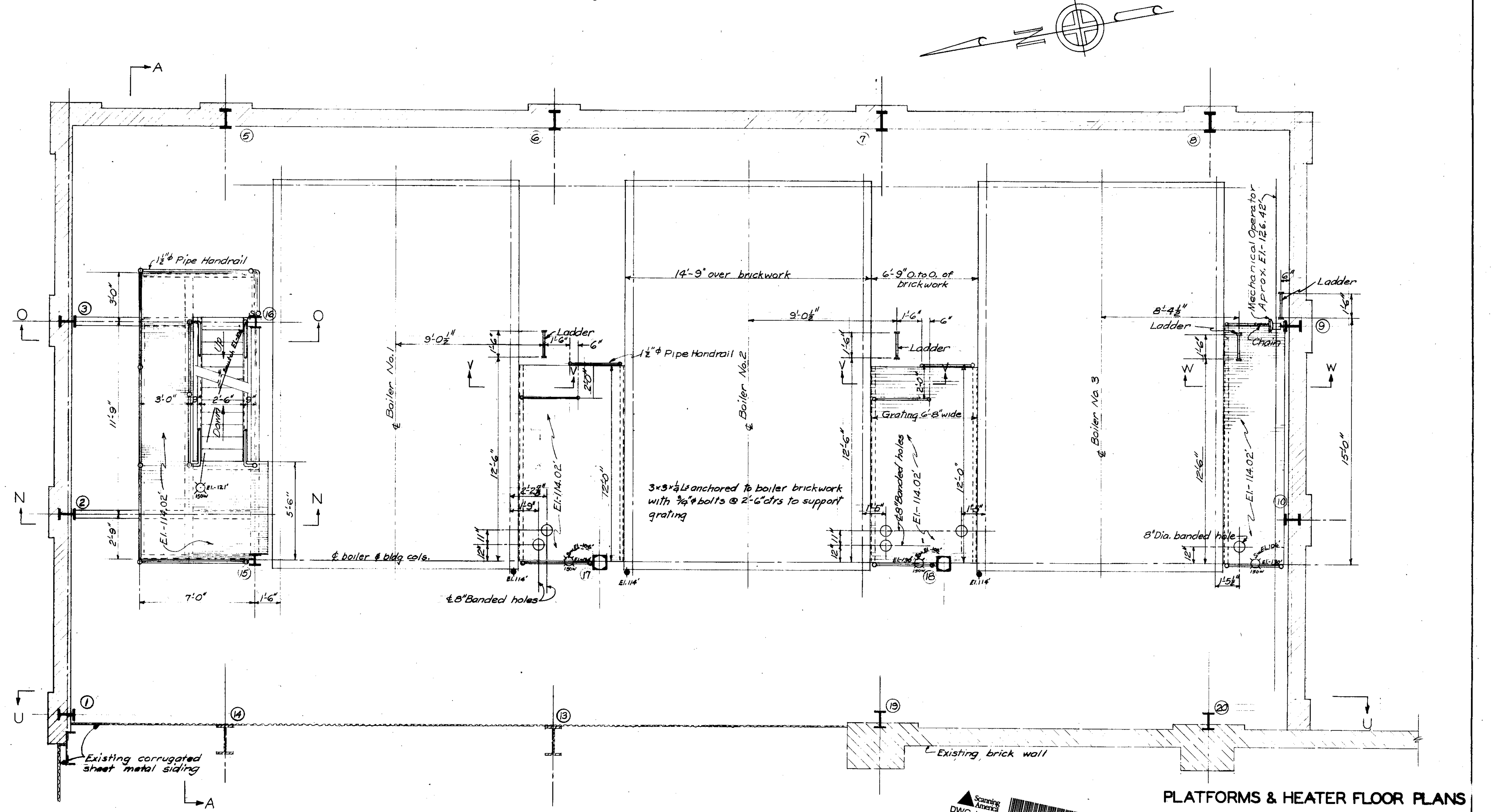


SECTION O-O
Scale 1/8" = 1'-0"



PLAN
HEATER FLOOR
Scale: 1/4" = 1'-0"

Note:
Pipe sleeves to be not less than 10 ga. Project 3" above finished floor.
Field check all openings thru grating before fabrication.



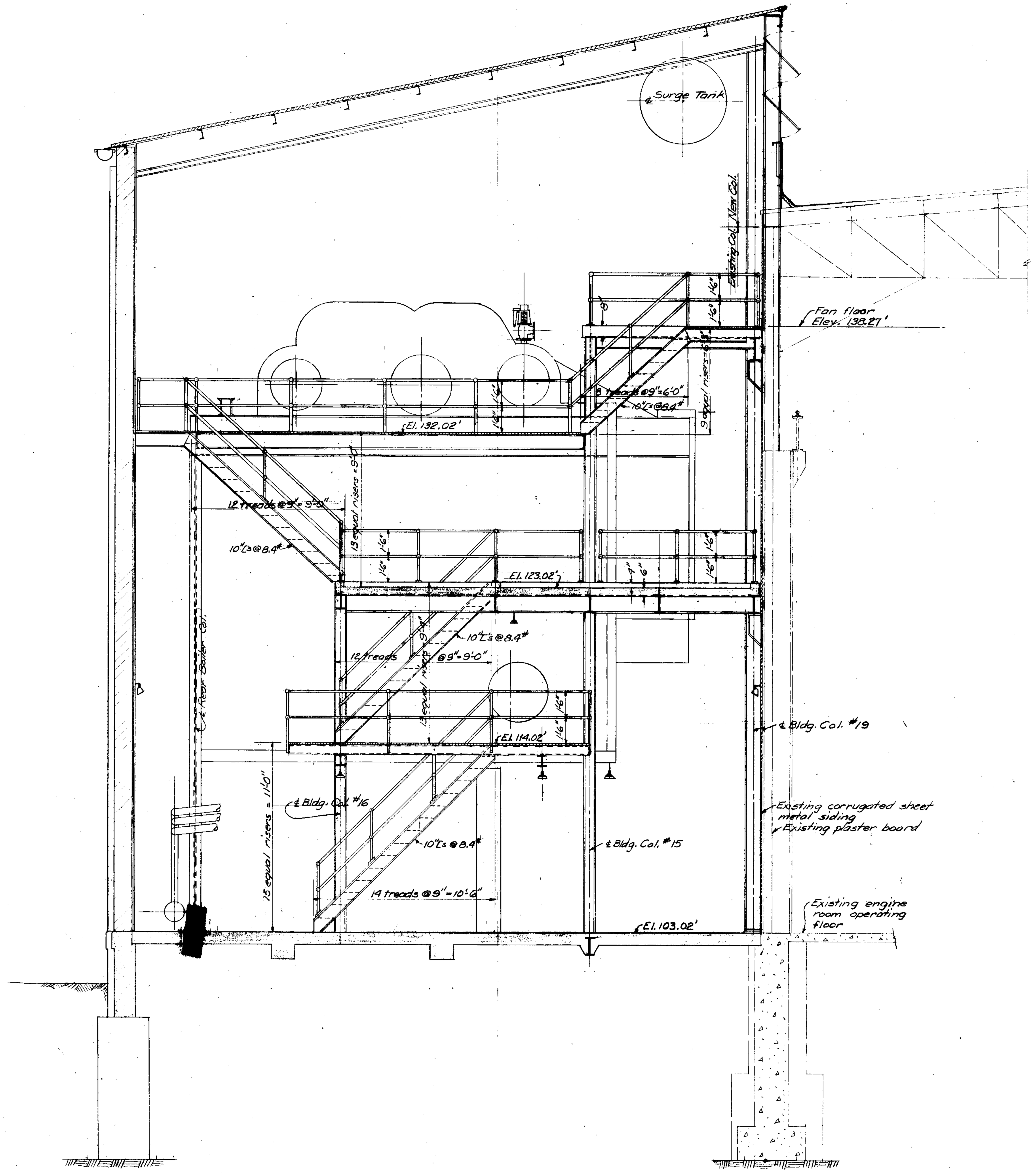
PLAN
LOWER DRUM ACCESS PLATFORMS
Scale: 1/4" = 1'-0"

FM013337

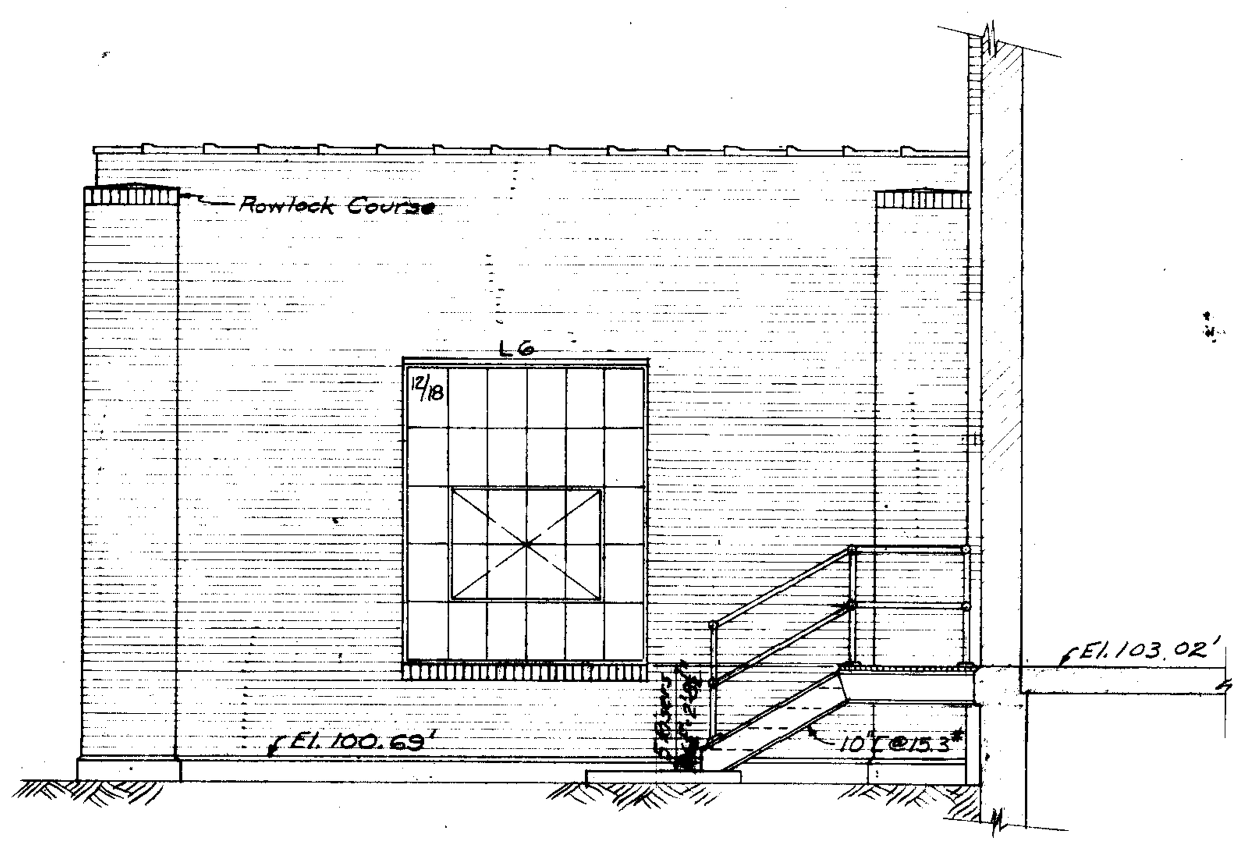
Aug. 16, 1941
May 27, 1941
May 1, 1941
April 25, 1941

PLATFORMS & HEATER FLOOR PLANS
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

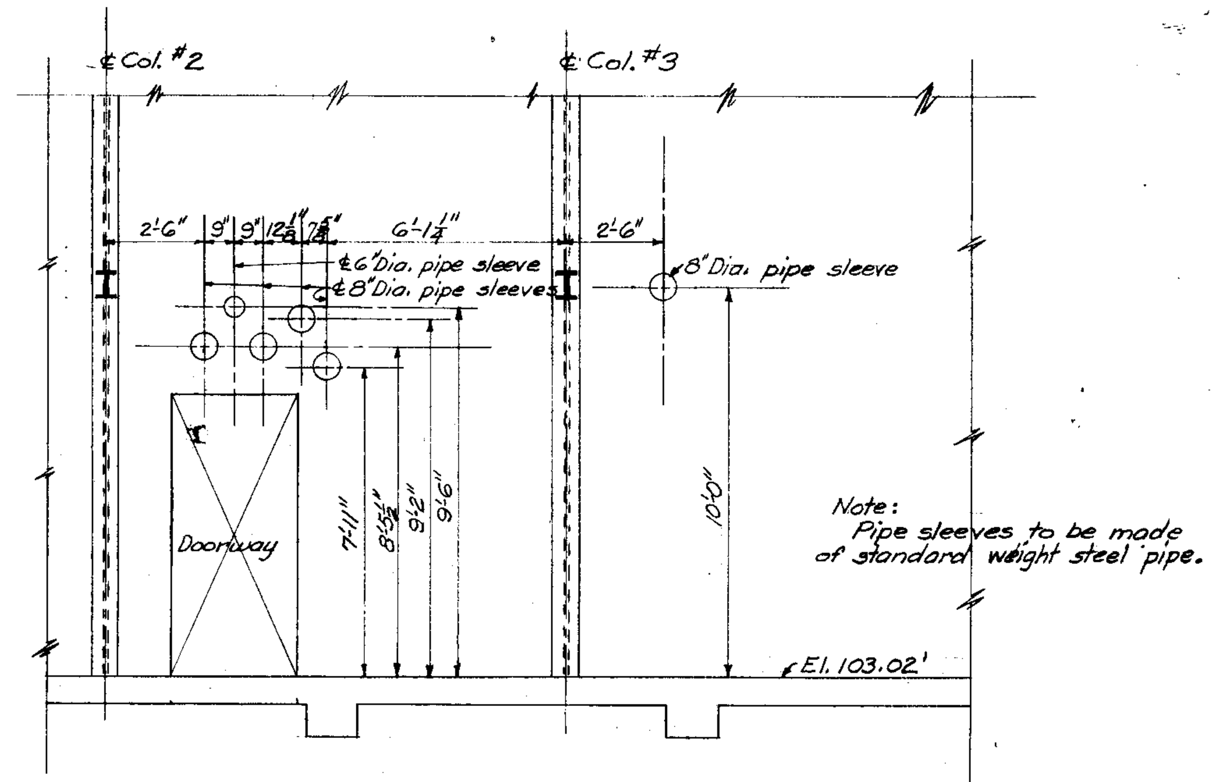
10



SECTION A-A
Scale 1/4" = 1'-0"



WEST ELEVATION
FILTER ROOM
Scale 1/4" = 1'-0"



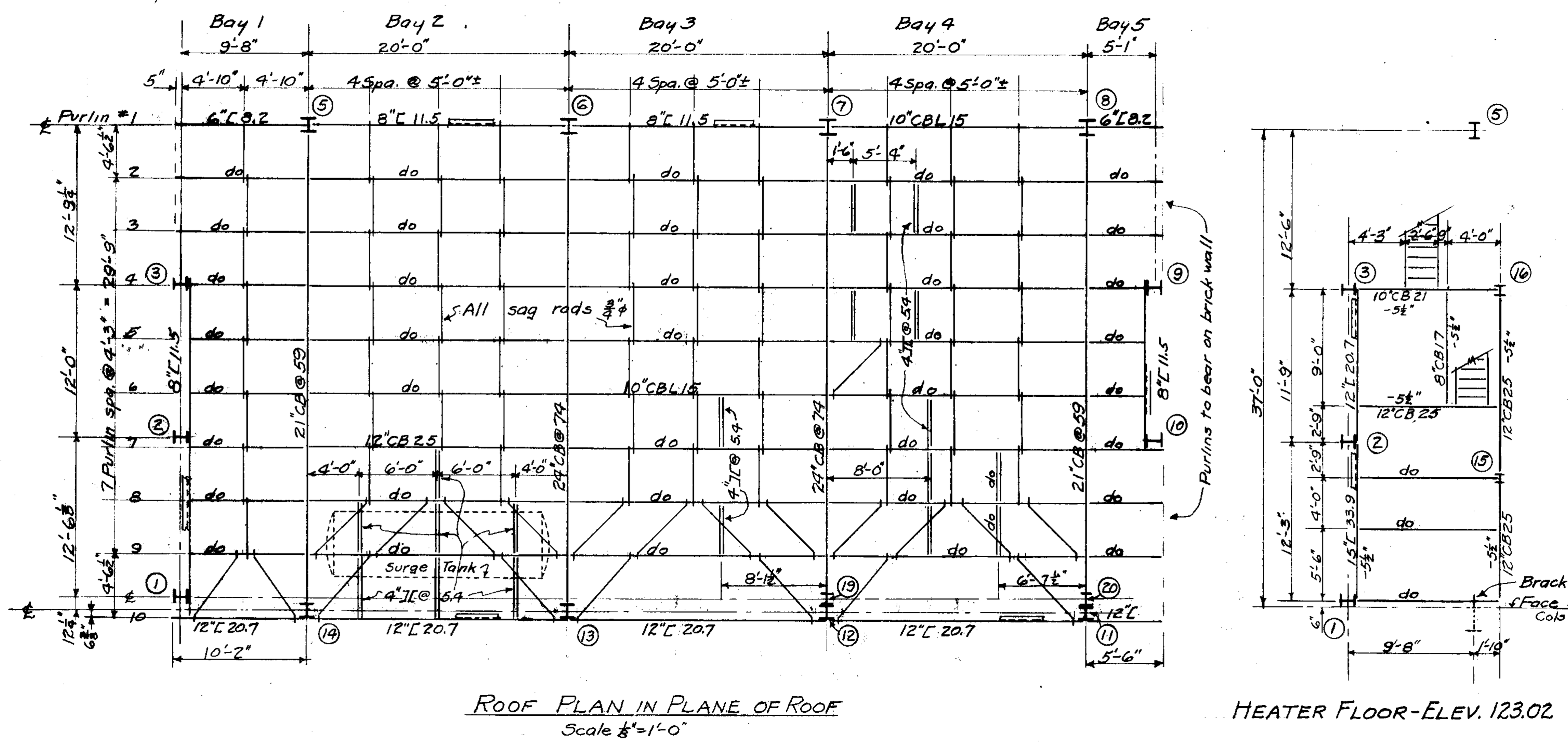
SECTION e-e
Scale 1/4" = 1'-0"

DWG_LABEL FM013338

ELEVATION & SECTIONS
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

Aug. 16, 1941
May 27, 1941
May 1, 1941
April 25, 1941

B
10



COLUMN SCHEDULE

Note-Elevation of Operating Floor given as 103.02

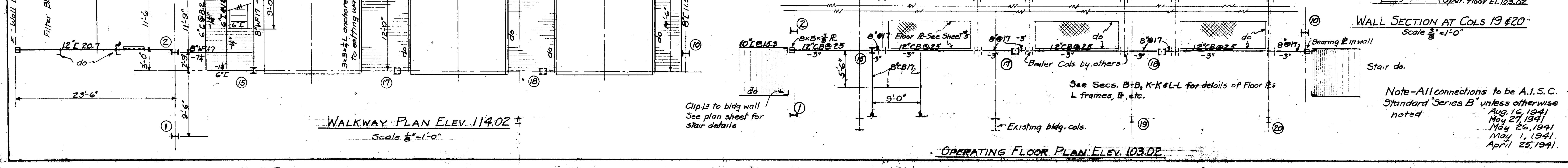
Column No's.	Section	Over All Length	Elev Bot. of Base PL	Elev Top of Cap PL	1" Base PLs A	1" Base PLs B	Anchor Bolts
5-6-7-8	14"WF@43#	45'-7 3/8"	103.12	148.73	16	12	1 1/4"x3'-0"
3-9	12"WF@40#	48'-1 5/8"	103.12	151.26	14	12	1"x3'-0"
2-10	12"WF@40#	50'-7 1/8"	103.12	153.71	14	12	1"x3'-0"
1	12"WF@40#	53'-1 5/8"	103.12	156.26	14	12	1"x3'-0"
11-12-13-14	12"WF@53#	12'-3"±	Butt weld @ 144.08±	156.31	No PL	reqd.	
15	8"WF@31#	36'-8"	100.98	137.65	10	12	1"x3'-0"
16	8"WF@31#	21'-3"	100.98	122.56	10	12	1"x3'-0"
17-18	2-10"[ ]@15.3#	35'-4"	100.98	136.32	12	11	1"x3'-0"
19	12"WF@40#	51'-2 3/8"	103.12	154.32	12	12	1"x3'-0"
20	12"WF@40#	51'-5 3/8"	103.12	154.57	12	12	1"x3'-0"

LINTEL SCHEDULE

Outside face of brick wall

Punch 3/8" holes about 18" ctrs @ 7/8" ga. for sash clamps

Lintel	No	Channel	Plate	Angle	"C"
L1	24	5"@6.7x7'-3"	11"x1/4"x7'-3"	1 3/4x1 3/4x1/4x6'-3"	7 1/2"
L2	1	do x3'-11"	do x3'-11"	none	
L3	4	do x3'-10"	do x3'-10"	1 3/4x1 3/4x1/4x3'-2"	7 1/2"
L4	1	8"@11.5x14'-0"	7"x1/4"x14'-0"	do x12'-8"	3 1/2"
L5	1	none	none	4x4x3/8x6'-0"	
L6	3	5"@6.7x7'-3"	7"x1/4x7'-3	1 3/4x1 3/4x1/4x6'-3"	3 1/2"



Note-All connections to be A.I.S.C. Standard "Series B" unless otherwise noted

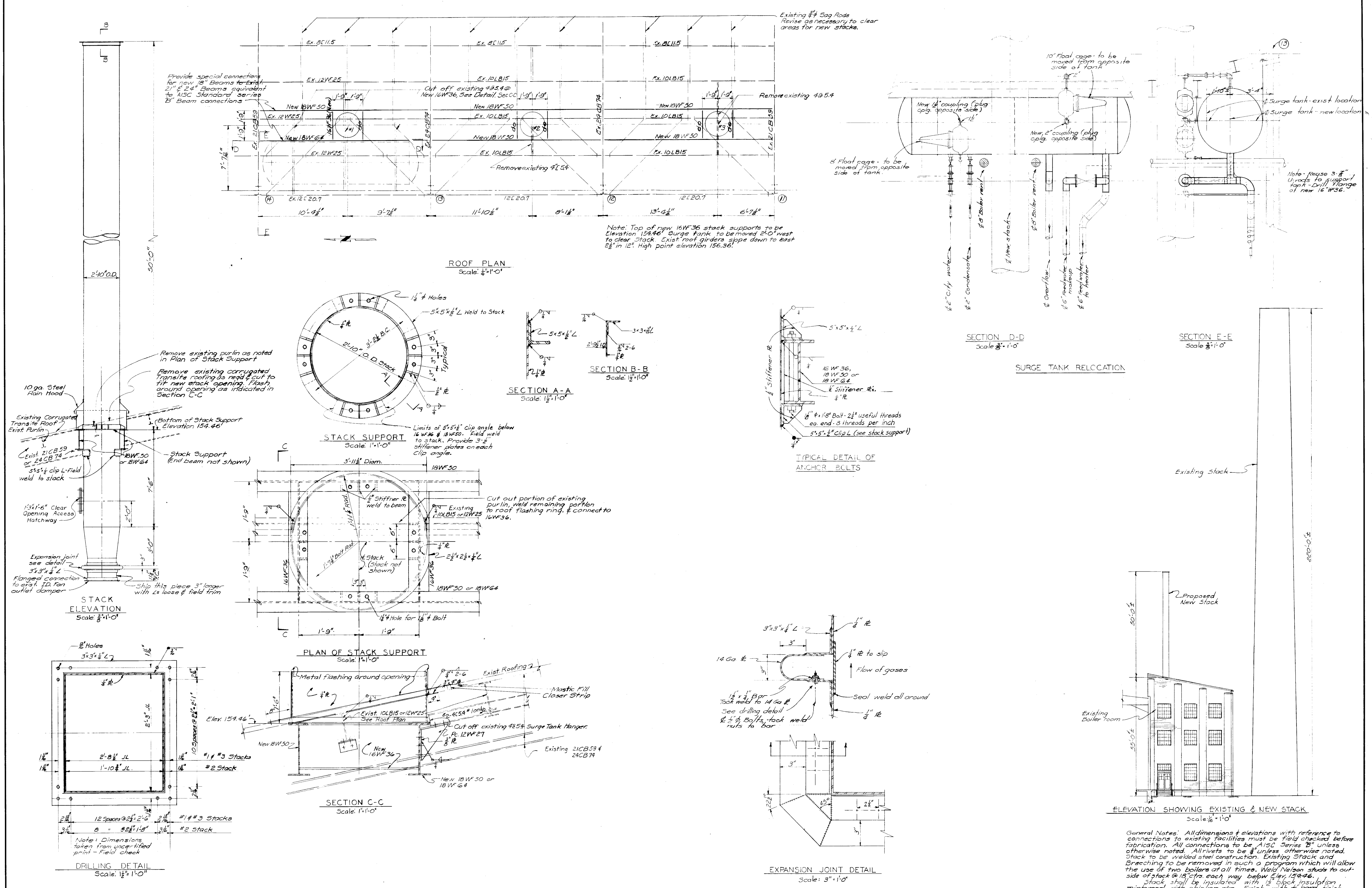
Aug. 16, 1941
May 27, 1941
May 26, 1941
May 1, 1941
April 25, 1941

DWG_LABEL FM013339

STEEL DETAILS
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941

10


BOILER FOUNDATION PLAN
Scale 1/4"=1'-0"
SECTION f-f
SECTIONAL SIDE ELEVATION
Scale 1/2"=1'-0"
SECTION k-k
Scale 1/2"=1'-0"
HALF SECTION m-m
Scale 1/2"=1'-0"
HALF SECTION n-n
Scale 1/2"=1'-0"
DETAILS OF
STEEL FLOOR SUPPORT
4 REQ'D.
Scale 1/2"=1'-0"
HALF SECTION g-g
HALF SECTION h-h
PLAN
SECTION
DETAIL "D"
For No. 1 Boiler Foundation Only
Note:
"F" - Material & labor by Setting Contractor
"N" - Furnished by Kansas Power & Light Co.
"L" - Material by Kansas Power & Light Co. & labor by Setting Contractor
"B&W" - Furnished by Babcock & Wilcox Co.
BOILER FOUNDATION DETAILS
POWER PLANT IMPROVEMENTS
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY, MO.
1941
Aug. 28, 1941
Aug. 16, 1941
June 24, 1941
FM013340



General Notes: All dimensions & elevations with reference to connections to existing facilities must be field checked before fabrication. All connections to be AISC Series "B" unless otherwise noted. All rivets to be 3/4" unless otherwise noted. Stack to be welded steel construction. Existing Stack and Breeching to be removed in such a program which will allow the use of two boilers at all times. Weld Nelson studs to outside of stack @ 18" ctrs each way below Elev. 159.46.
Stack shall be insulated with 1 1/2" block insulation reinforced with chicken wire. Finish with 1/2" hard finish asbestos cement. (Below El. 154.46)

DWG_LABEL FM013341

BLACK & VEATCH
CONSULTING ENGINEERS KANSAS CITY, MO.

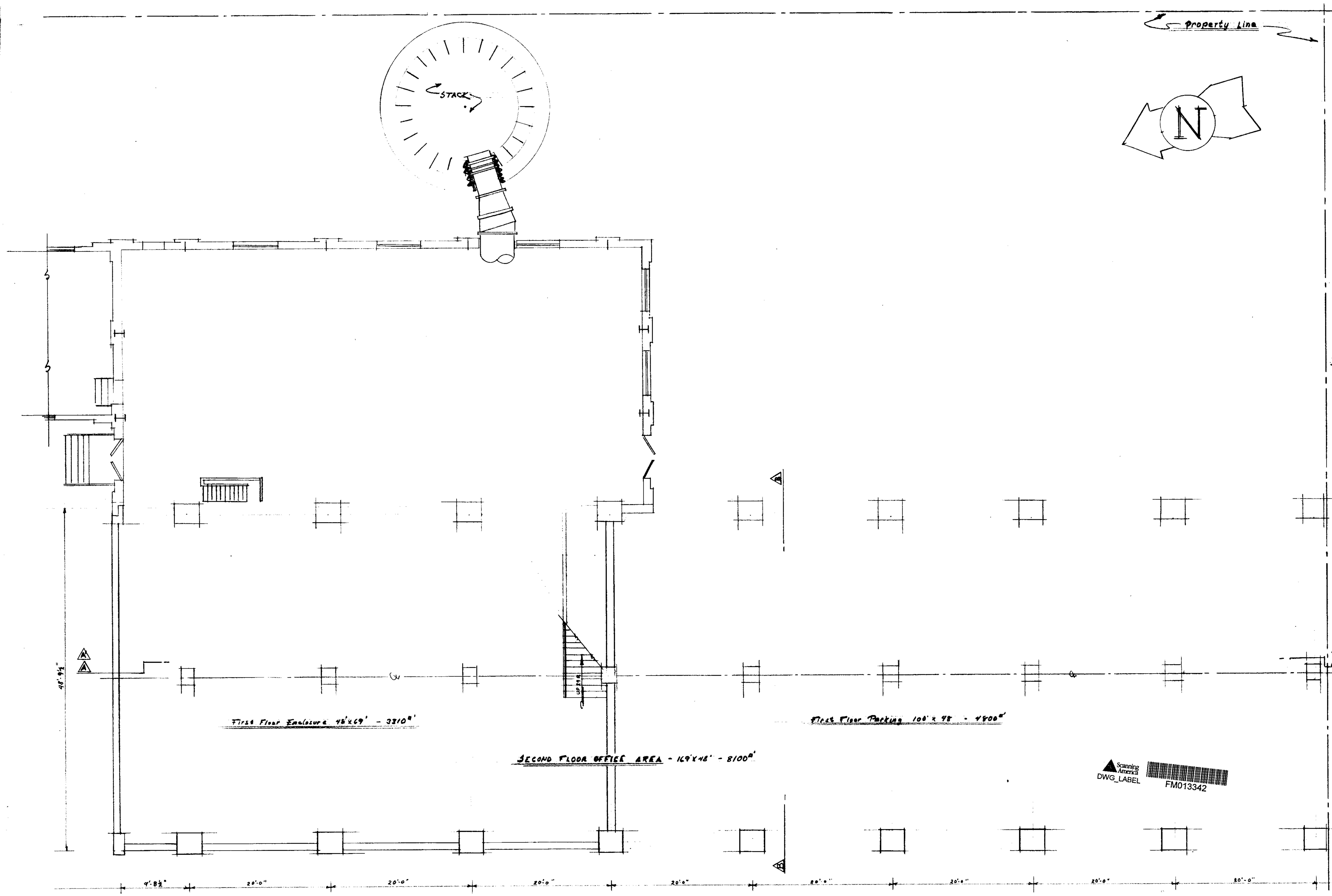
KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

VAN BUREN HEATING STATION
TOPEKA, KANSAS

BUILDING ALTERATIONS & STACK DETAILS

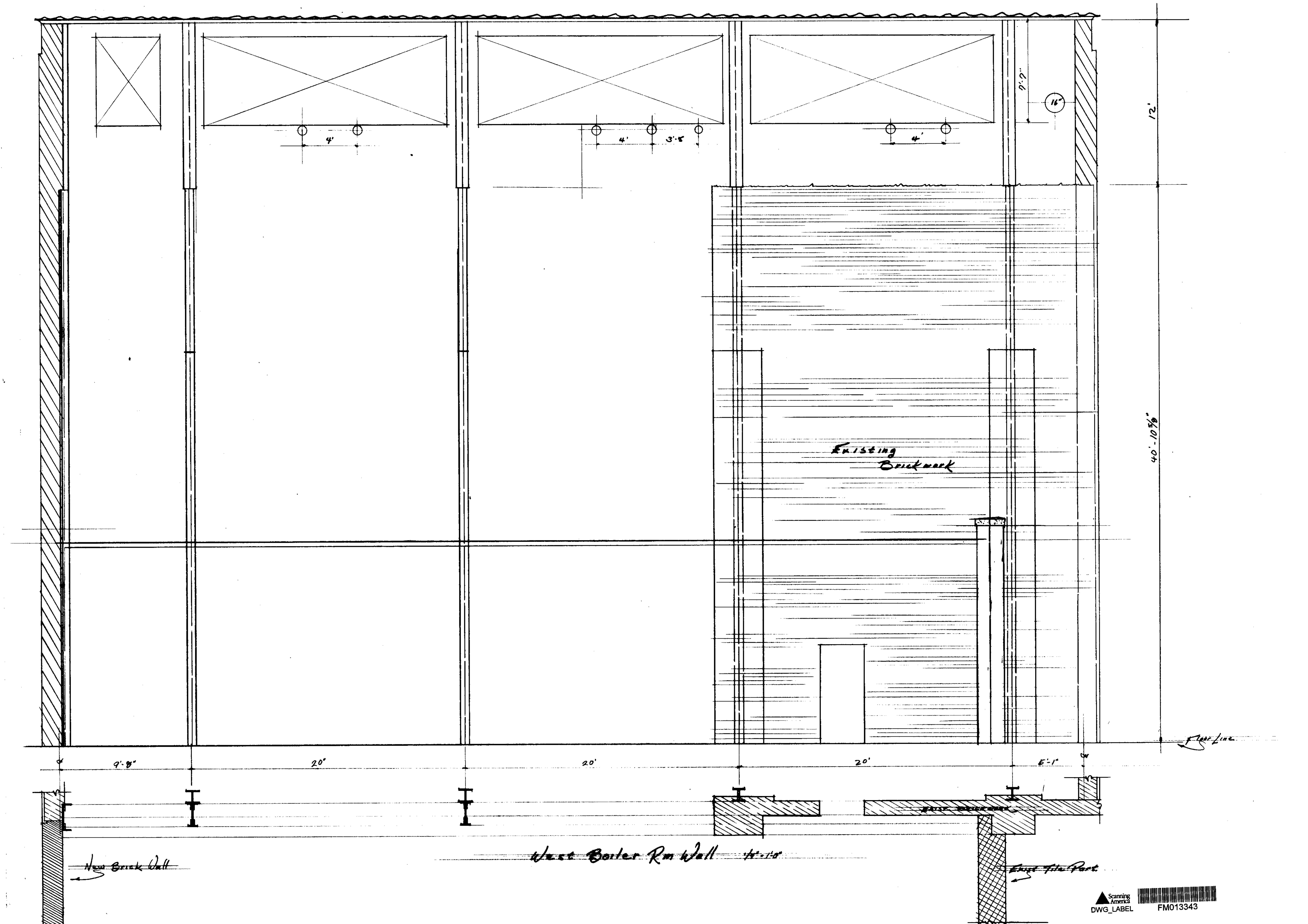
SCALE As Noted	DRAWN BY H.L.K.C.B.	TRACED BY	CHECKED BY C.L.M.	
DATE 6-18-?	APPROVED BY FOR BLACK & VEATCH		APPROVED BY FOR KANSAS POWER & LIGHT CO.	1

File C-14

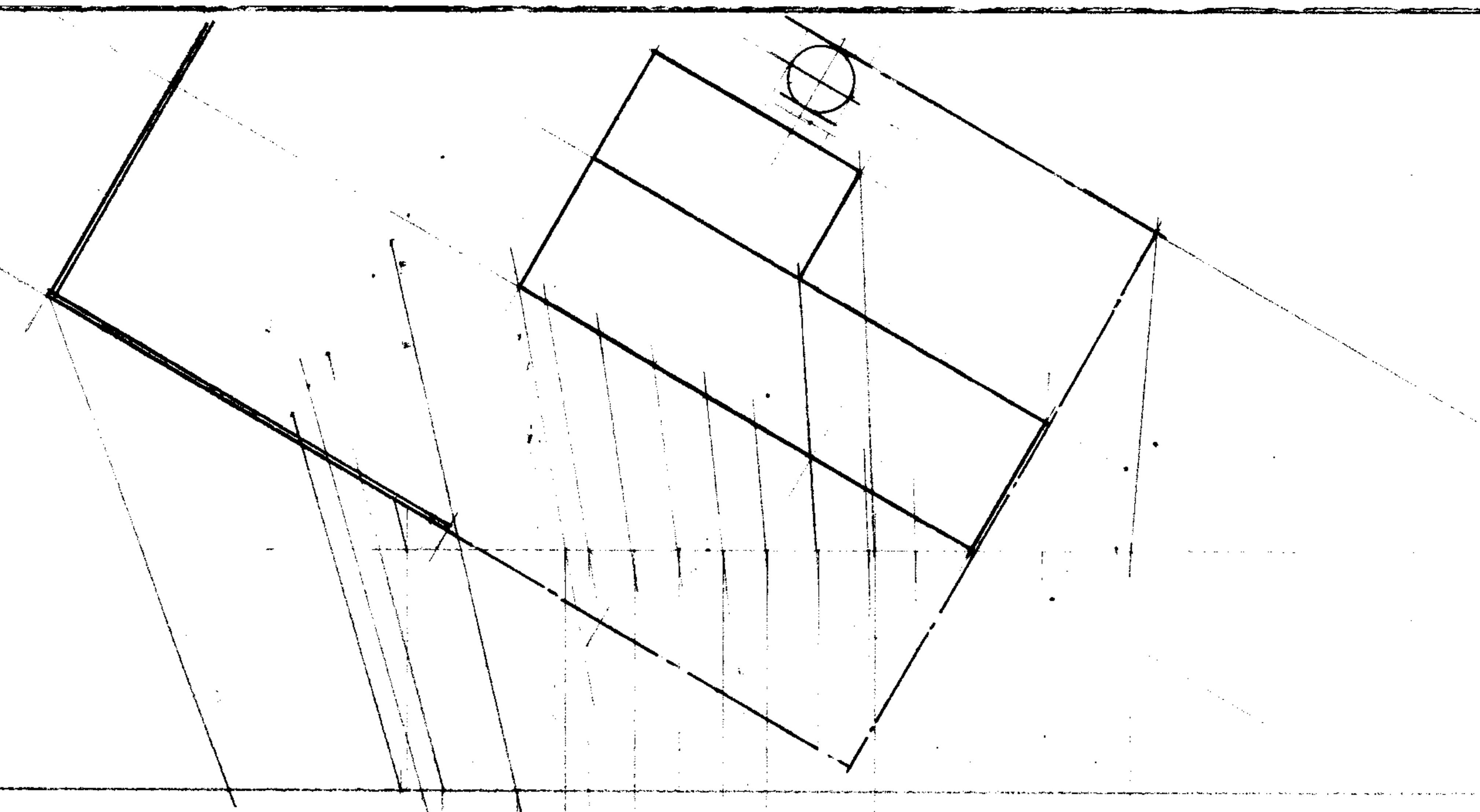


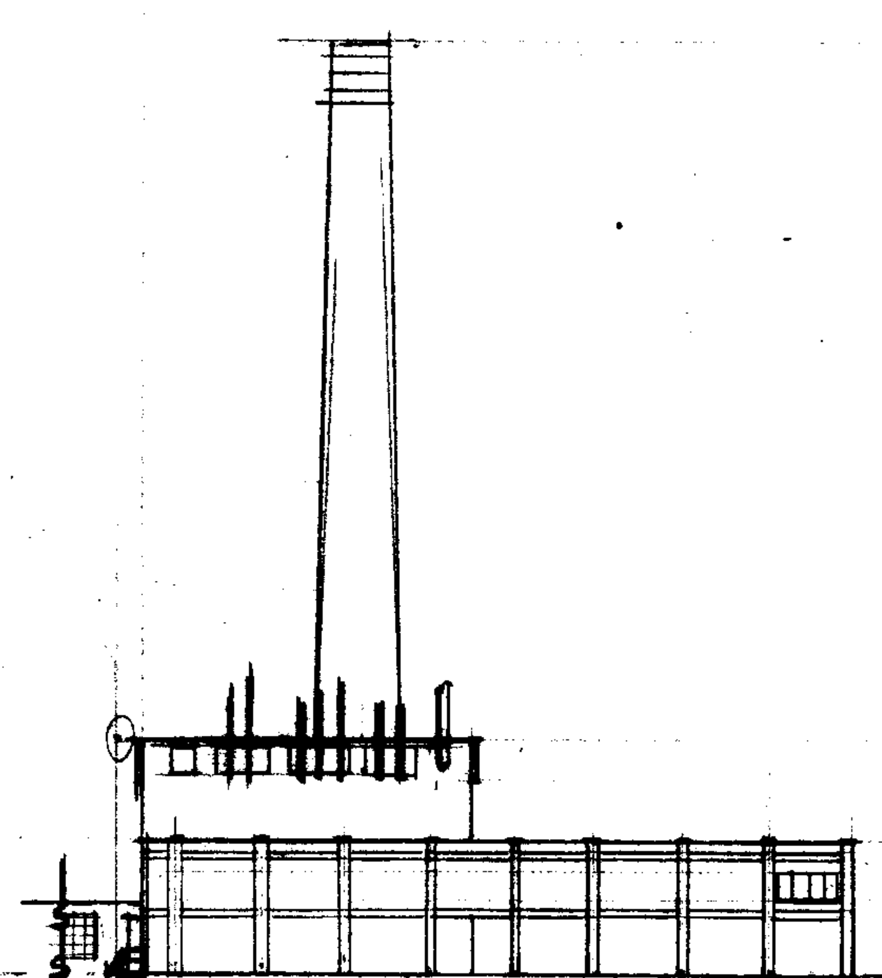
FLOOR PLAN
1/8" = 1'-0"

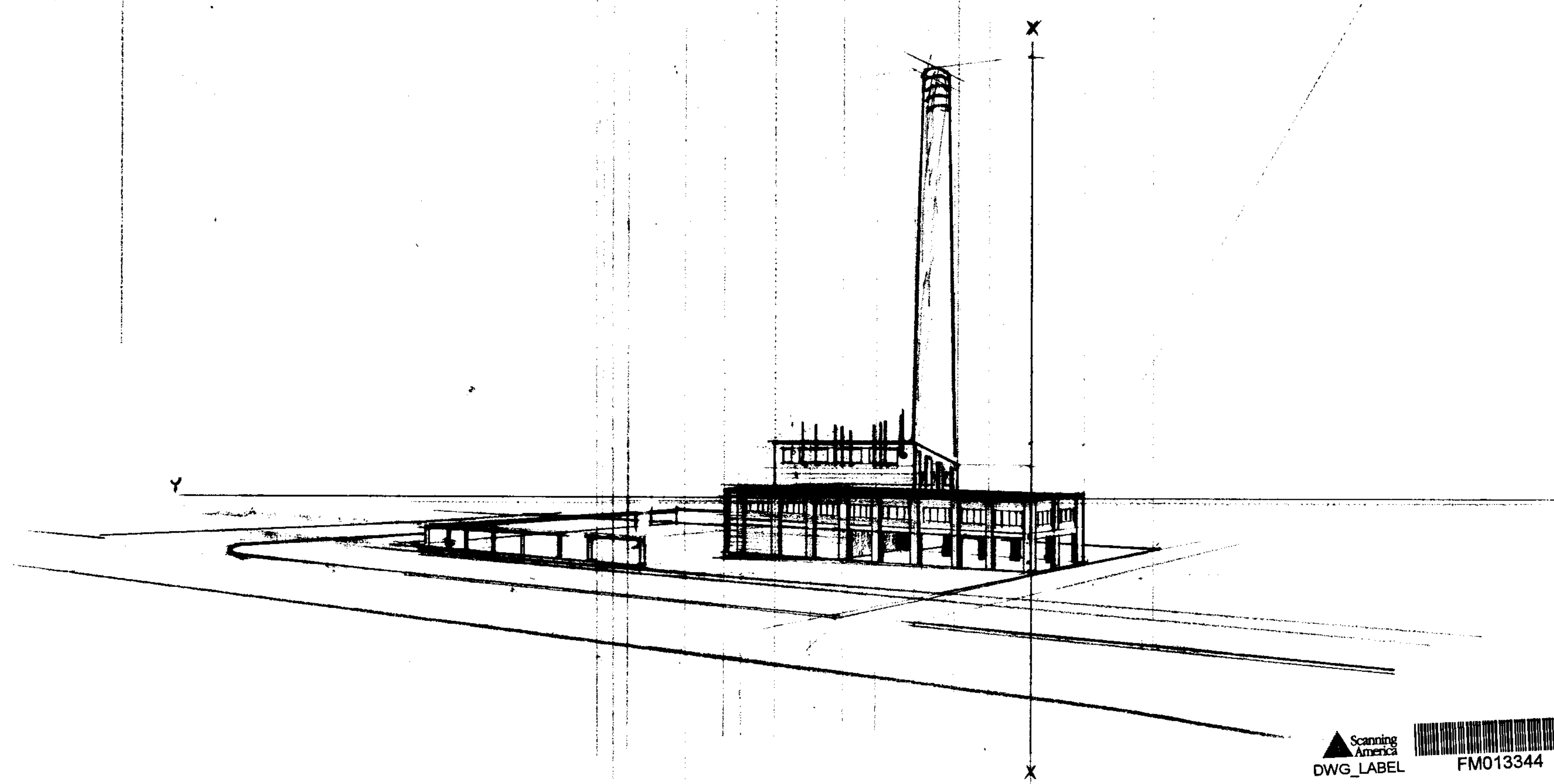
4 APR 56
Duane D. Goodrich



4'
4'
3'-5"
4'
16"
12'
40'-10 5/8"
Existing Brickwork
Floor Line
9'-8"
20'
20'
20'
5'-1"
West Boiler Rm Wall
New Brick Wall
Exist Tile Part.

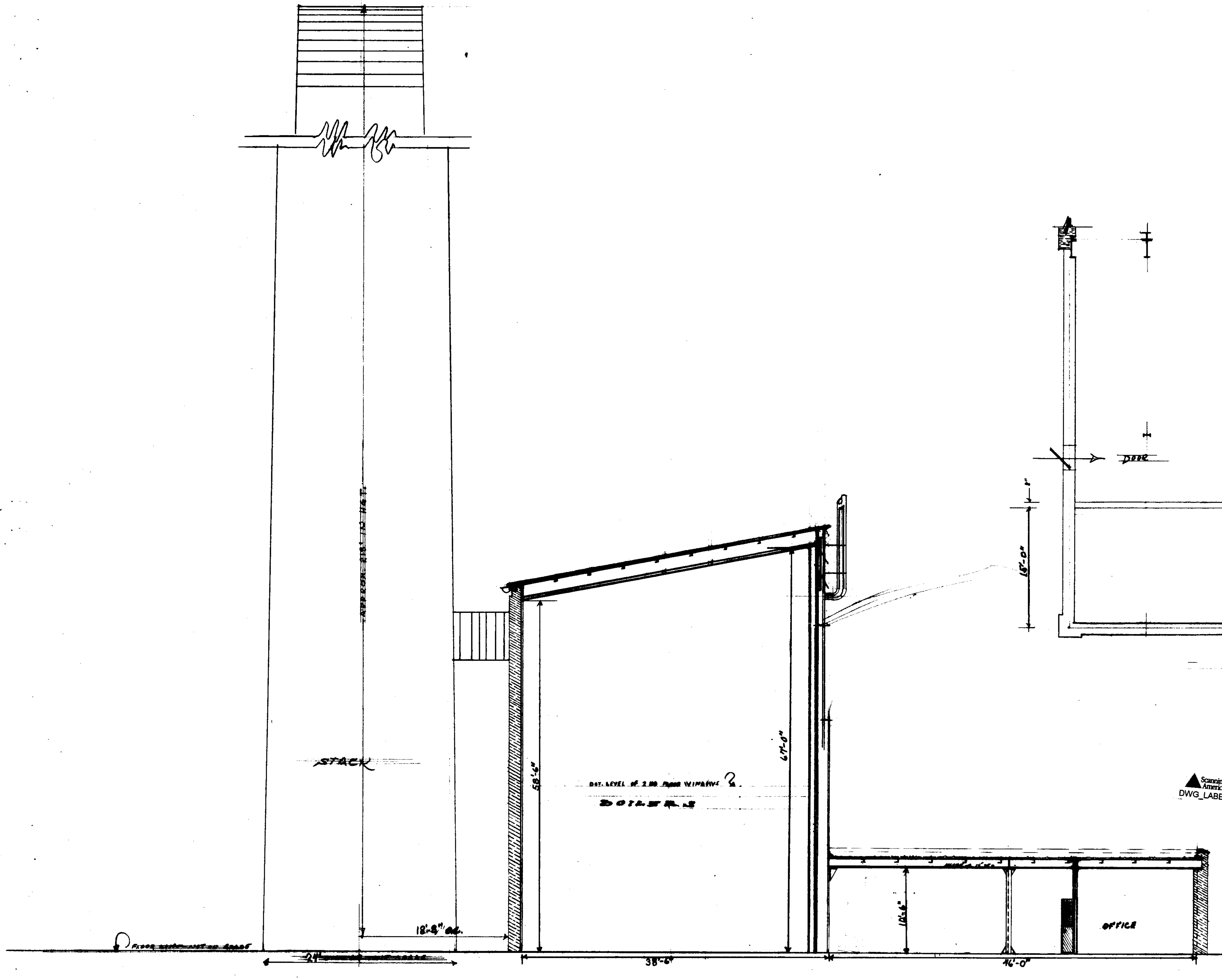




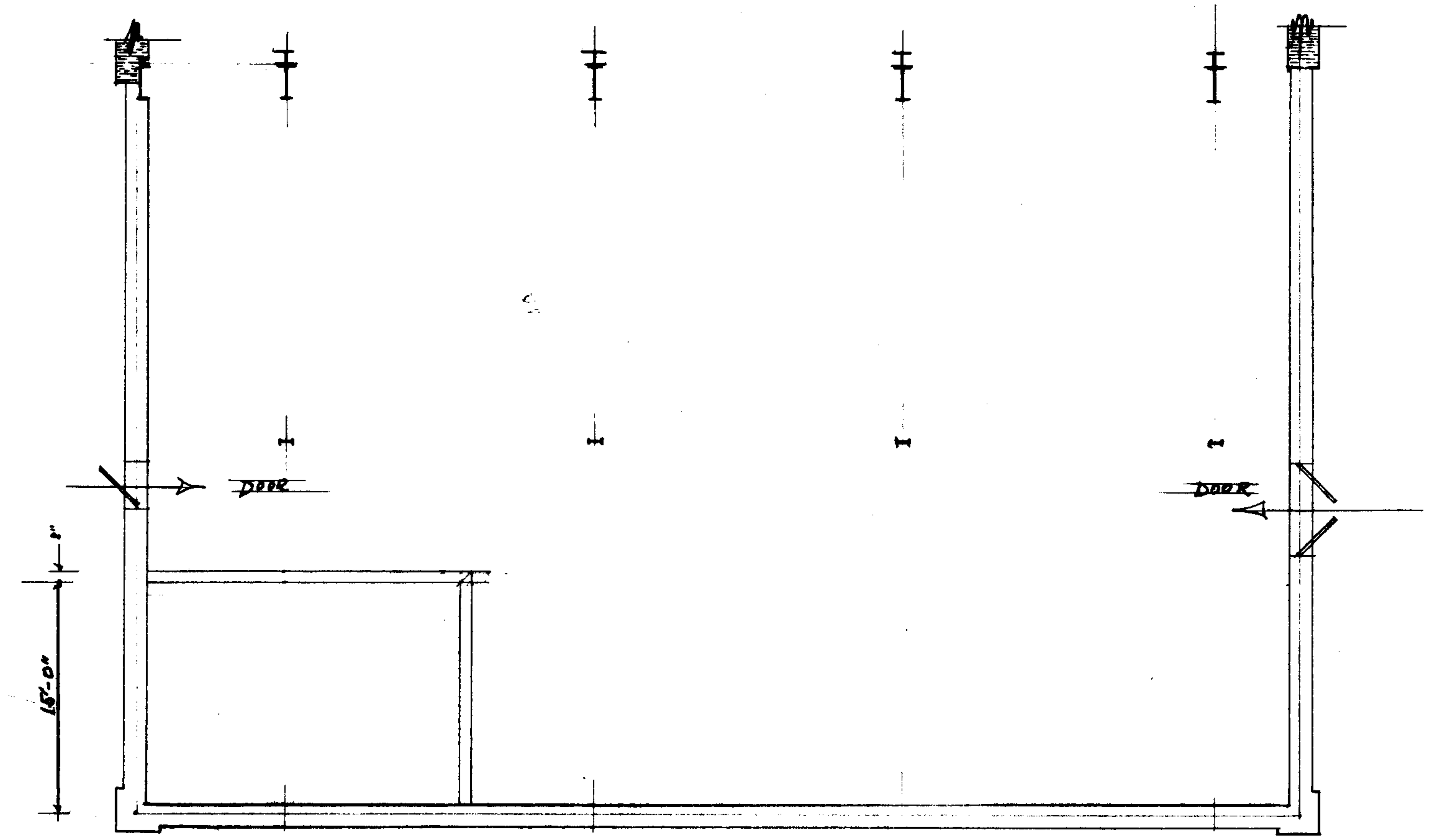


Perspective - SW.

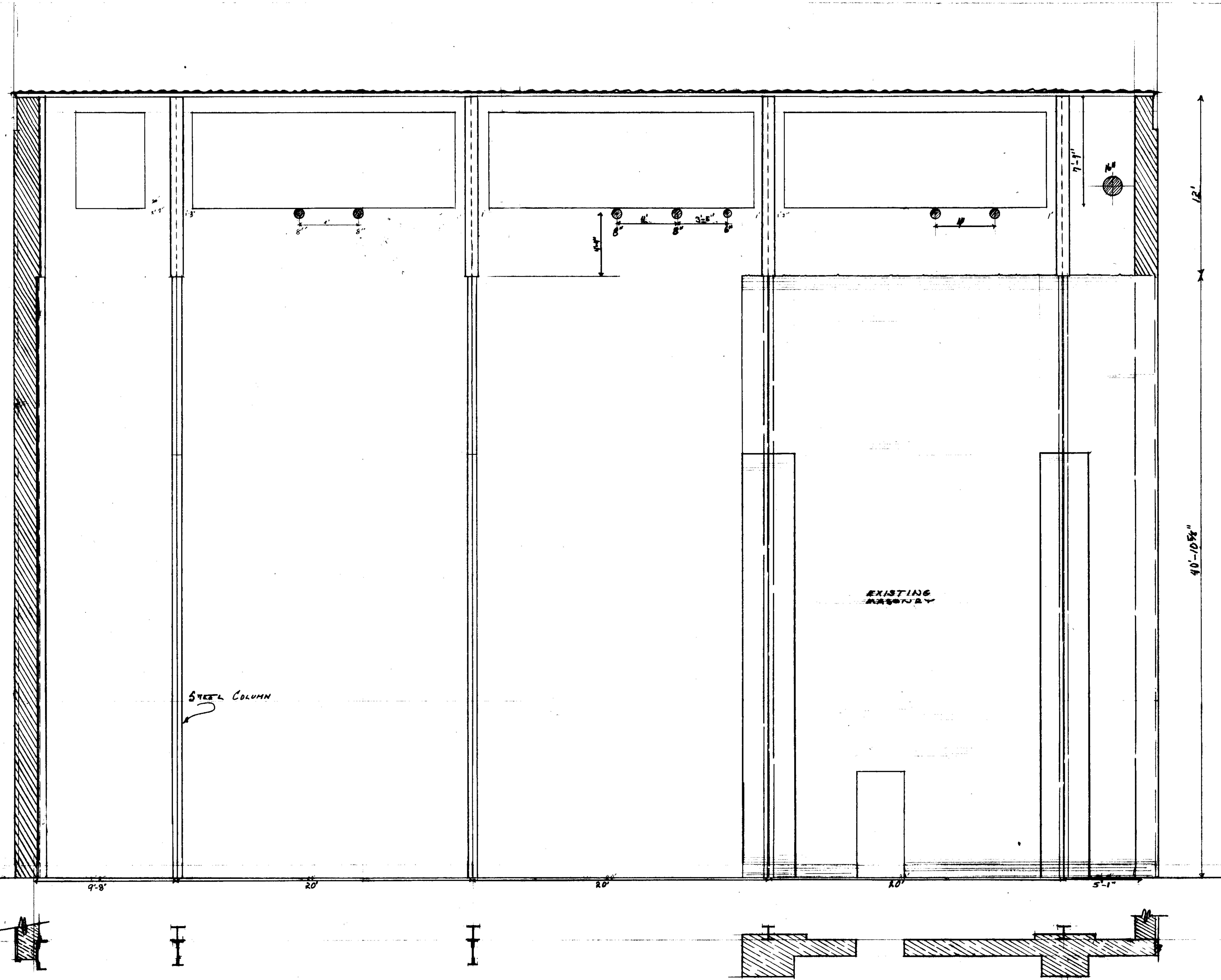
4. APR 56
Duane D. Goodrich



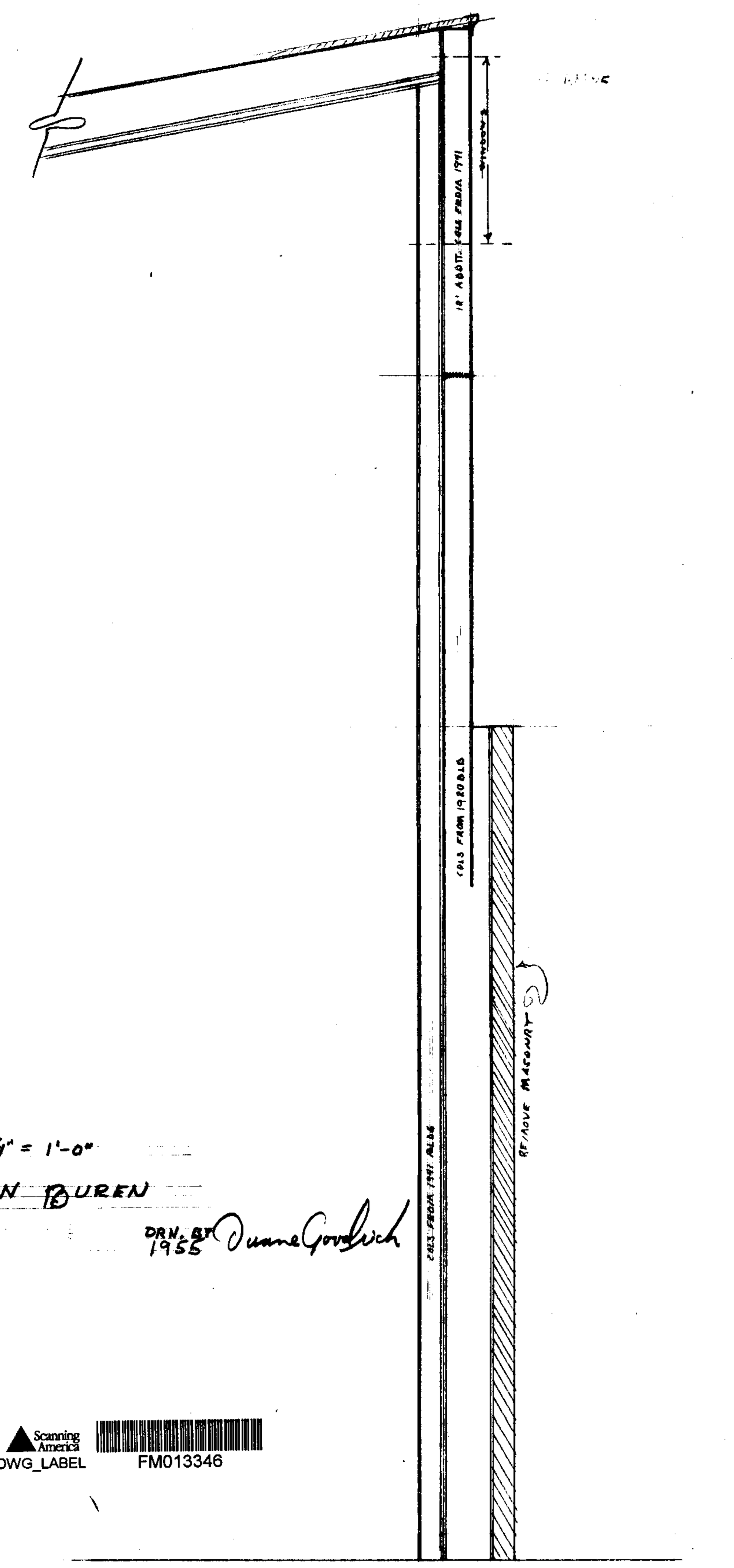
SECTION B-B



FLOOR PLAN OF PROPOSED ADDITITION



1/8" SCALE (WEST WALL OF NEW)

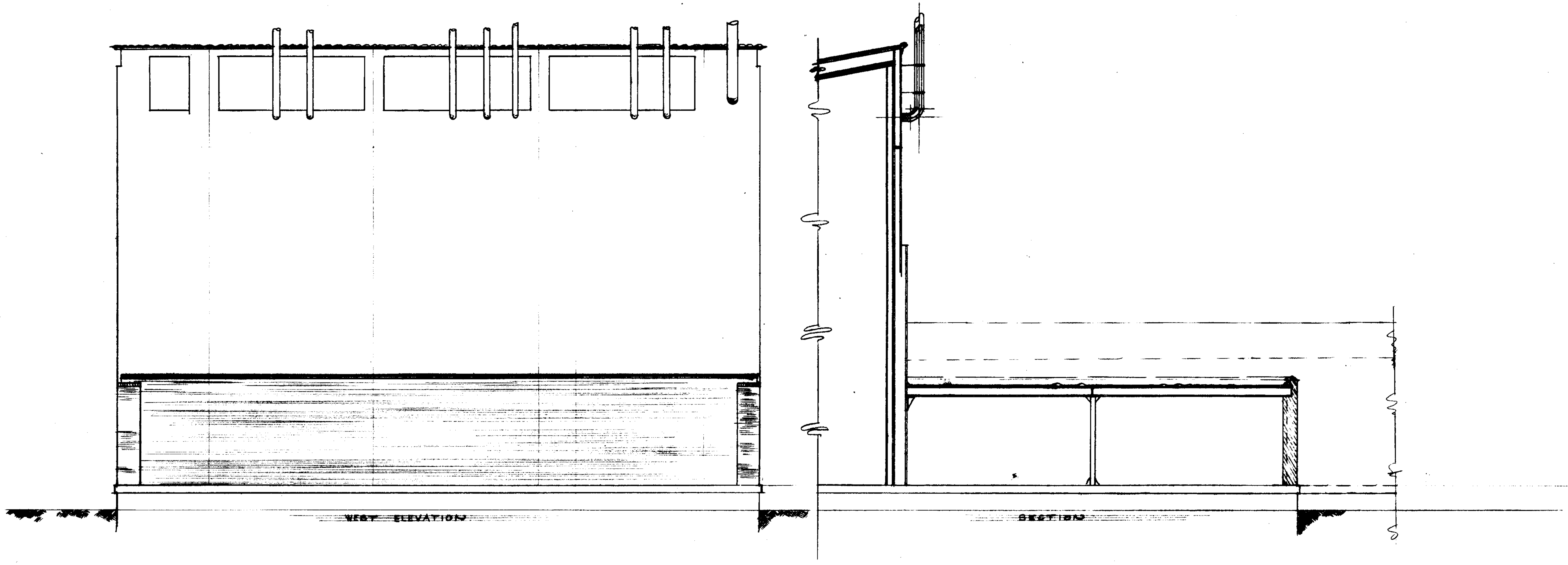


SECTION OF WEST BOILER ROOM WALL

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

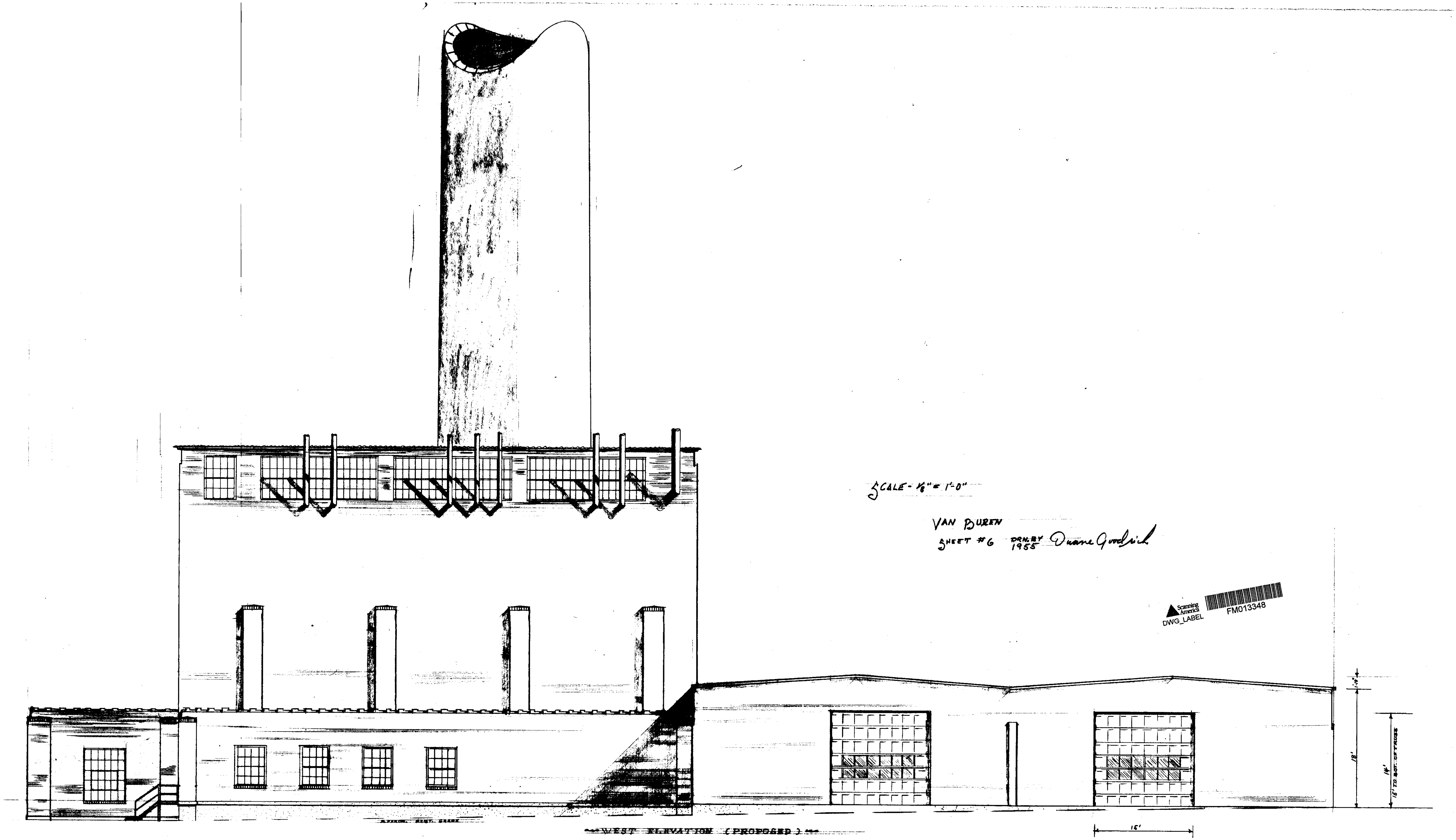
VAN BUREN

DRN. BY Duane Goodrich
1955



Van Bullen

SHEET # 4 of 2

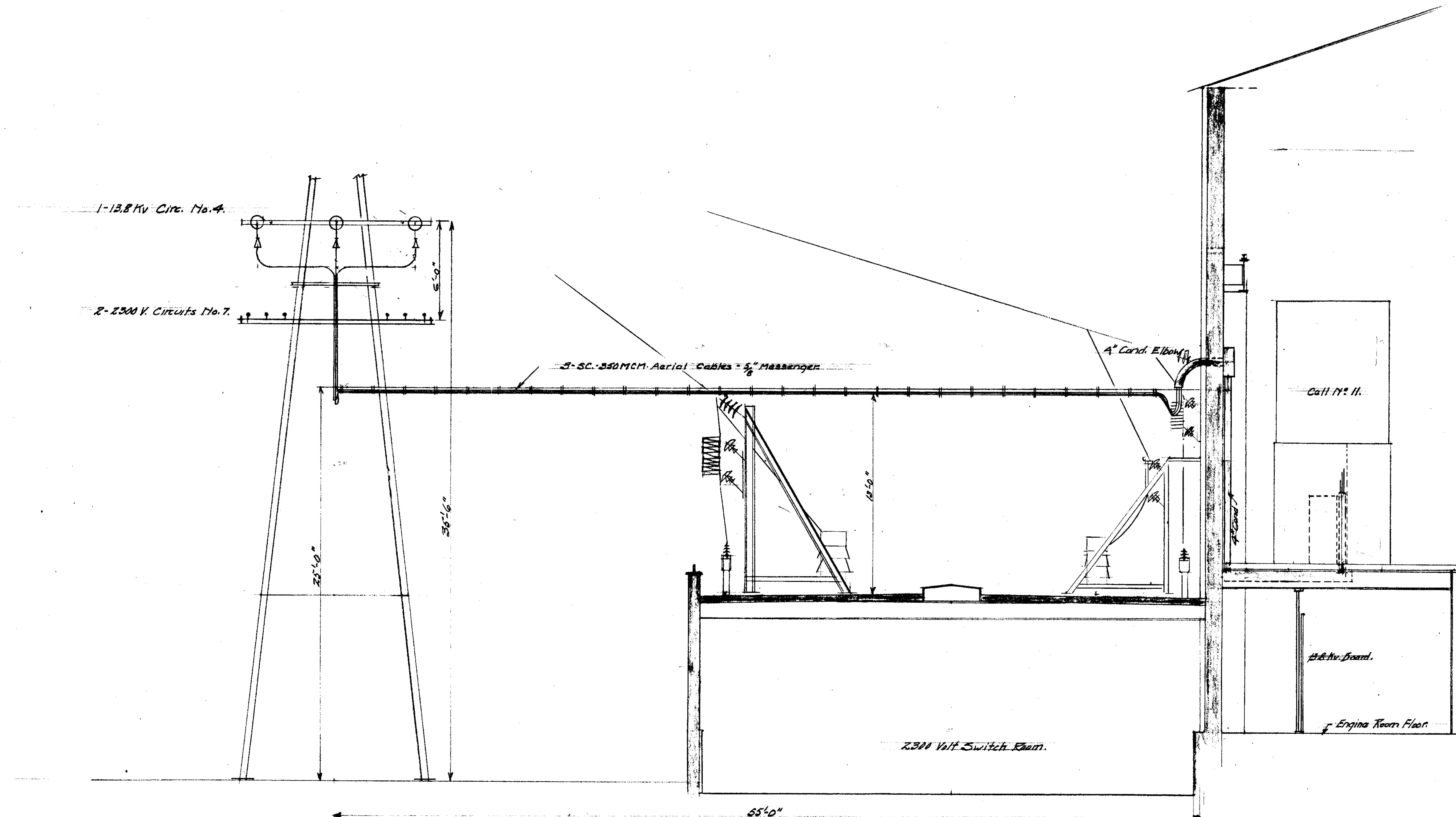


WEST ELEVATION (PROPOSED)

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

VAN BUREN
SHEET #6 DRN. BY 1955 Duane Goodrich

SHEET # 2 Van Buren ~~Goodrich~~



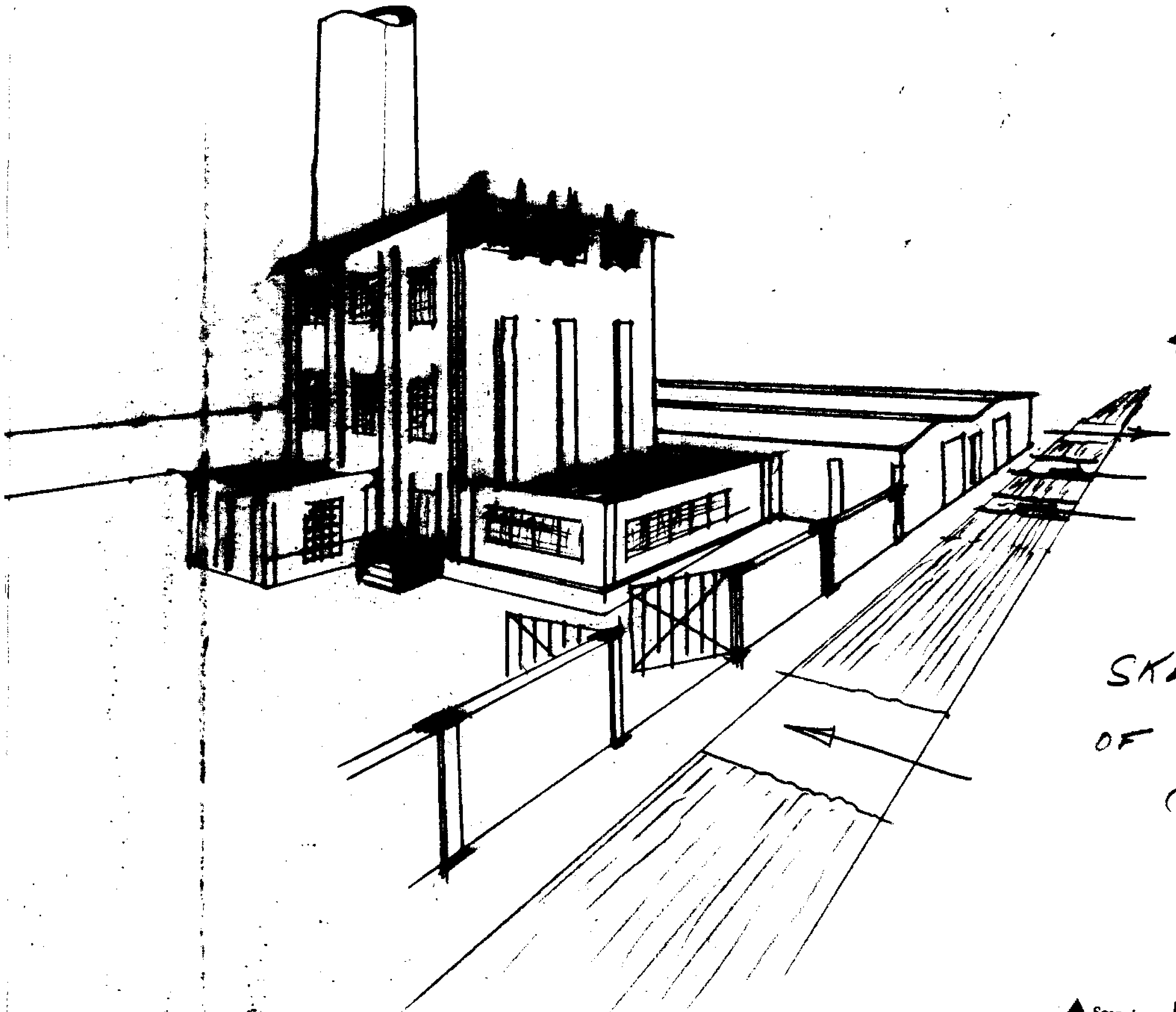
SECTION LOOKING EAST.

THE KANSAS POWER AND LIGHT CO
TOPEKA, KANSAS

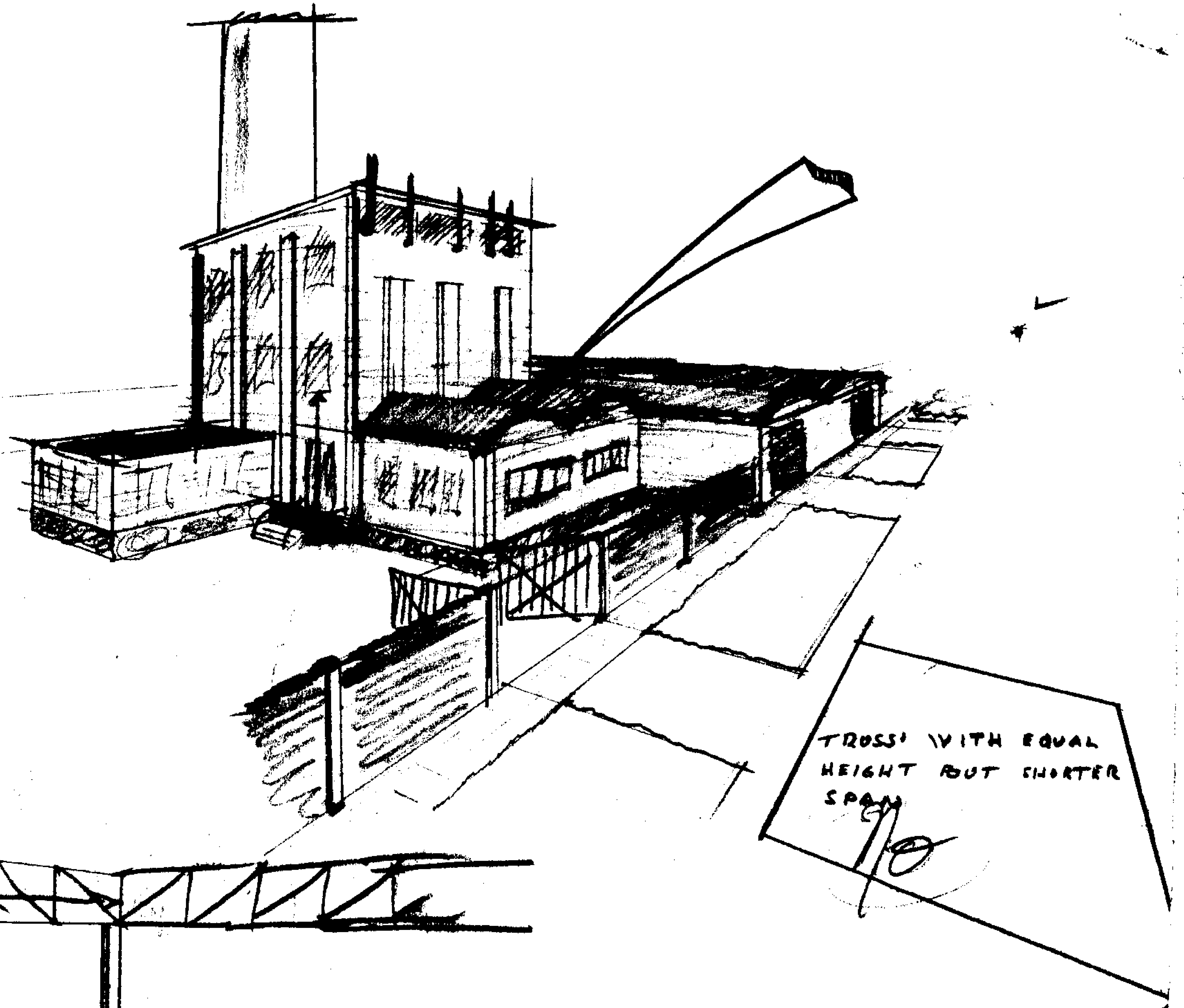
13.8 Kv. No. 4 Feeder. Van Buren.

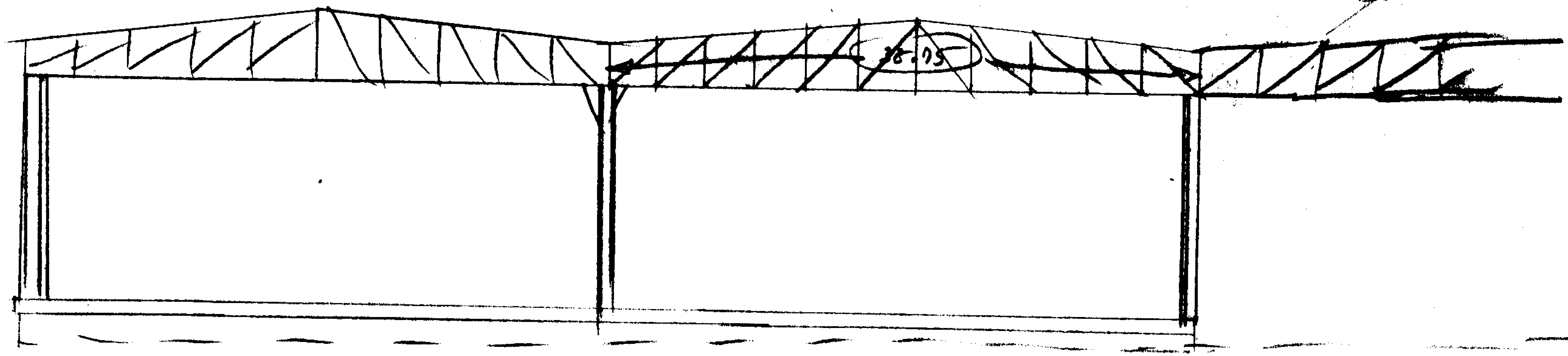
CH.		SCALE 1/4" = 1'-0"
O. K.		D-6311
APP.		

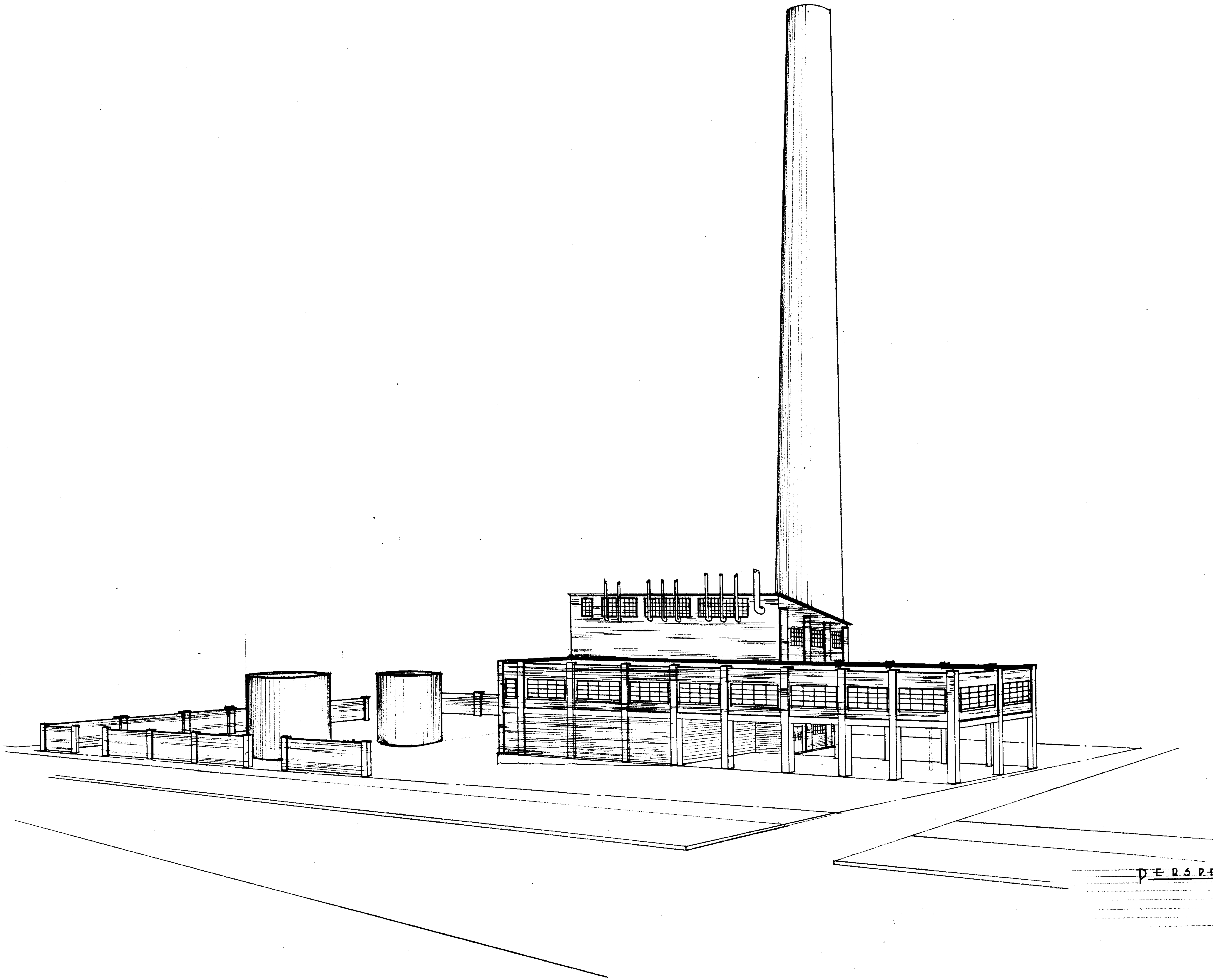
1935



SKETCH
OF PROPOSAL

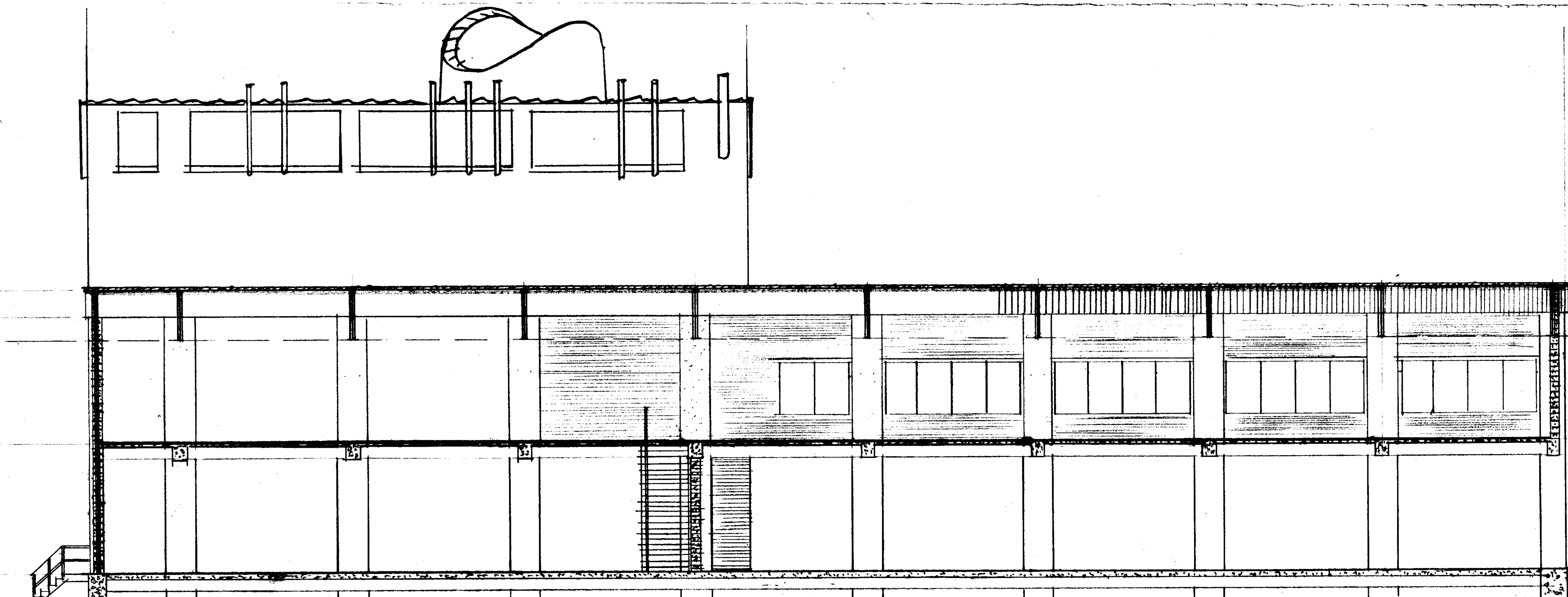

TRUSS' WITH EQUAL
HEIGHT BUT SHORTER
SPAN


38.75



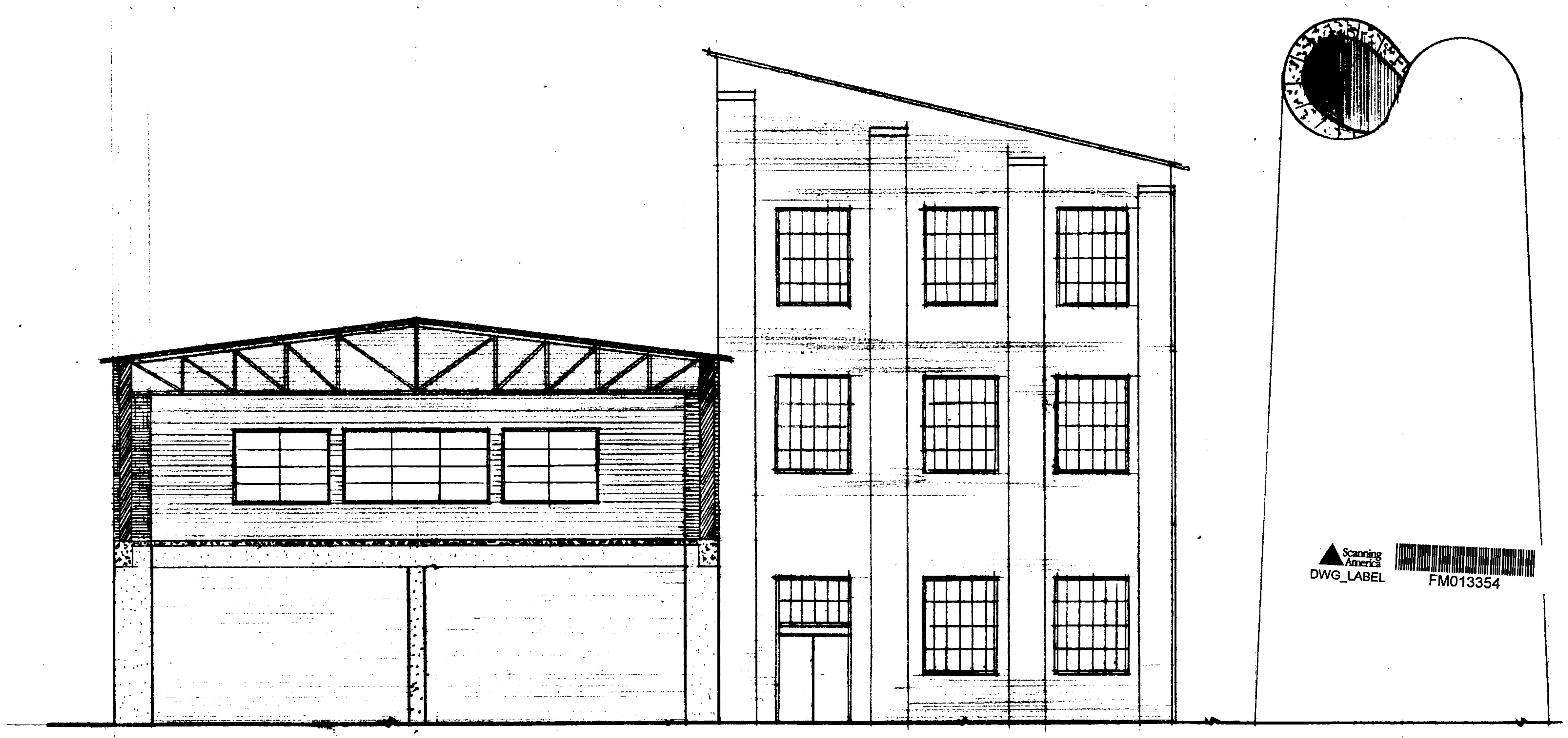
PERSPECTIVE

4 APR 56
Duane D. Goodrich



SECTION A-A

1/8" = 1'-0"

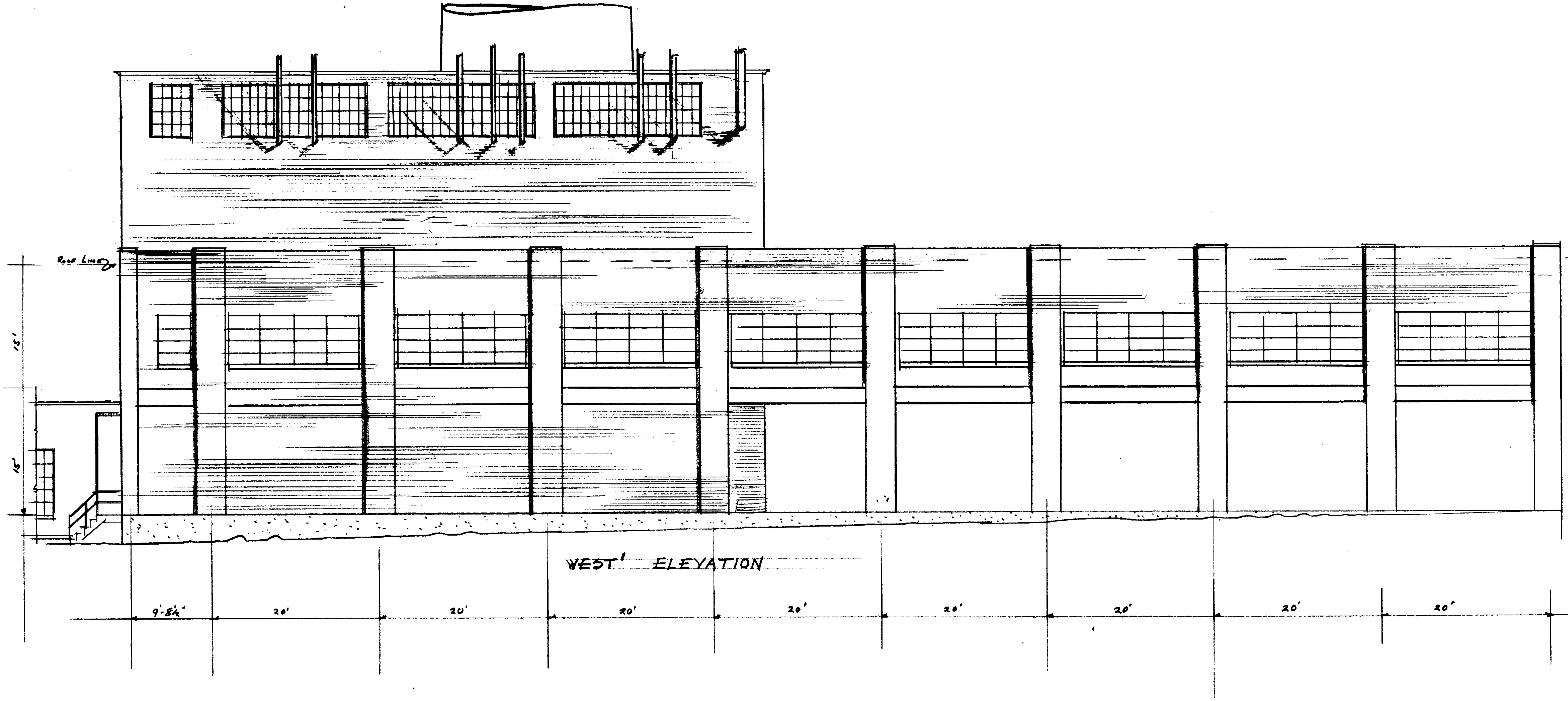


SECTION B-B

1/4" = 1'-0"

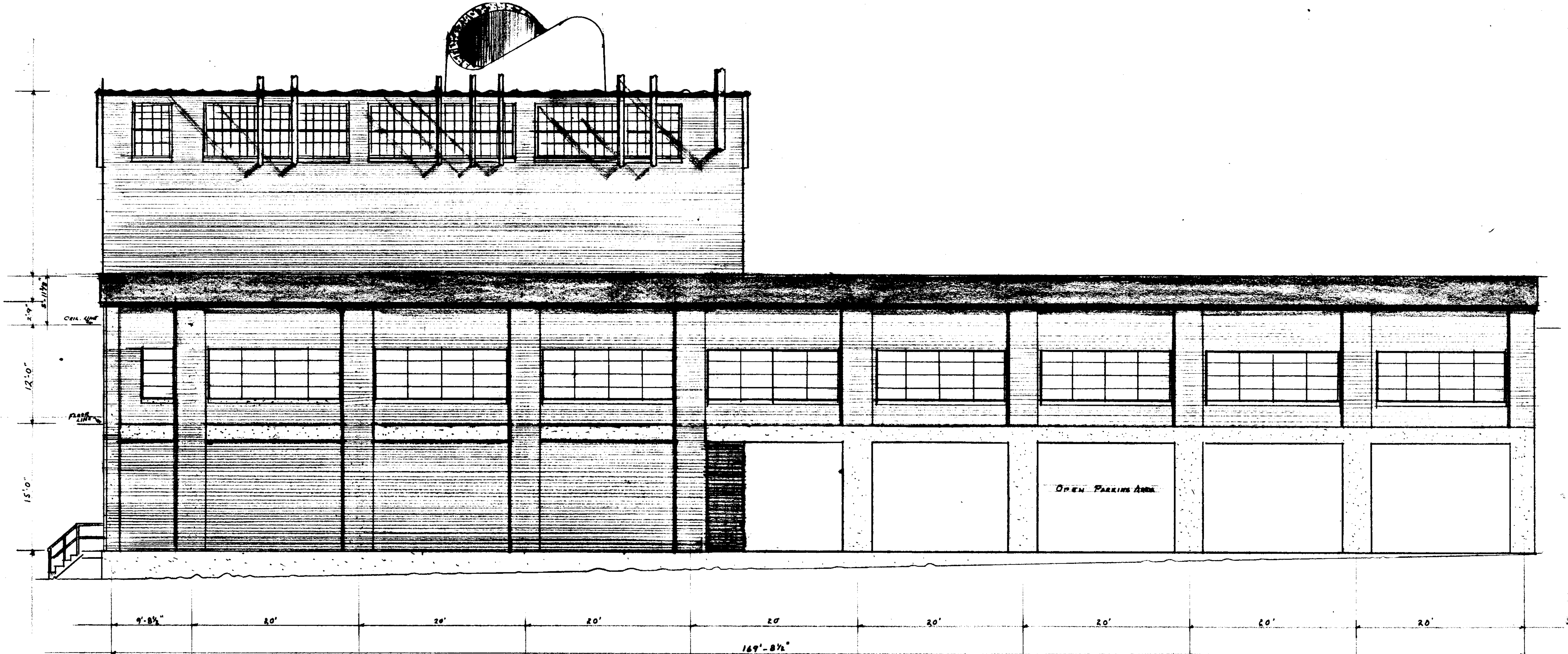
Section A-A
" BB

4 APR 56
Duane D. Goodrich



WEST' ELEVATION

4 APR 56
Duane D. Goodrich

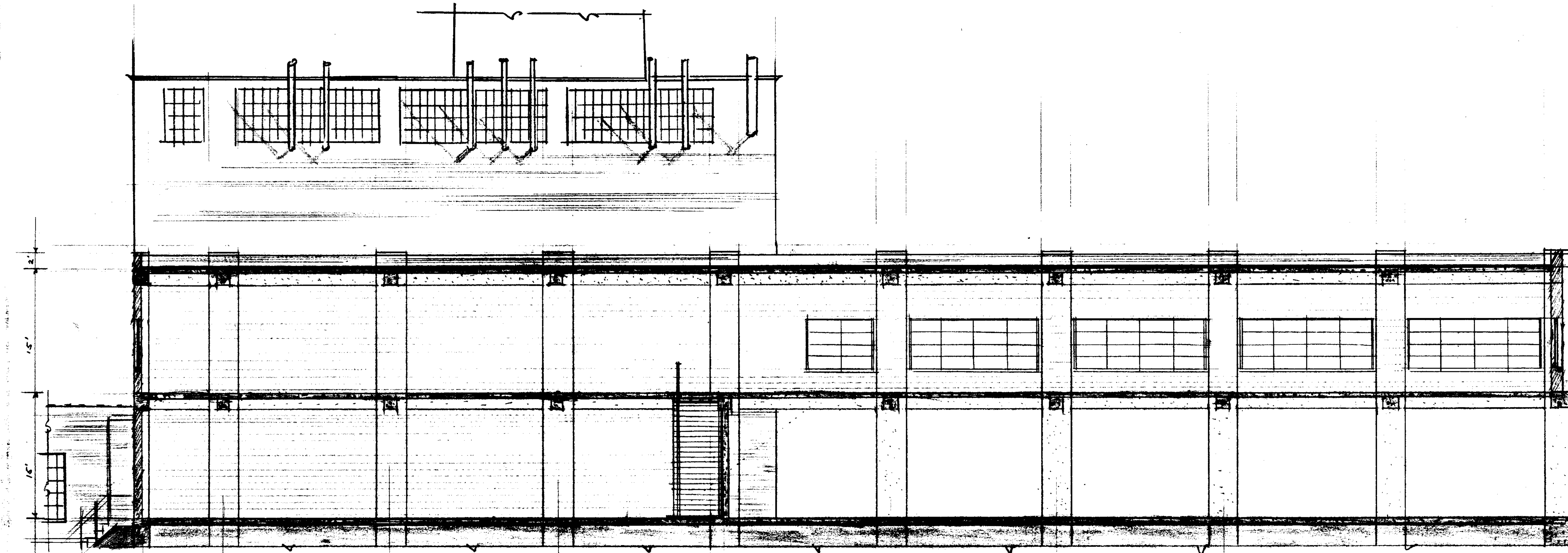


WEST ELEVATION
½" = 1'-0"

Elevation - West

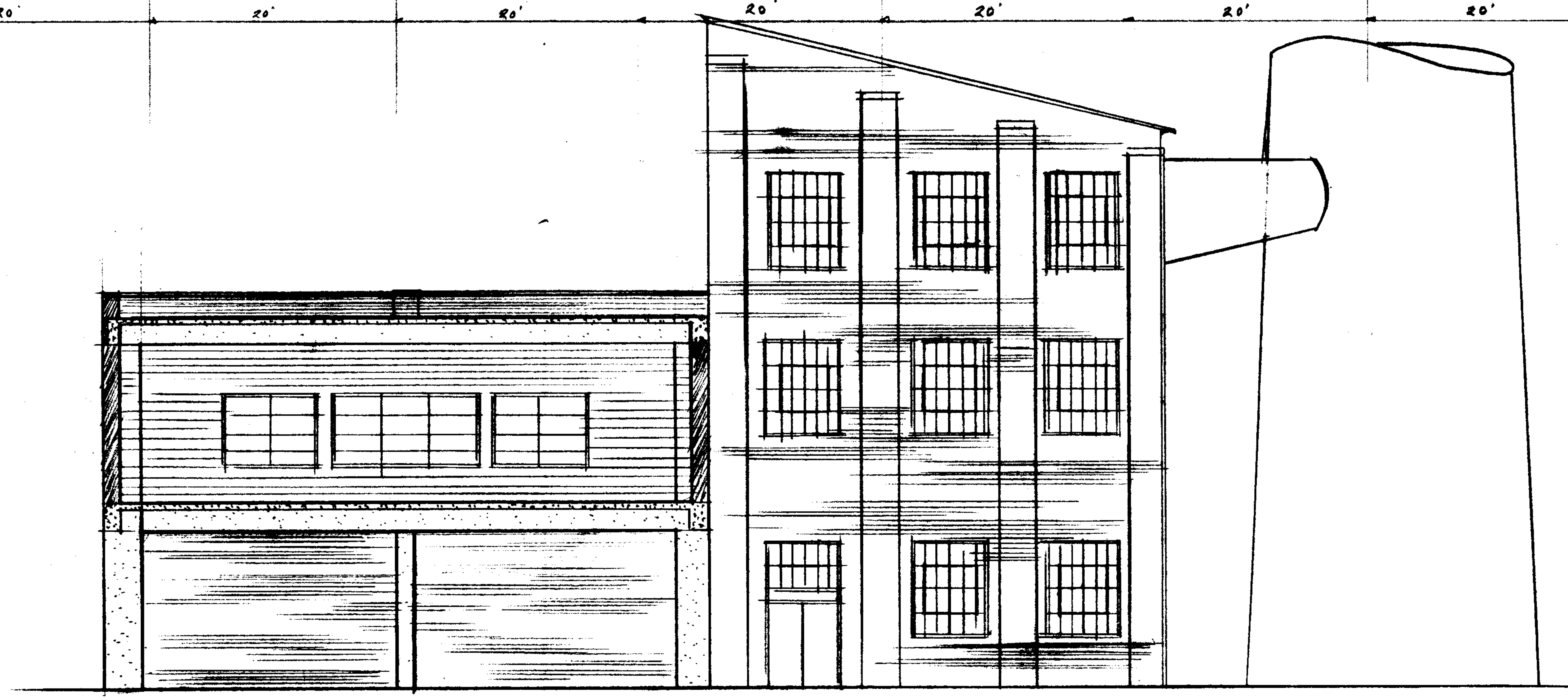
4. APR 56

Duane D. Goodsel



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

9'-8½" | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20'



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

Section A-A'
" B-B'

4 APR 56
Duane D. Goodrich

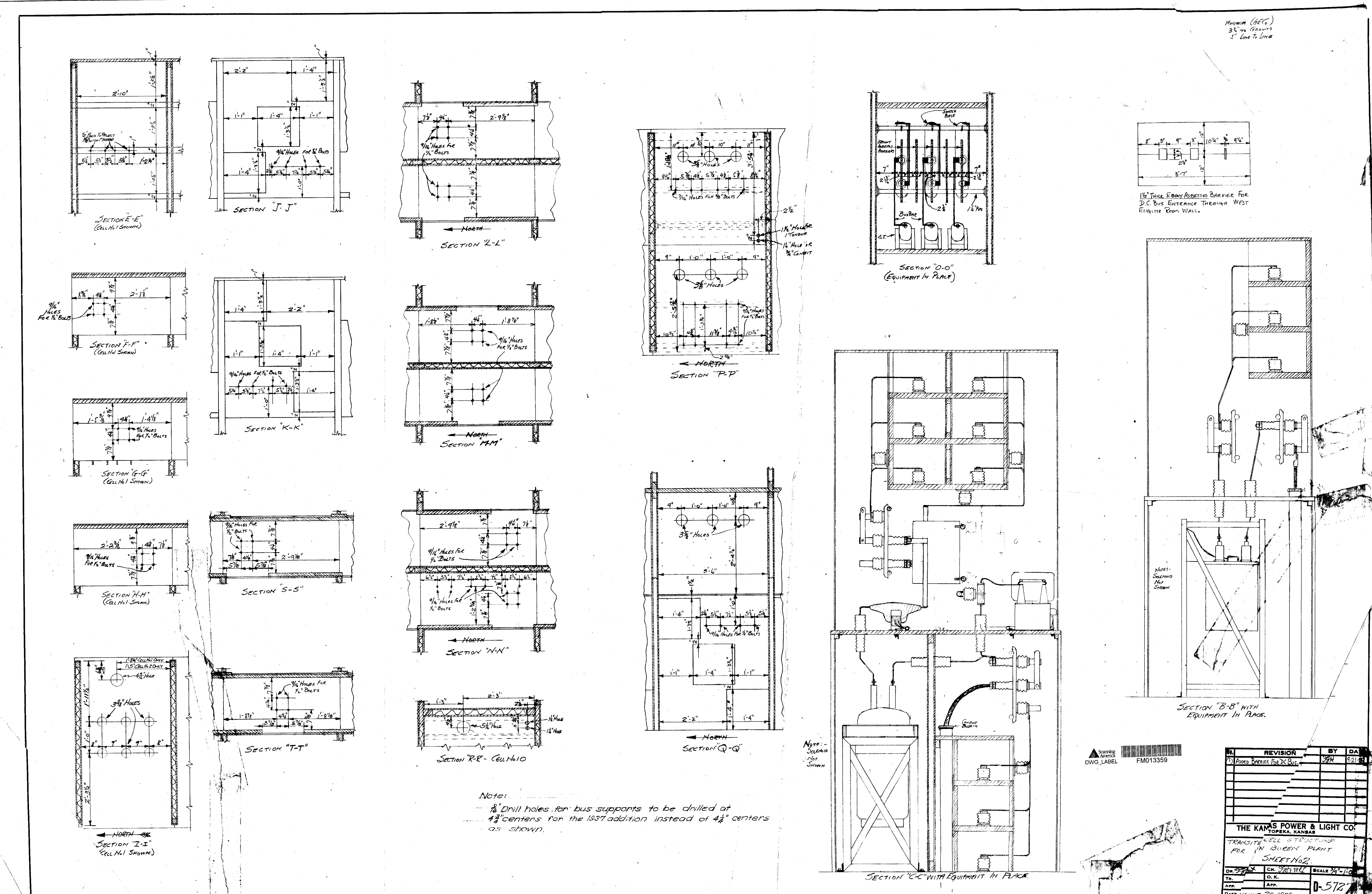
SECTION A-A

AN ACCEPTED STANDARD - NOT
APPLICABLE FOR LINE TRUCKS

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

VAN BUREN

DRN. BY Duane Goodrich
1965



Note:
9/16" Drill holes for bus supports to be drilled at 4 3/4" centers for the 1937 addition instead of 4 1/4" centers as shown.

Scanning America DWG_LABEL FM013359

No.	REVISION	BY	DATE
1	Added Barrier For DC Bus.	FGH	9-21-

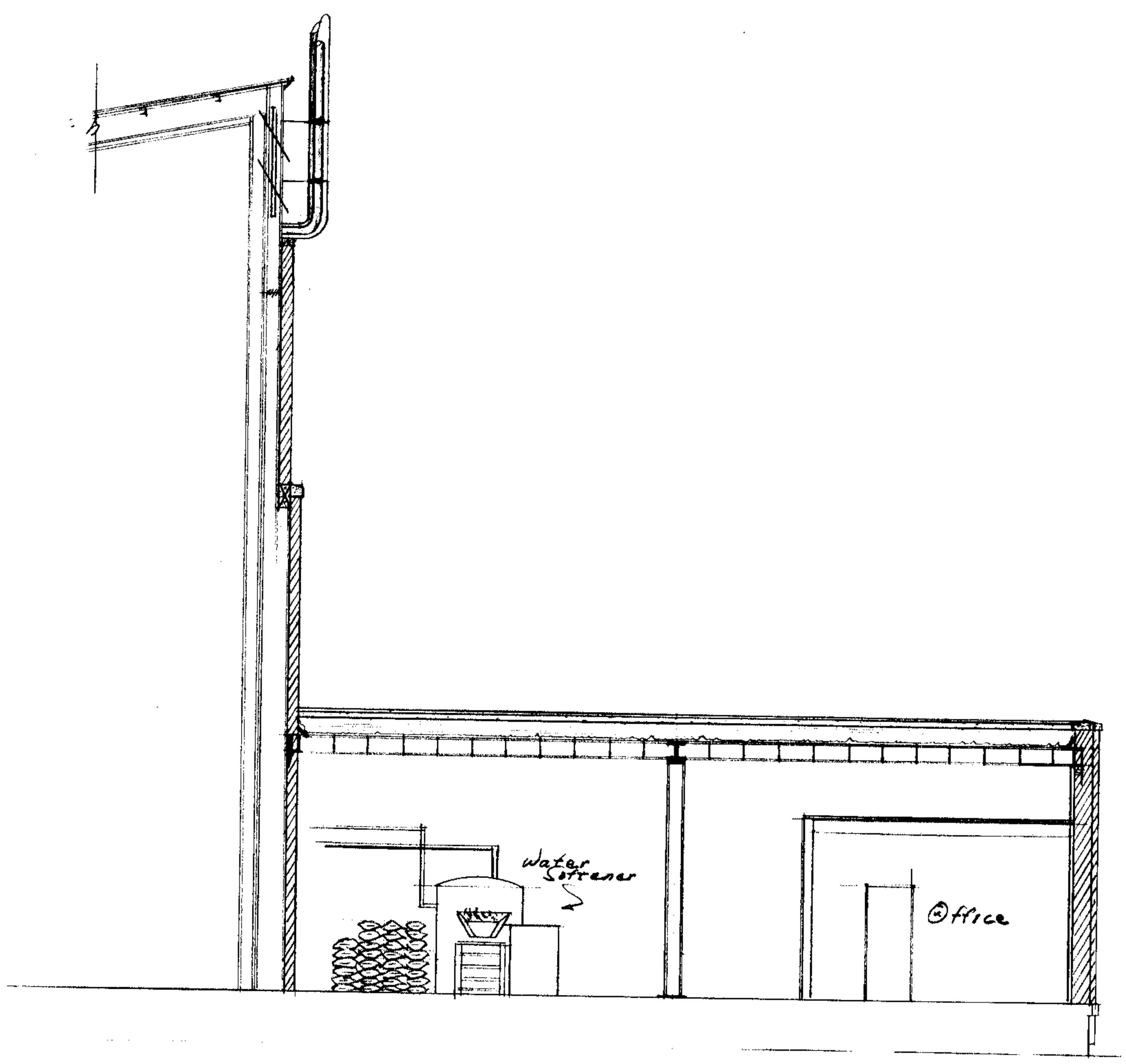
THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

TRANSITE CELL STRUCTURE FOR VAN BUREN PLANT
SHEET No 2.

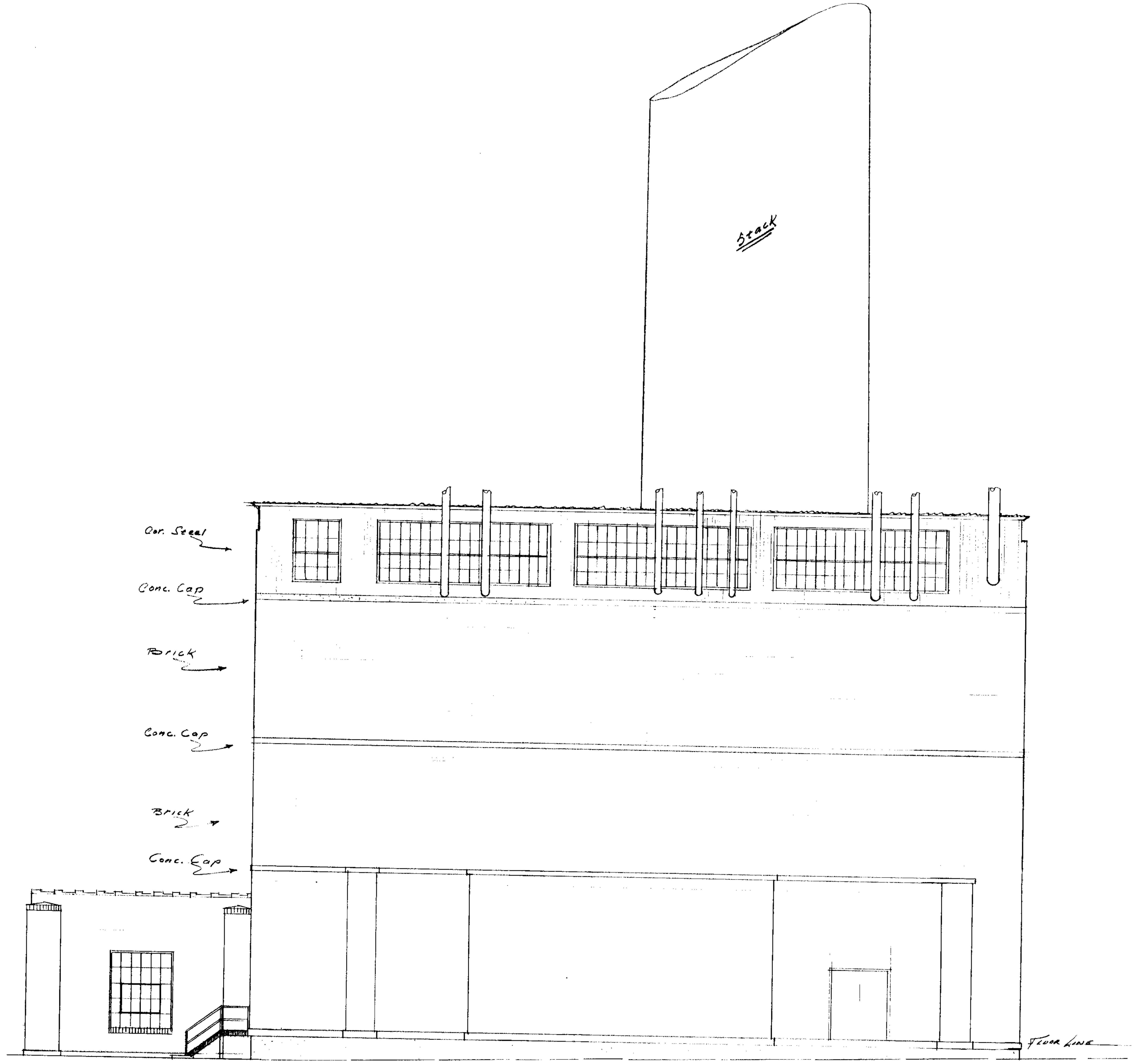
DR.	CH.	SCALE 3/4" = 1'-0"
TR.	O.K.	D-5727
APP.	APP.	
DATE AUGUST 20-1929		

THE KANSAS POWER & LIGHT CO.
Topeka Kansas
STEP-REGULATOR 750 KVA
13.2 K.V. FOR VAN BUREN PLANT

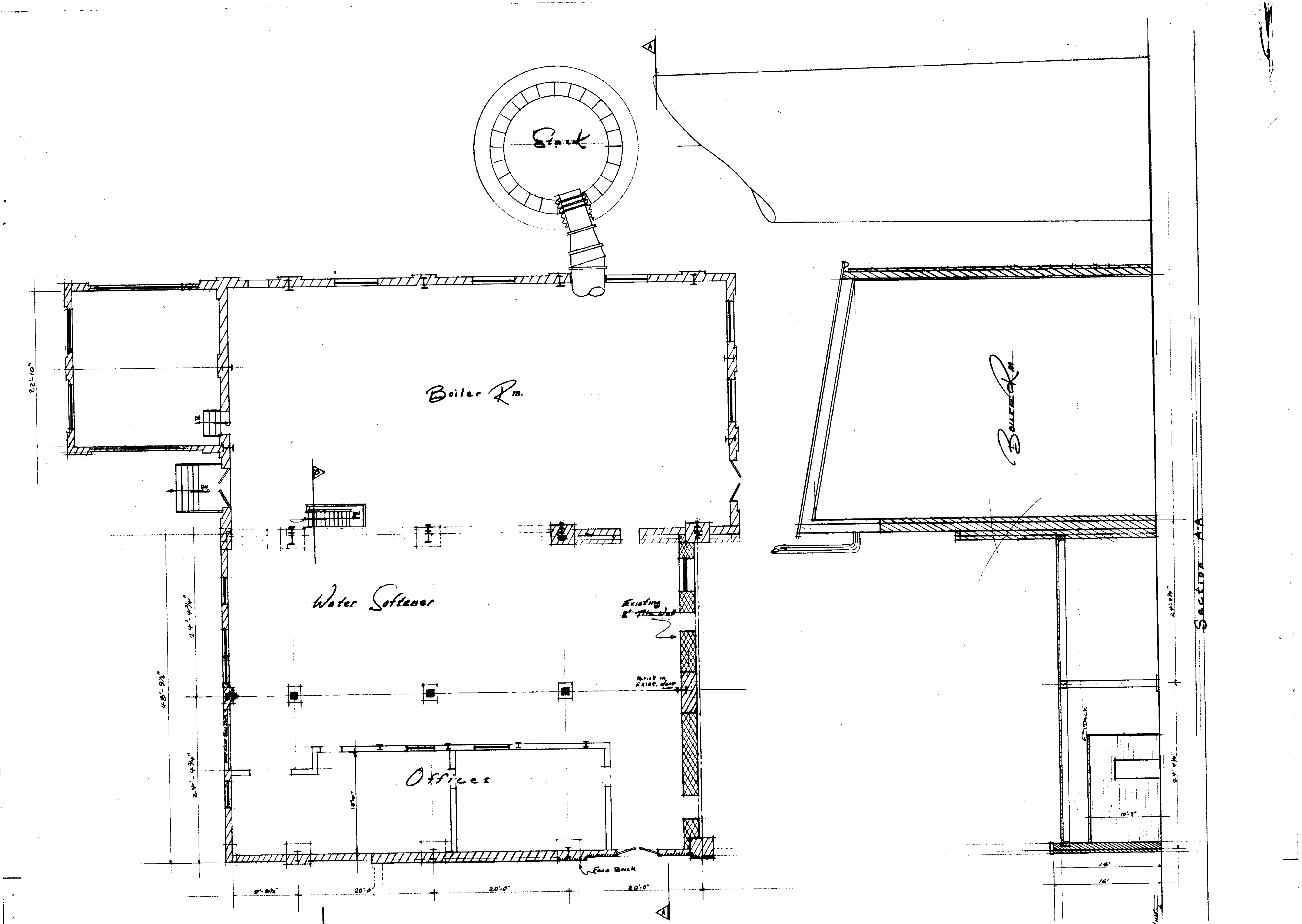
Dr. WIKOFF-DAVIDSON	Scale 1" = 2'
Date 4-10-41	
Dwg. # D-6907	W.O. # 3521



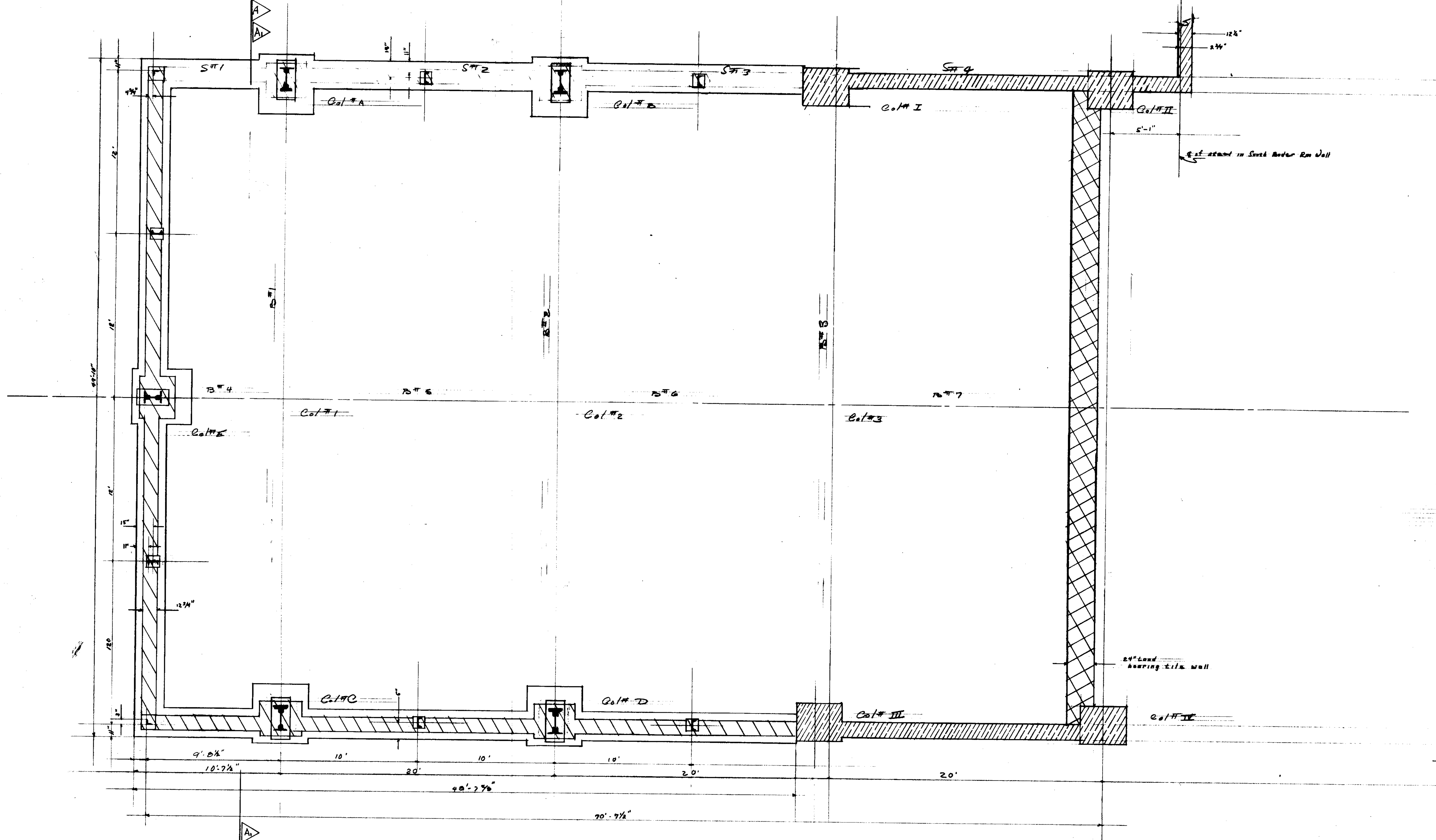
Section B-B



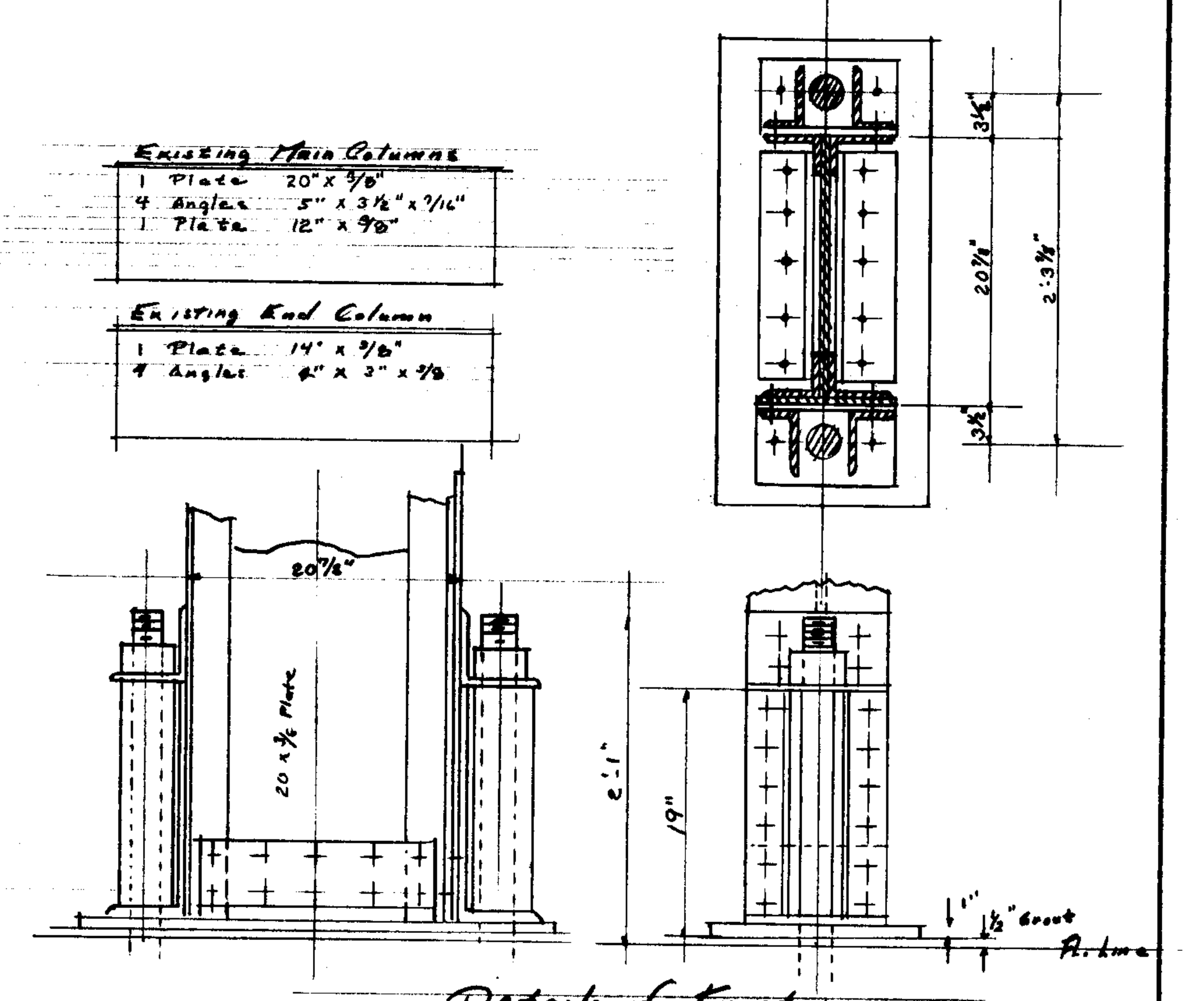
Proposed West Elevation



FLOOR PLAN - 1/8" = 1'-0"



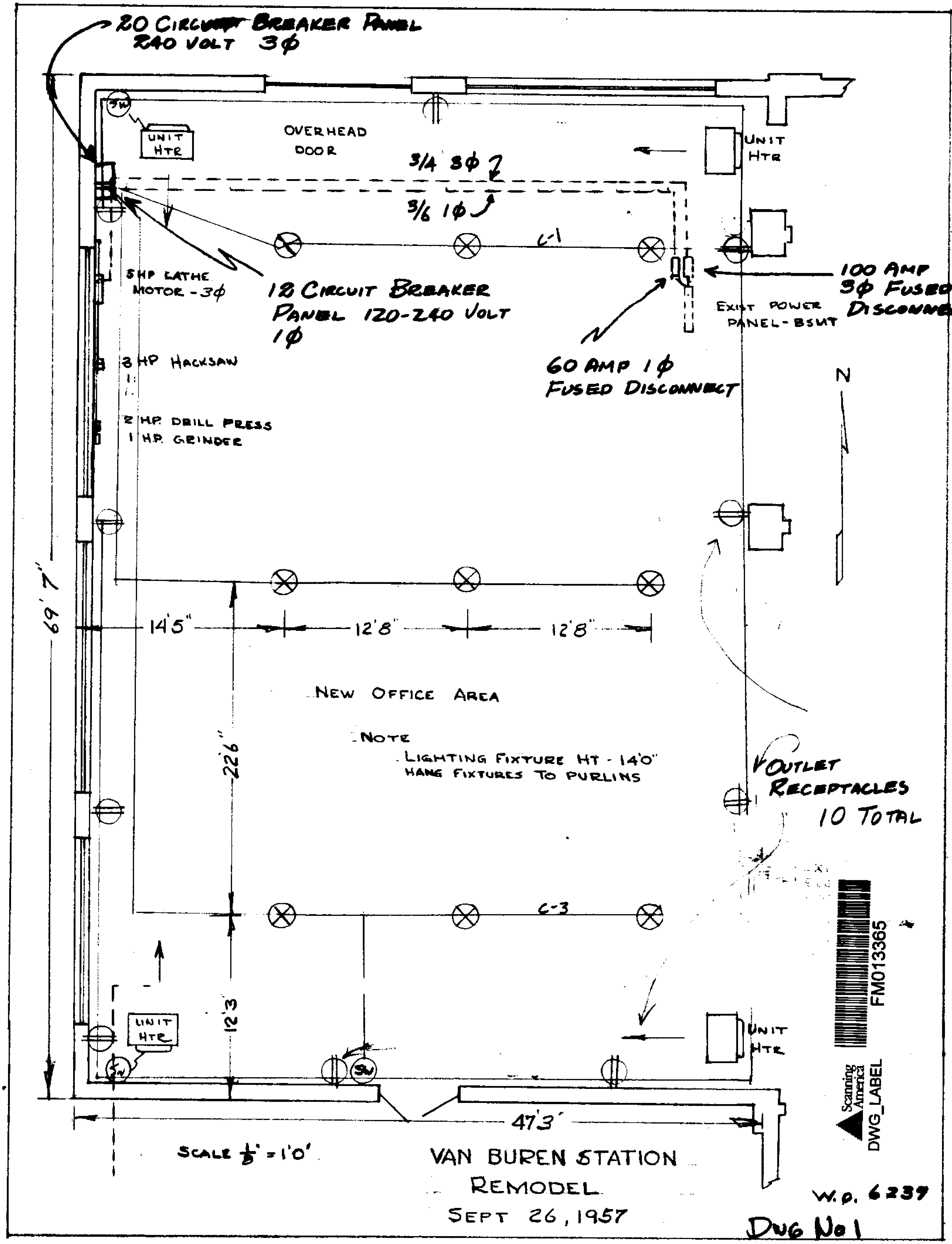
Floor Plan 1/8" = 1'-0"

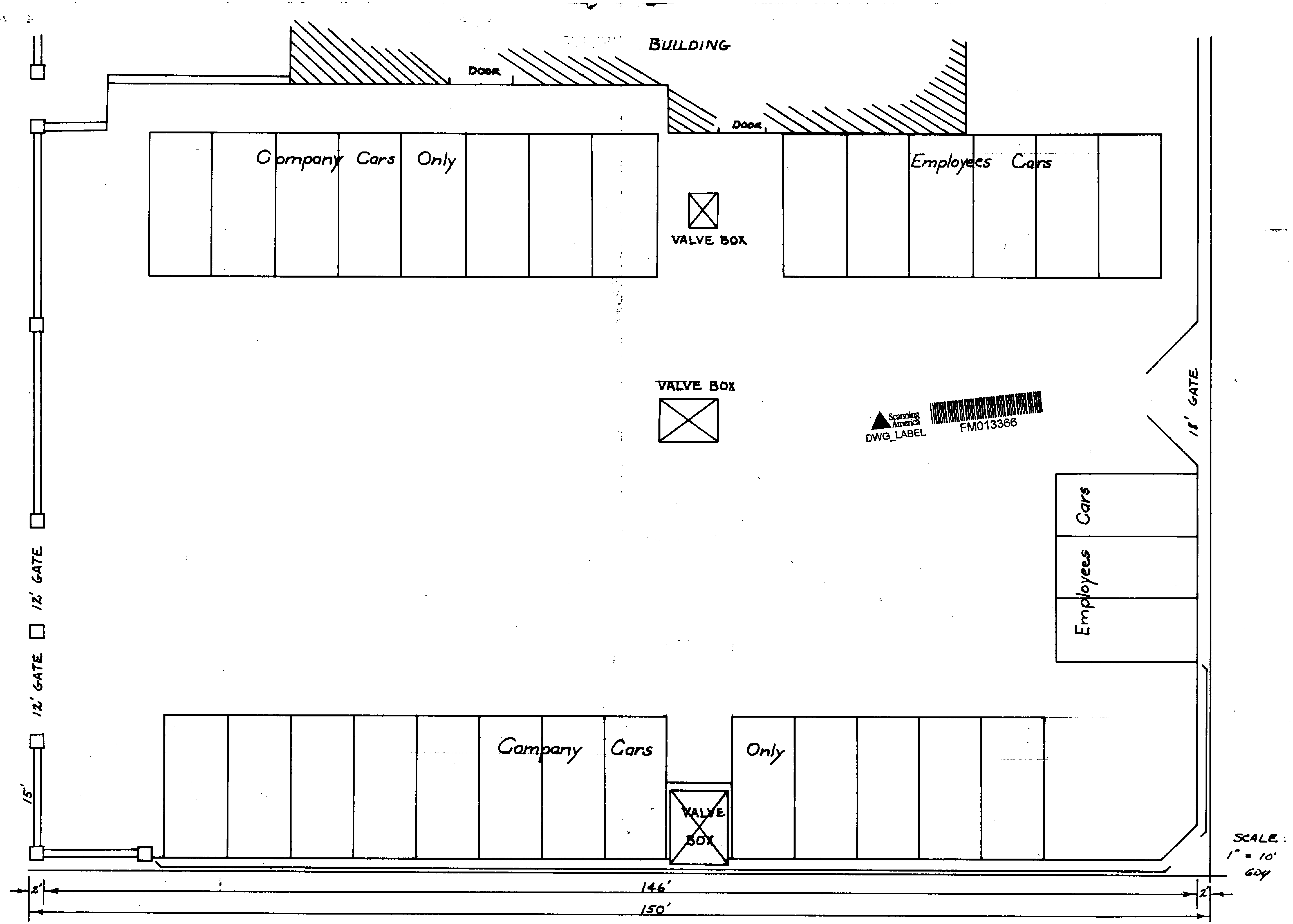


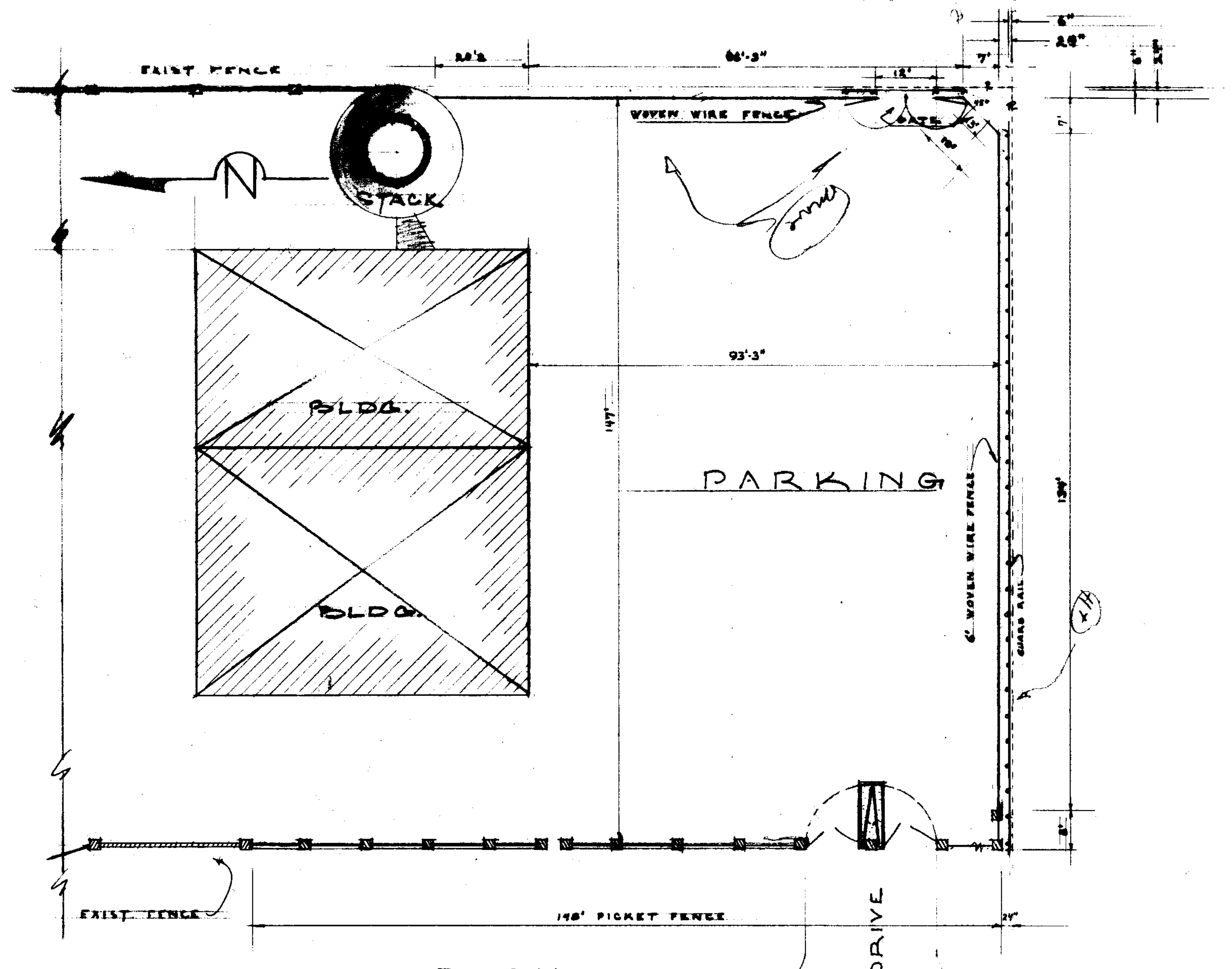
Details of Existing Main Columns
1" = 1'-0"

3 Jun 36


Exist. Plan of Corner Detail
Corner Col. of Boiler Rm.
Struct. Section A.A. (Existing)
Existing Boiler Rm Wall Detail 1/4" = 1'-0"
Struct. Section A-A (Proposed)
1/4" = 1'-0"
Conc. Slab Roof w/ Blt. up Roofing
Gusset
Gussets
Continuous Beam
Col.
22'-7 7/8"
DWG_LABEL
FM013364


20 CIRCUIT BREAKER PANEL
240 VOLT 3ϕ
OVERHEAD DOOR
UNIT HTR
3/4 3ϕ
3/6 1ϕ
C-1
UNIT HTR
100 AMP 3ϕ FUSED DISCONNECT
EXIST POWER PANEL - BSMT
5 HP LATHE MOTOR - 3ϕ
18 CIRCUIT BREAKER PANEL 120-240 VOLT 1ϕ
60 AMP 1ϕ FUSED DISCONNECT
3 HP HACKSAW
2 HP DRILL PRESS
1 HP GRINDER
N
69' 7"
14' 5"
12' 8"
12' 8"
NEW OFFICE AREA
NOTE
LIGHTING FIXTURE HT - 14'0"
HANG FIXTURES TO PURLINS
22' 6"
OUTLET RECEPTACLES
10 TOTAL
C-3
12' 3"
UNIT HTR
SW
SW
SW
UNIT HTR
47' 3"
SCALE 1/8" = 1'0"
VAN BUREN STATION
REMODEL
SEPT 26, 1957
W.O. 6239
DWG NO 1


BUILDING
DOOR
DOOR
Company Cars Only
Employees Cars
VALVE BOX
VALVE BOX
18' GATE
Employees Cars
12' GATE
12' GATE
15'
Company Cars Only
VALVE BOX
2'
146'
2'
150'
SCALE:
1" = 10'



PLAN SCALE 1"=20'

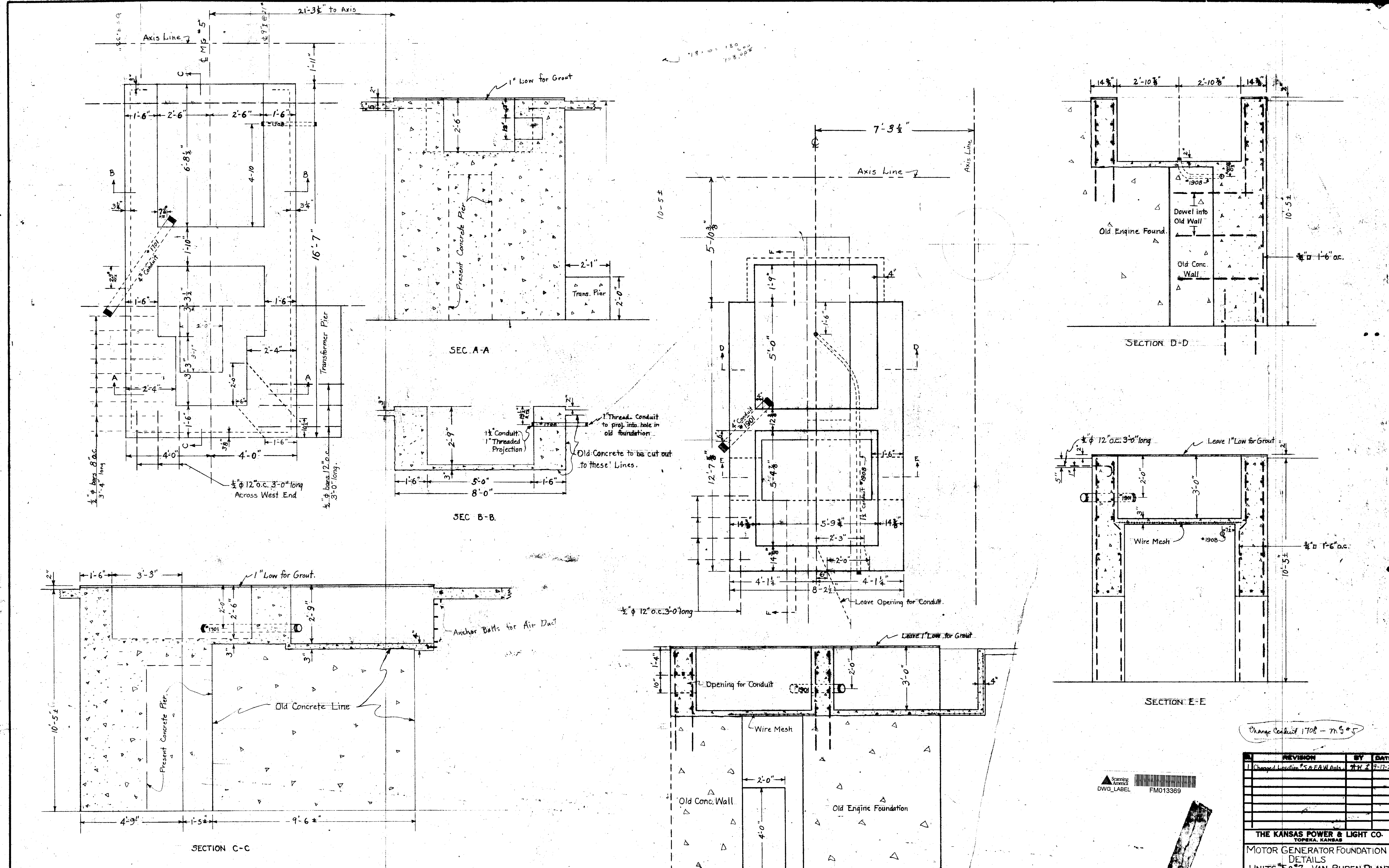
SUPERCEDED
Ref. Dwg 1104(P)

DWG_LABEL FM013367

A FENCE FOR VAN BUREN PLANT

The Kansas Power and Light Company
Duane D. Goodrich 28 Jan 57


TOPEKA, KANSAS
Electric Light Valuation
TOPEKA EDISON CO.
TAPERING CONCRETE CHIMNEY
BURNS & McDONNELL
ENGINEERS KANS CITY, MO.
1914
SCALE: 1/8"=1 FOOT
SECTION AB
ASSUMED 230' BELOW TOP OF CHIMNEY
HALF ELEV. DOUBLE OPENING
HALF ELEV. SINGLE OPENING
Double thickness of Wire Mesh from 5' below to 5' above the openings
8" Baffle Wall 14'-6" High
Horizontal Reinforcement: American Steel & Wire Co's Triangular Mesh, Style #23, 1/4" rods, laced 4" c.c.
The reinforcement is for temperature stresses only.
STACK CUT DOWN IN JULY 1933.
24 Vert. 1/2" ϕ Bars 50'-0"
30 Vert. 1/2" ϕ Bars 40'-0"
36 Vert. 1/2" ϕ Bars 25'-0"
48 Vert. 1/2" ϕ Bars 50'-0"
60 Vert. 1/2" ϕ Bars 35'-0"
72 Vert. 1/2" ϕ Bars 25'-0"
84 Vert. 1/2" ϕ Bars 15'-0"
60' of 8" Common Brick Lining
Common Brick Lining
250'-0"
262'-0"
125'-0"
EXHIBIT No. 14
DWG LABEL FM013368



FOUNDATION PLAN AND SECTIONS FOR M.G. SET #5

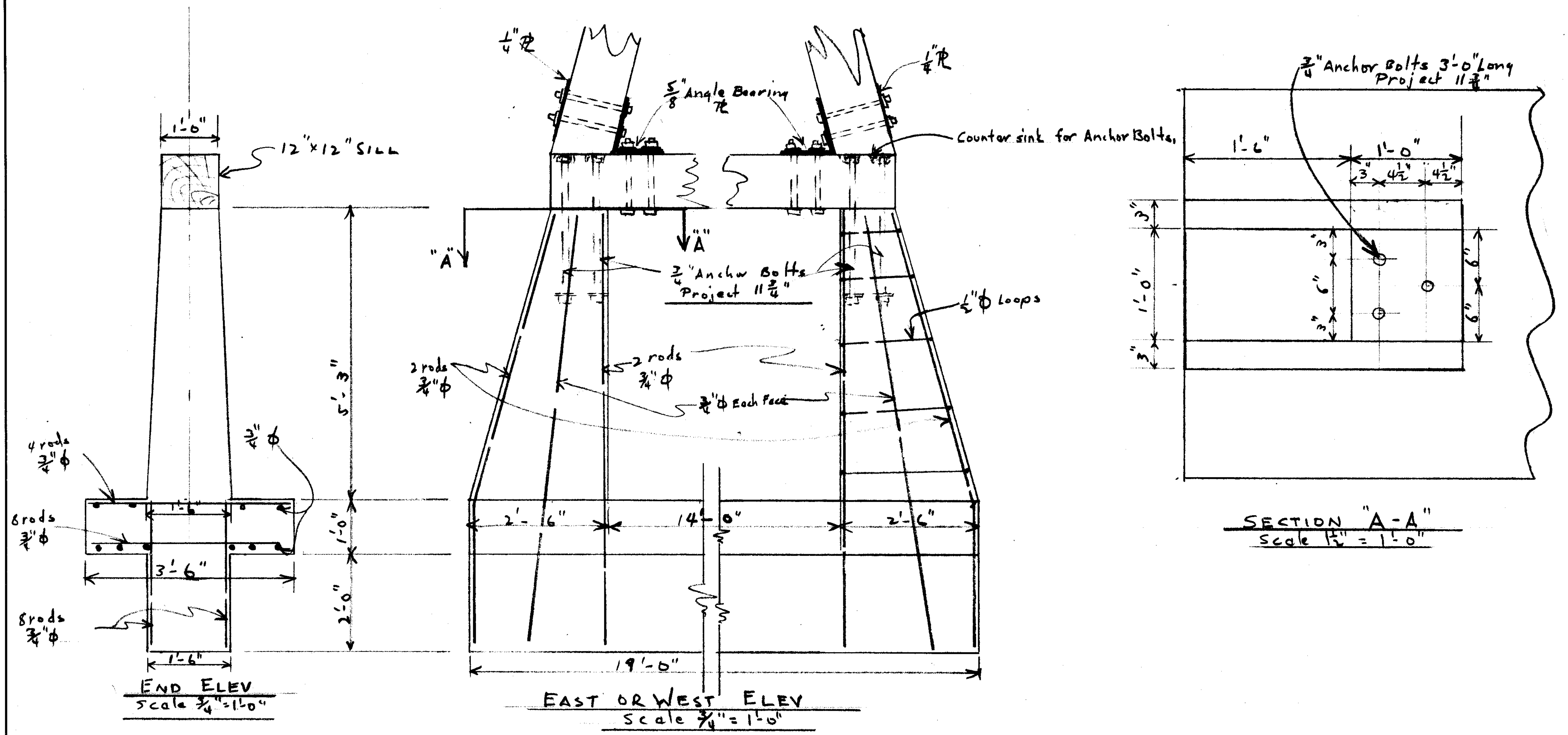
FOUNDATION PLAN AND SECTIONS FOR M.G. SET #7

	REVISION	BY	DATE
1	Changed Location #5 & F & W Axis	H.R.K.	9-17-29

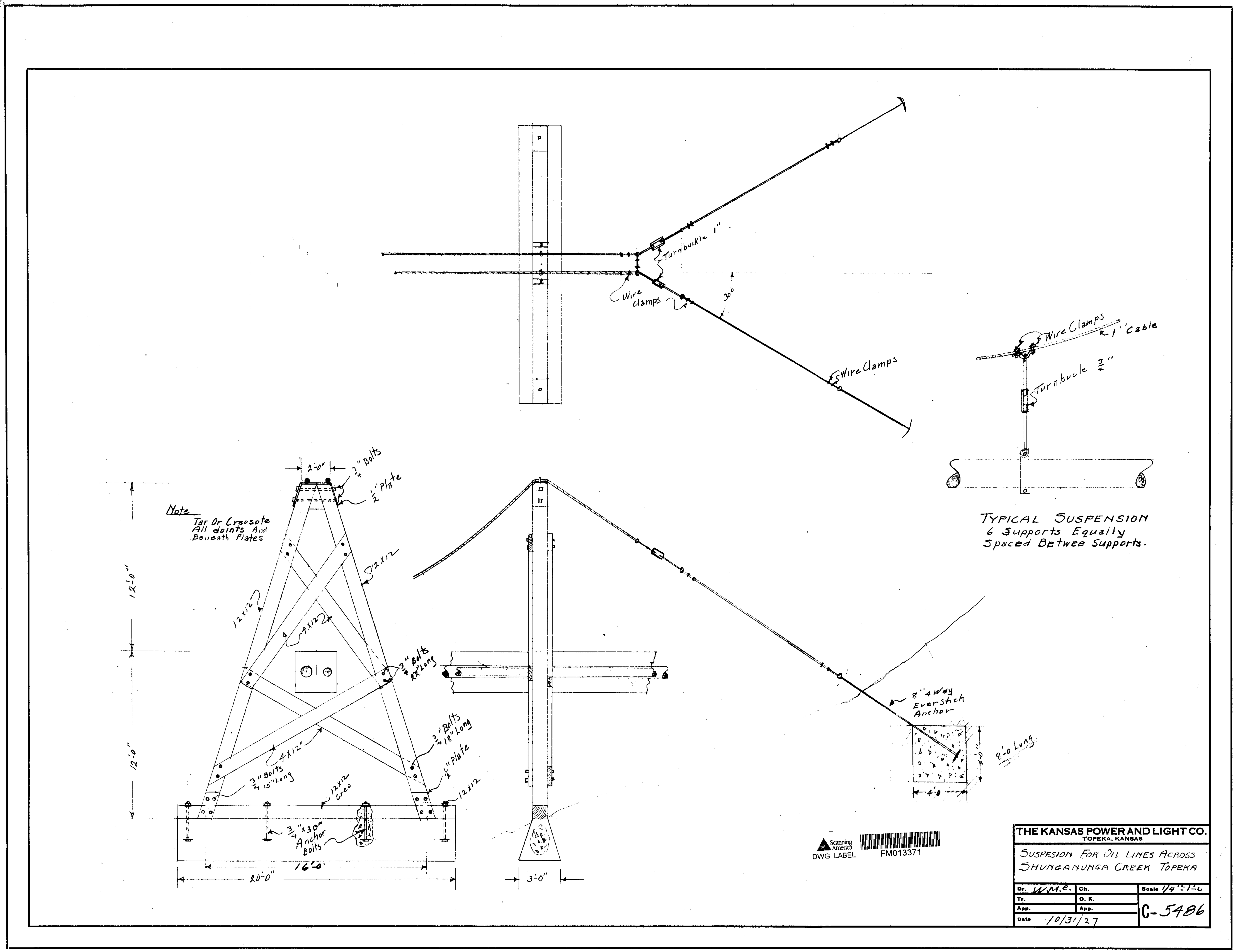
THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

MOTOR GENERATOR FOUNDATION DETAILS
UNITS #5 & #7 VAN BUREN PLANT

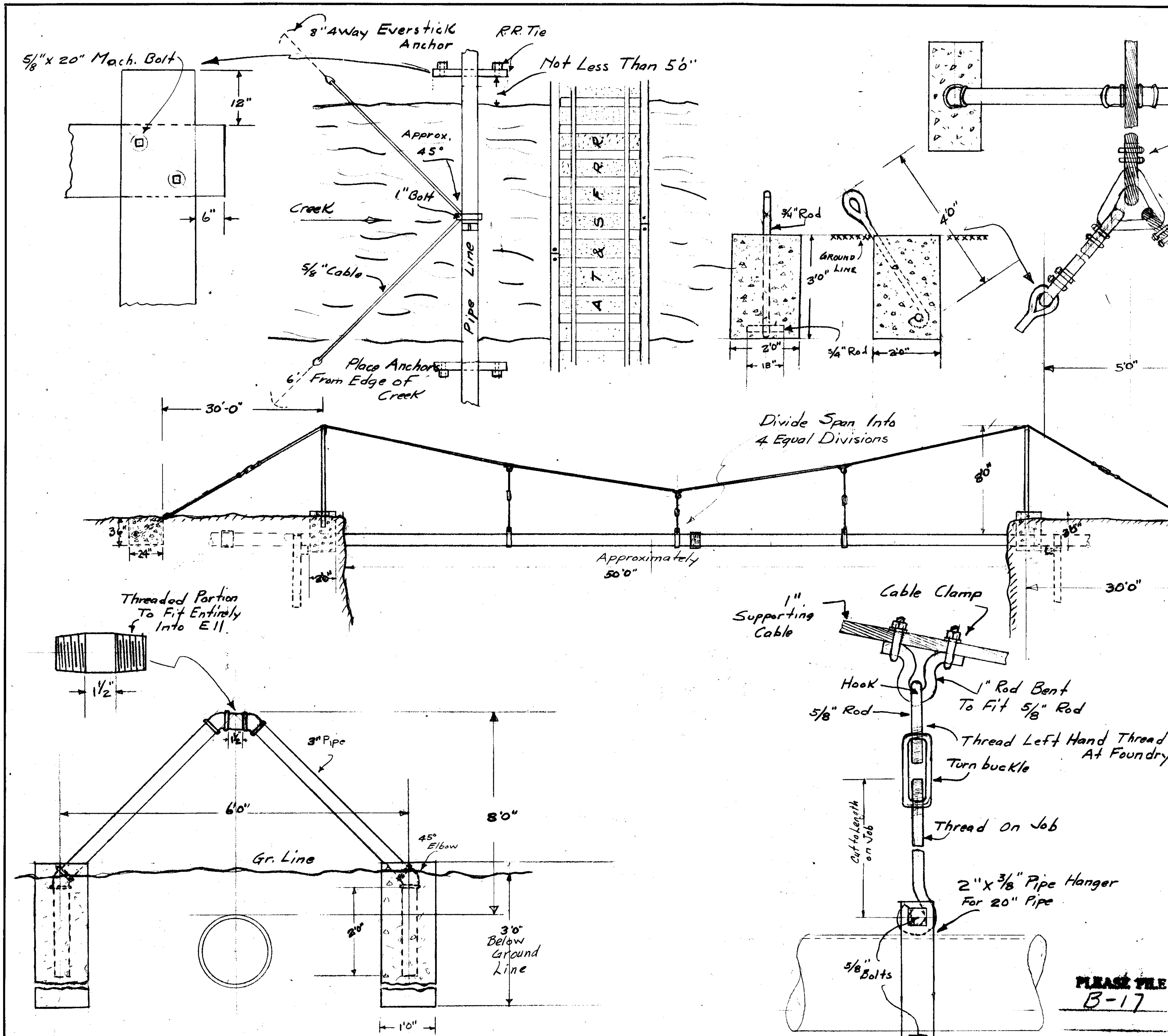
DR. H.R.K.	CH.	SCALE ½" = 1'-0"	
TR.	O.K.		
APP.	APP.		D-5739
DATE Sept. 16, 1929			



THE KANSAS POWER AND LIGHT CO. TOPEKA, KANSAS			
DETAILS OF A FRAME FOOTING OIL LINE SUPPORT ACROSS SHUNGANUNGA CREEK TOPEKA, KANSAS			
Dr. OKJ	Ch.	Scale As Shown	
Tr.	O. K.		
App.	App.	C-5506	
Date 1-25-28			


Turnbuckle 1"
Wire Clamps
30°
Wire Clamps
Wire Clamps
1" Cable
Turnbuckle 3/4"
TYPICAL SUSPENSION
6 Supports Equally
Spaced Betwee Supports.
2'-0"
3/4" Bolts
1/2" Plate
Note
Tar Or Creosote
All Joints And
Beneath Plates
12'-0"
12'-0"
12X12
12X12
4X12"
3/4" Bolts 22" Long
3/4" Bolts 18" Long
4X12"
1/2" Plate
3/4" Bolts 15" Long
12X12 Creo
12X12
3/4" X30" Anchor Bolts
16'-0
20'-0"
3'-0"
8" 4 Way Everstick Anchor
4'-0
4'-0
8'-0 Long
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS
Suspesion For Oil Lines Across
Shunganunga Creek Topeka.
Dr. W.M.e.
Ch.
Scale 1/4"=1'-0
Tr.
O. K.
App.
App.
Date 10/31/27
C-5486
Scanning America
DWG LABEL
FM013371

6

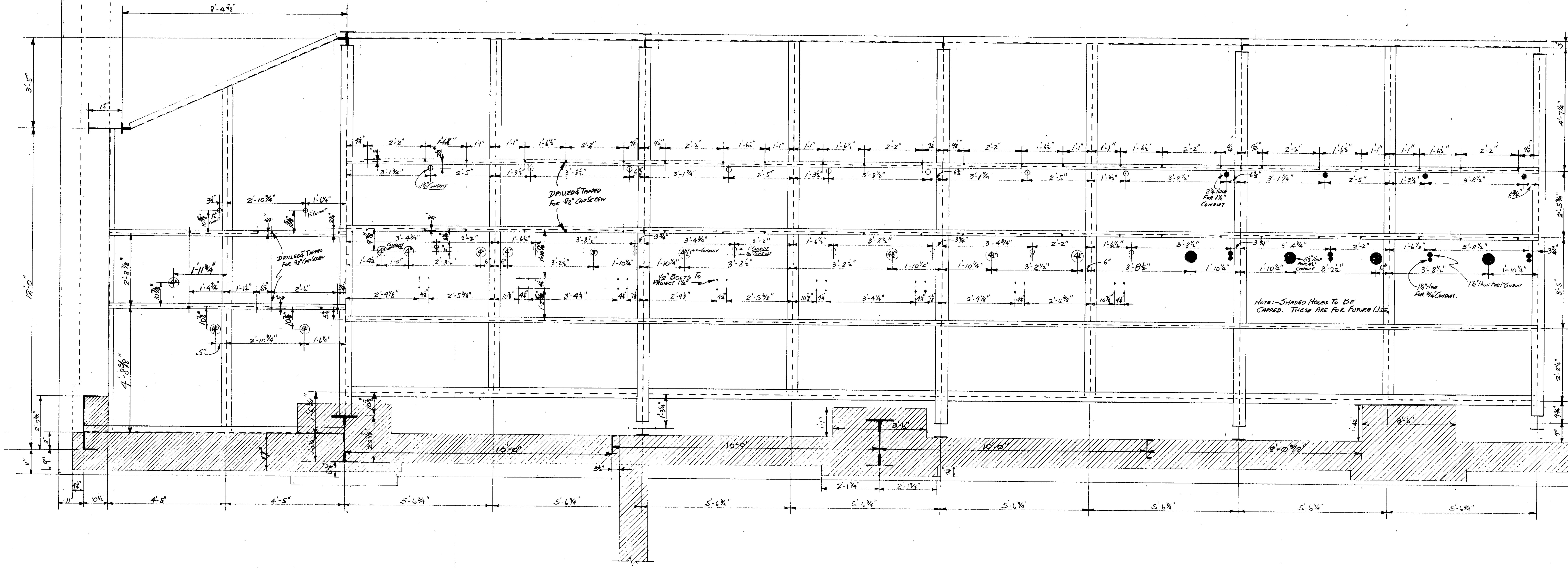


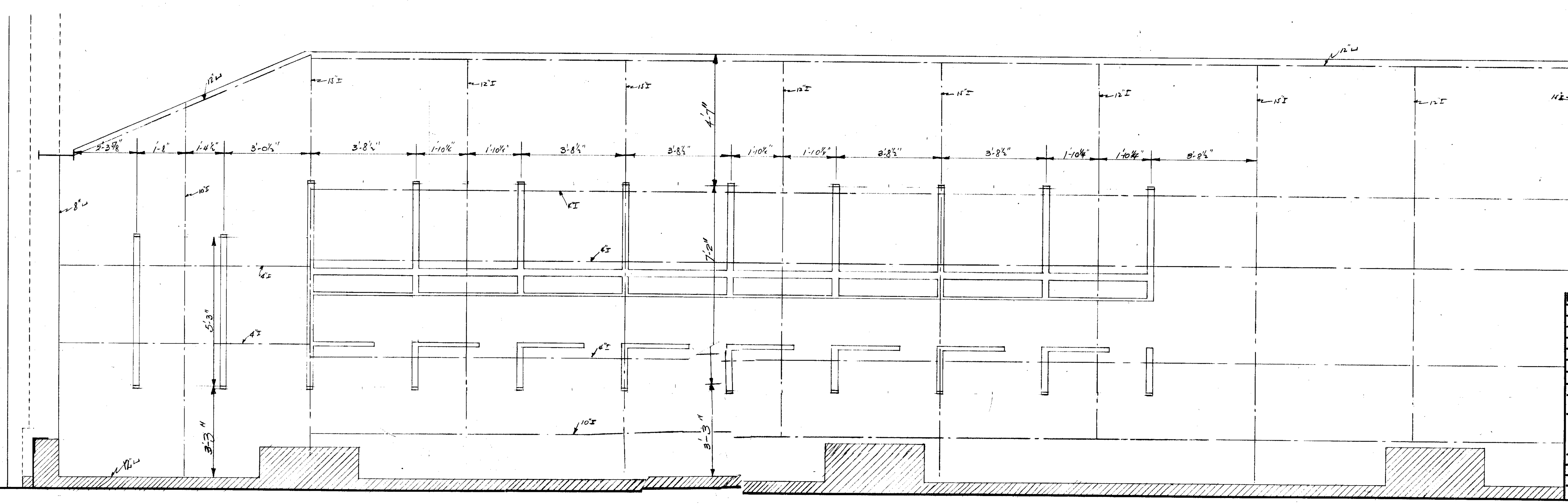
Scanning America
DWG_LABEL
FM013372

PLEASE FILE
B-17

THE KANSAS POWER & LIGHT CO. Topeka Kansas			
Proposed Cable Support For 20" Warming Line			
Dr. RJ	Ch.	Scale None	
Tr.	O.K.		
App. 10-29-26	App.	C-5197	
Date of Last Change 11-15-26			

FLOOR PLAN OF PUMP HOUSE
EAST & WEST ELEVATIONS
1/4"=1'-0"
NORTH ELEVATION
SOUTH ELEVATION
SECTION THROUGH CENTER OF BUILDING AND PIT - LOOKING SOUTH
Note Gable Section On East And West Sides Only.
PLAN
1/2"=1'-0"
SECTION A-A
1/2"=1'-0"
SECTION B-B
1/2"=1'-0"
8" To Racks
6" To Plant
To Unloading Rack
REVISION
BY
THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BUILDING AND PIPING DETAILS FOR PUMP HOUSE AT OIL STORAGE TANK
DATE 1/15/29
SCALE
D-5638
FM013373



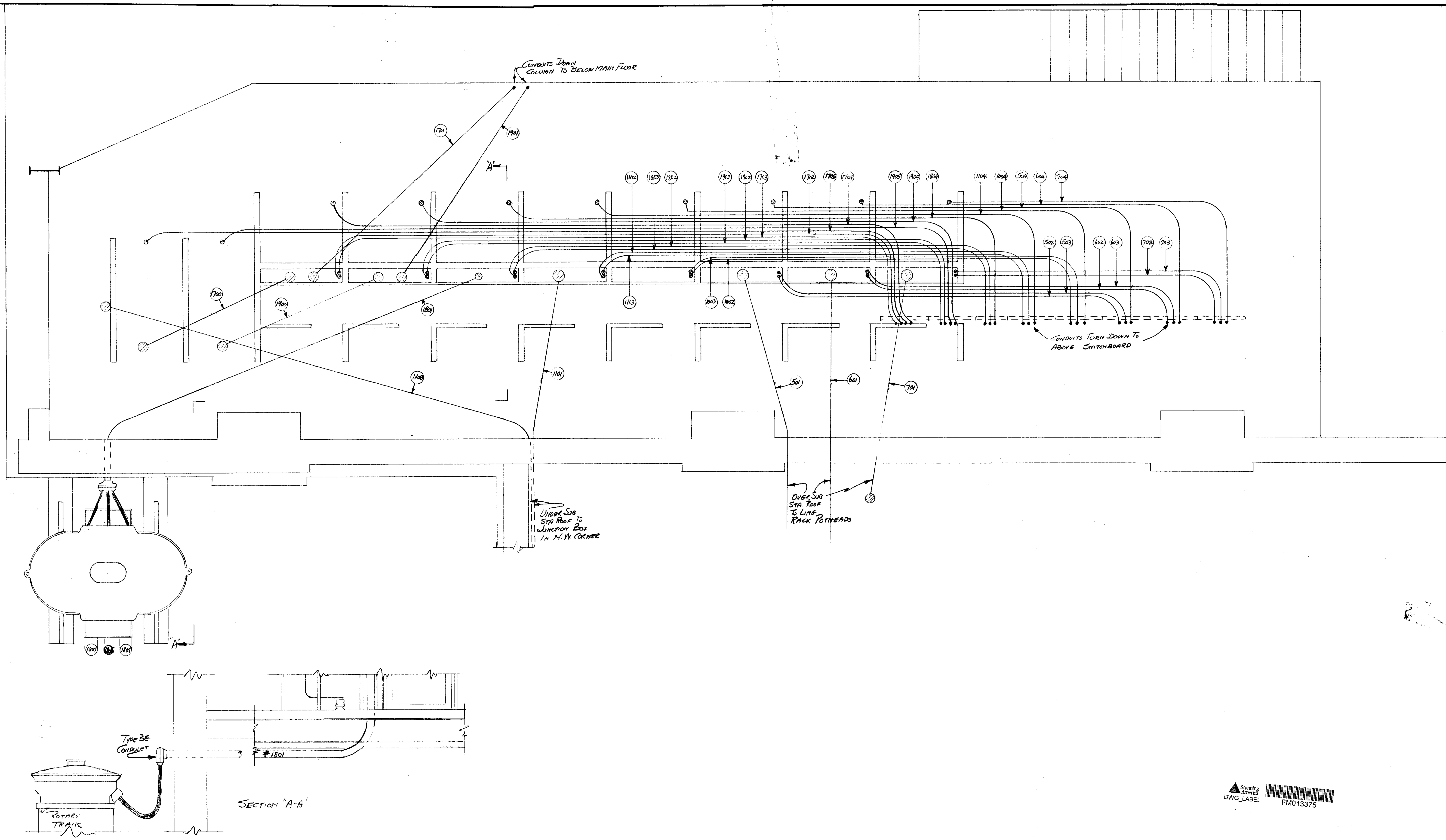


No.	REVISION	BY	DATE
1	Measurements Revised	FJH	9-18-29
2	Notes Added	FJH	9-23-29

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

Balcony Steel Work Showing Location of Conduits, Anchor Bolts etc

Dr. FJH	Ch. FJH 9/11/29	Scale 1/2"=1'-0"
Tr.	O. K.	D-5728
App.	App.	
Date Sept. 10-1929.		



Scanning America DWG_LABEL FM013375

No.	REVISION	BY	DATE
1	REVISED & REDRAWN	[illegible]	10-24-29

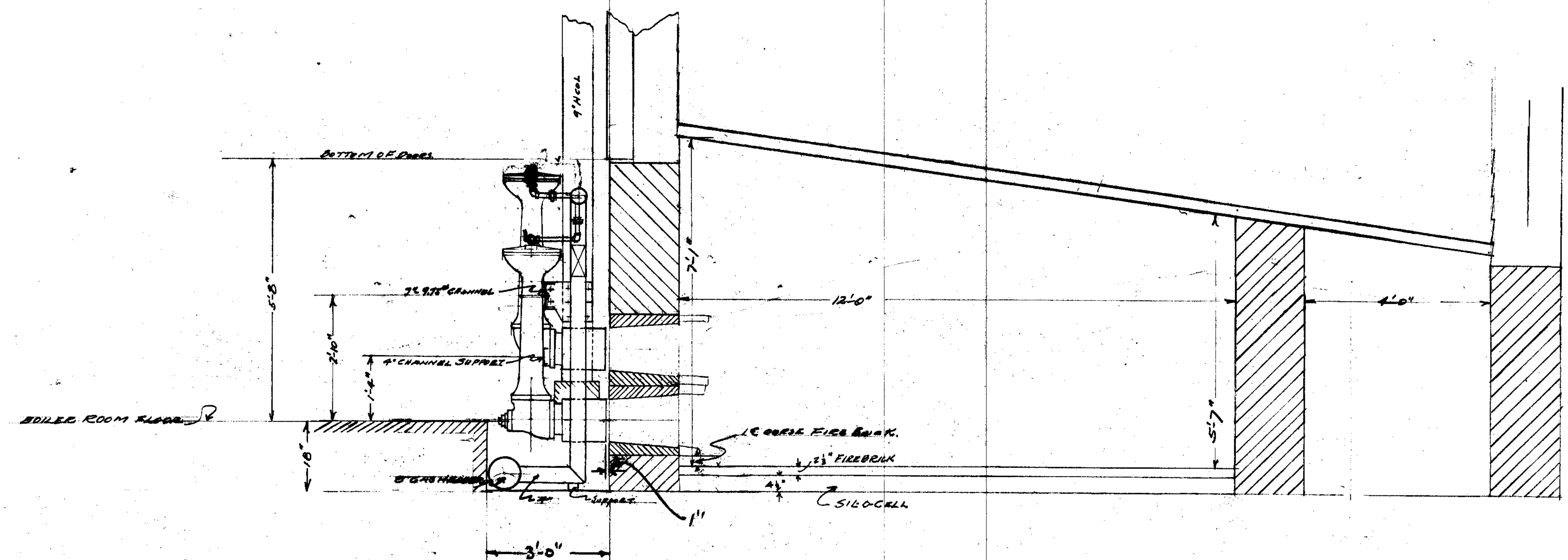
THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

CONDUITS UNDER BALCONY - VAN BUREN

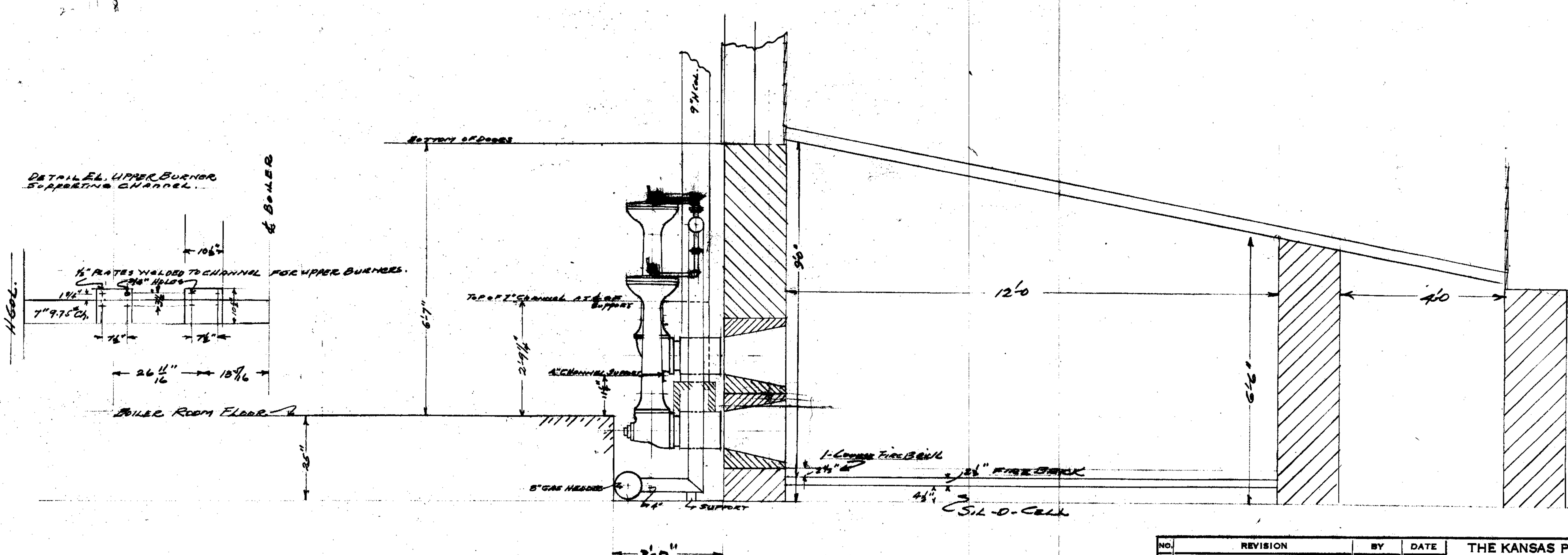
DR. [illegible]	CH.	SCALE 1/2" = 1'-0"
TR.	O. K.	D-5716
APP.	APP.	
DATE SEPT 10-1929		


TOP
sump drain
8" oil line to pump house
steam from pump house
steam trap
drains
scale 1/16" = 1'
2" steam line
pipe bracket
12"
8" oil line
36"
36"
12"
ground level
steam trap
concrete pier
21"
3"
10'
36"
steam from pump house
SIDE
pump house
TOP
110 ft.
C
C
SECTION C-C
2" steam line
8" tile
insulate with rock wool
2" Steam Line From Pump House
8" Oil Line To Pump House
2" Steam line to trap
Steam outlet to tank cars
expansion valve
A
A
12"
gate valve
P 12' P 16' P 14' P 17' P 20' P 20' P 20' P 12' P 19' P 20' P 20' P 13' P 21' P 21' P 18' P 20' P 20' P 21' P 18' P 20' P 20' P 20' P 20' P 18' P
VERTICAL SCALE 1/8" = 1'
HORIZONTAL SCALE 1/8" = 1'
Oil outlet to tank cars
coupling
Pipe brackets as shown in detail
Concrete piers as shown in detail
4"
4"r.
16"
10"
24"
ground level
Detail of Concrete Pier "P"
25 required
Lay pipe in tar paper so it will not bond with the concrete
weld strap on bracket
2" Steam line
12"
Detail of Pipe Bracket
45 required
Brackets made from 3 1/2" boiler tubes
weld
8" Oil line
A
2" Steam line
12"
8" Oil line
Section A-A
16"
Concrete pier
ground level
24"
A
HORIZONTAL SCALE 1/8" = 1'
VERTICAL SCALE 1/8" = 1"
NOTE: -
Oil and steam lines to have slope of 1 inch per 100 ft.
REVISIONS
NO. DATE REMARKS
THE KANSAS POWER & LIGHT COMPANY
TOPEKA, KANSAS
TITLE Diagram for reconstruction of Oil Dock for Steam Heat Dept. at Topeka
SCALE
SUB
DWN. BY D. Miller 6-27-47
CHKD. BY W.O. 2662
APP. BY
D-8049
DWG_LABEL FM013376
CAPITAL CITY BLUE, TOPEKA


CONCRETE FUEL OILTANK
60'-0"X25'-0"X7'-0"
STEEL FUEL OIL TANK
24'-0"DIAM.X10'-0"
NO 10 BOILER
NO 9 BOILER
NORTH BOILER ROOM
STACK
SEWER
ECONOMIZER
WATER FILTERS
NO 4 BOILER
NO 3 BOILER
NO 5 BOILER
NO 6 BOILER
OIL SUCTION
CISTERN
OLD STACK BASE
NO 2 BOILER
NO 1 BOILER
NO 7 BOILER
NO 8 BOILER
5"6" HEATER SUCTION LINE
BLOWOFF TO SEWER
SHOP
SEWER
4" RETURN FROM STATE HOUSE
6" TREATED WATER LINES
NORTH HEATER ROOM
6" CITY WATER LINE
10" STEAM LINE
10" GAS LINE
9'-5"
20'-0"
11'-8"
12'-0"
12'-0"
GAS REG. HOUSE
OLD ENGINE ROOM
REMOVABLE FLOOR FOR TRUCK LOADING
10" GAS
13.2 SWITCH BALCONY
GAS METER AND VALVES
24' DIAM. TREATED WATER TANKS
4000 V. SWITCHING AND STATION BATTERY
NOTE:
PIPE LOCATIONS ARE APPROXIMATE
16" STEAM LINE
4000 V. TRAN. BANK
DWG_LABEL FM013377
THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
LAYOUT OF BOILER PLANT
VAN BUREN ST. STATION
RCD
Scale: 1/8"=1
-684
DATE 9-



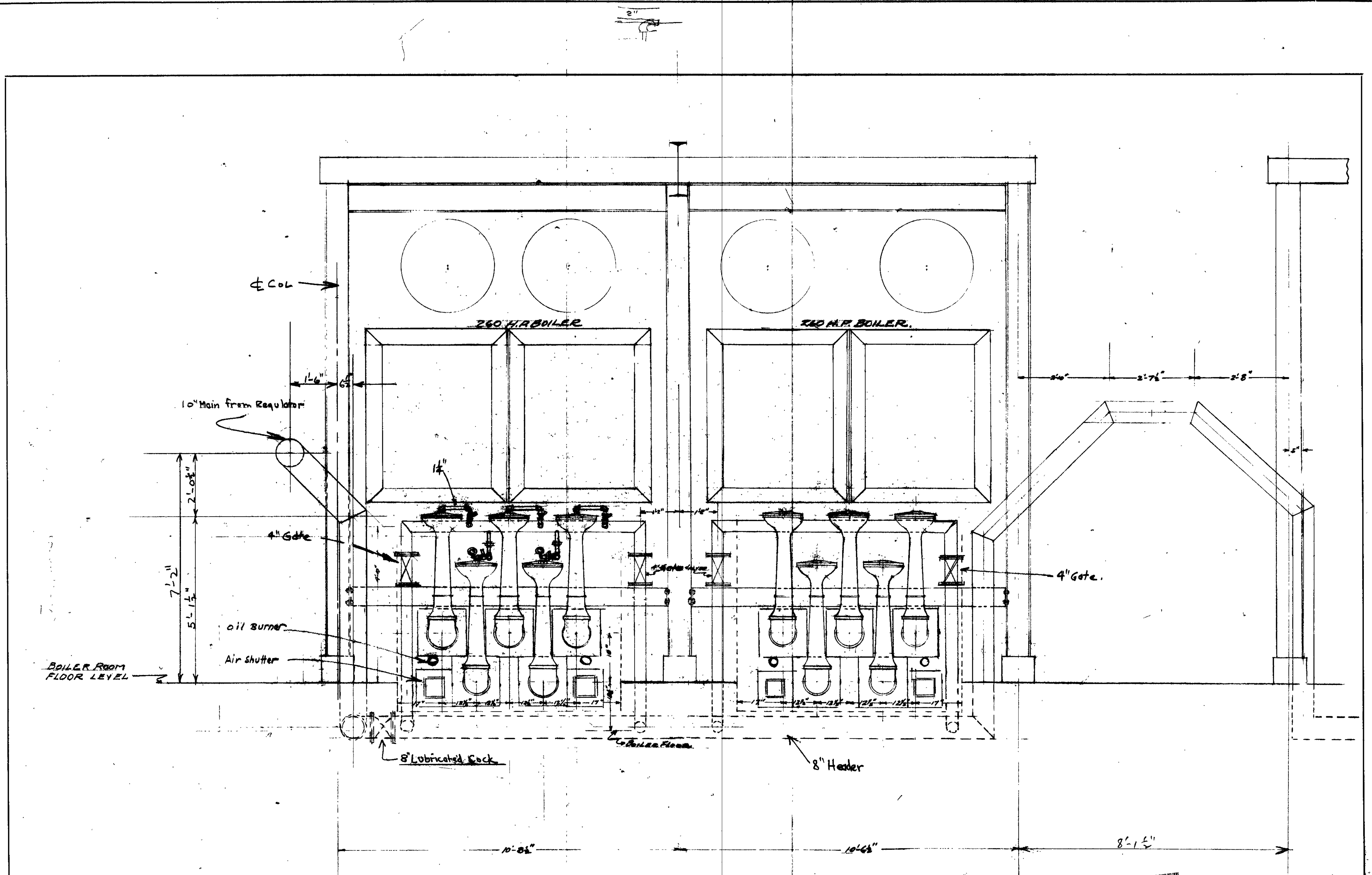
X-SECTION - 260 H.P. BOILER



X-SECTION - 300 H.P. BOILER

NO.	REVISION	BY	DATE	THE KANSAS POWER AND LIGHT CO. TOPEKA, KANSAS	
				SIDE ELEVATION GAS PIPING SOUTH BOILER ROOM VAN BUREN ST. STATION	
				DR. OKJ	CH.
				TR. SBZ.	OK.
				APP.	APP.
				DATE 11-24-31	SCALE C-6201

GALLUP—K. C., MO.



NORTH ELEVATION

NO.	REVISION	BY	DATE

THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

~~FRONT ELEVATION~~ ~~HEADERS~~
GAS PIPING
SOUTH BOILER ROOM
VAN BUREN ST PLANT

DR. GKJ. CH.
TR. SBN OK.
APP. APP.
DATE Nov 16 1931

SCALE ½" = 1'0"

C-6200

10 5/8

5 3/8

No.	REVISION	BY	DATE
1	REDRAWN & REVISED		
2	MEASUREMENTS REVISED		

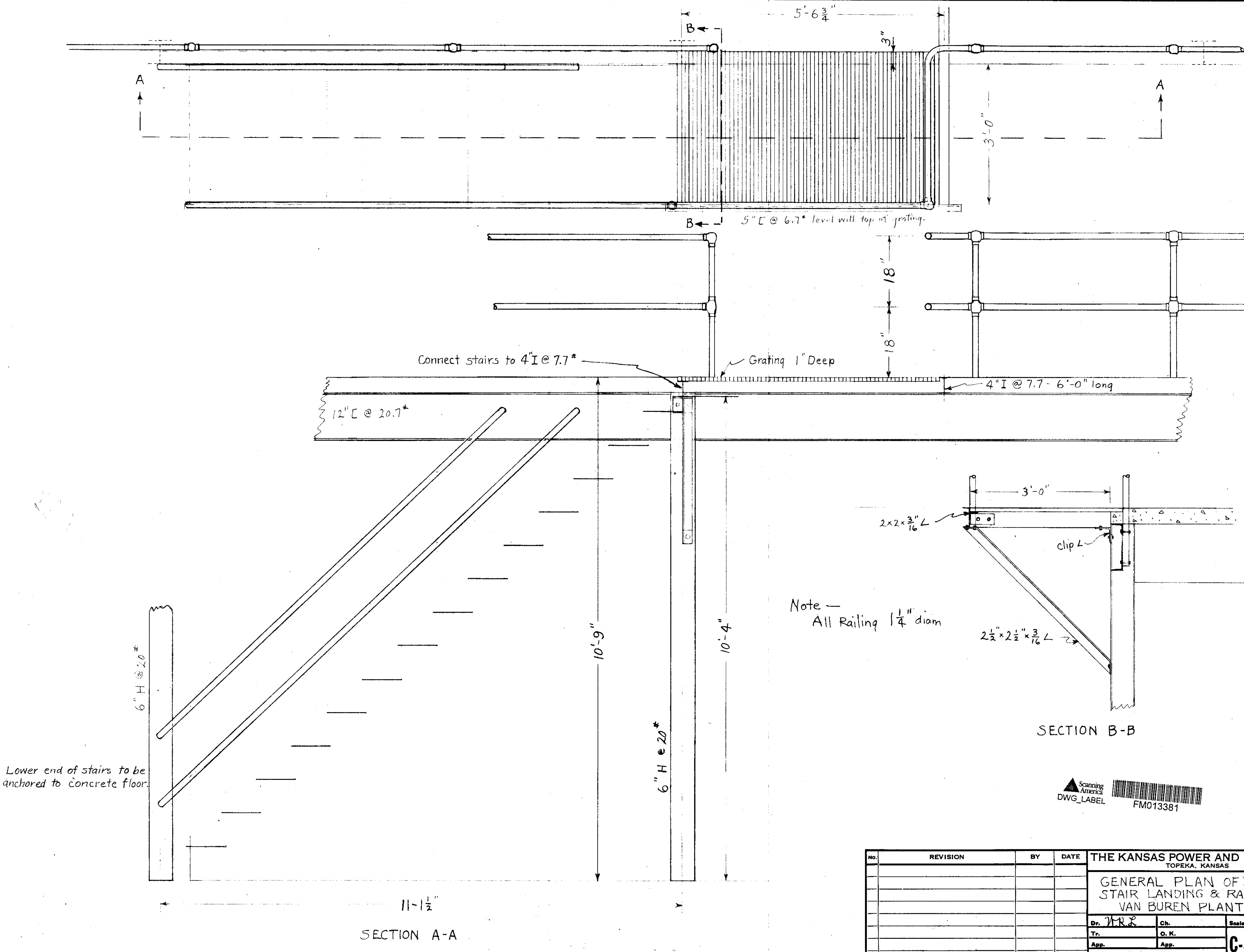
THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

TRANSITE CELL STRUCTURE
FOR VAN BUREN PLANT.
SHEET No 1

SCALE 3/4"=1'-0"

DATE AUGUST 16-1929

D-5725

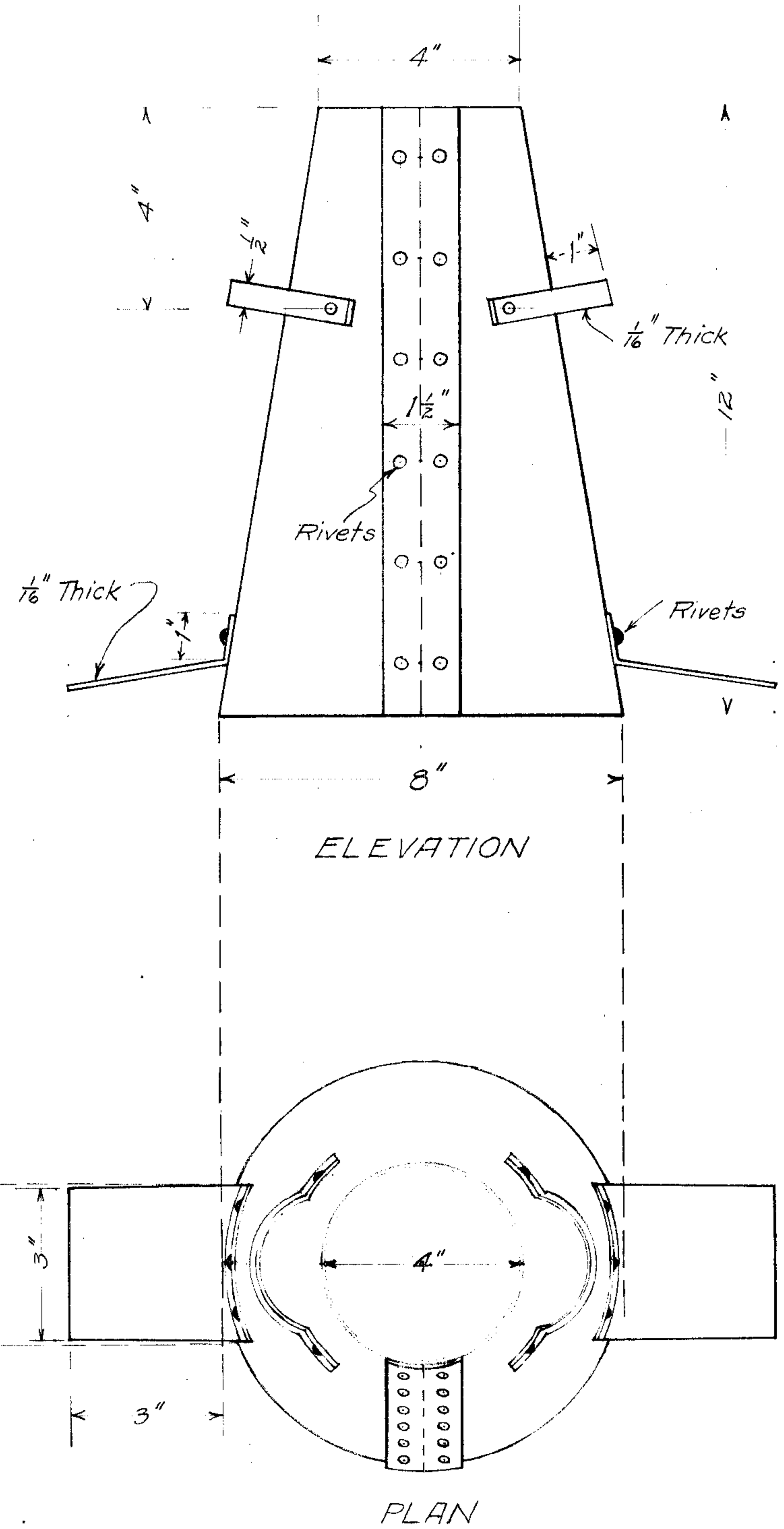


NO.	REVISION	BY	DATE

THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

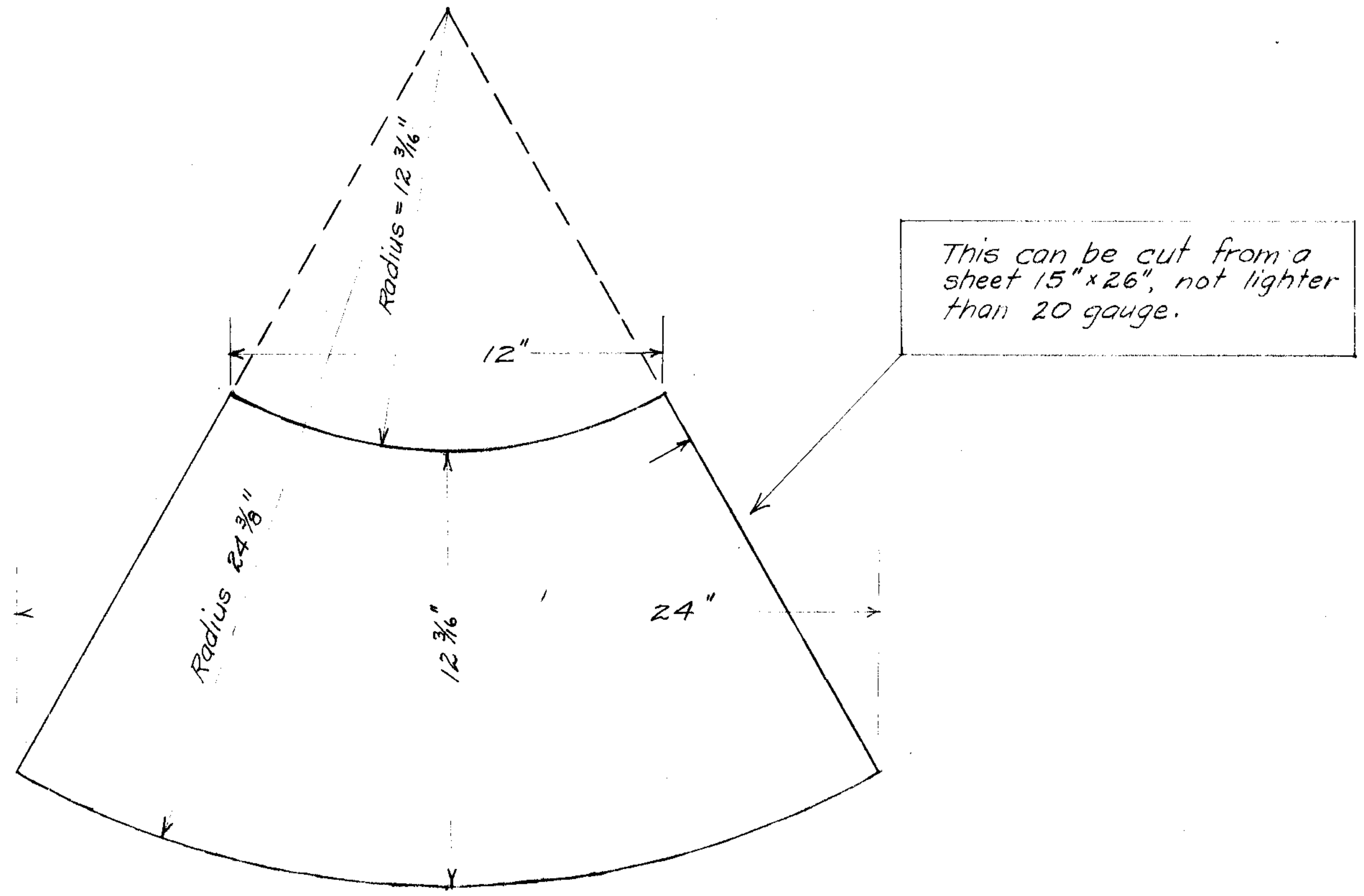
GENERAL PLAN OF STAIR
STAIR LANDING & RAILING
VAN BUREN PLANT

Dr. W.R.L.	Ch.	Scale 3/4" = 1'-0"
Tr.	O. K.	C-5718
App.	App.	
Date July 22, 1929		



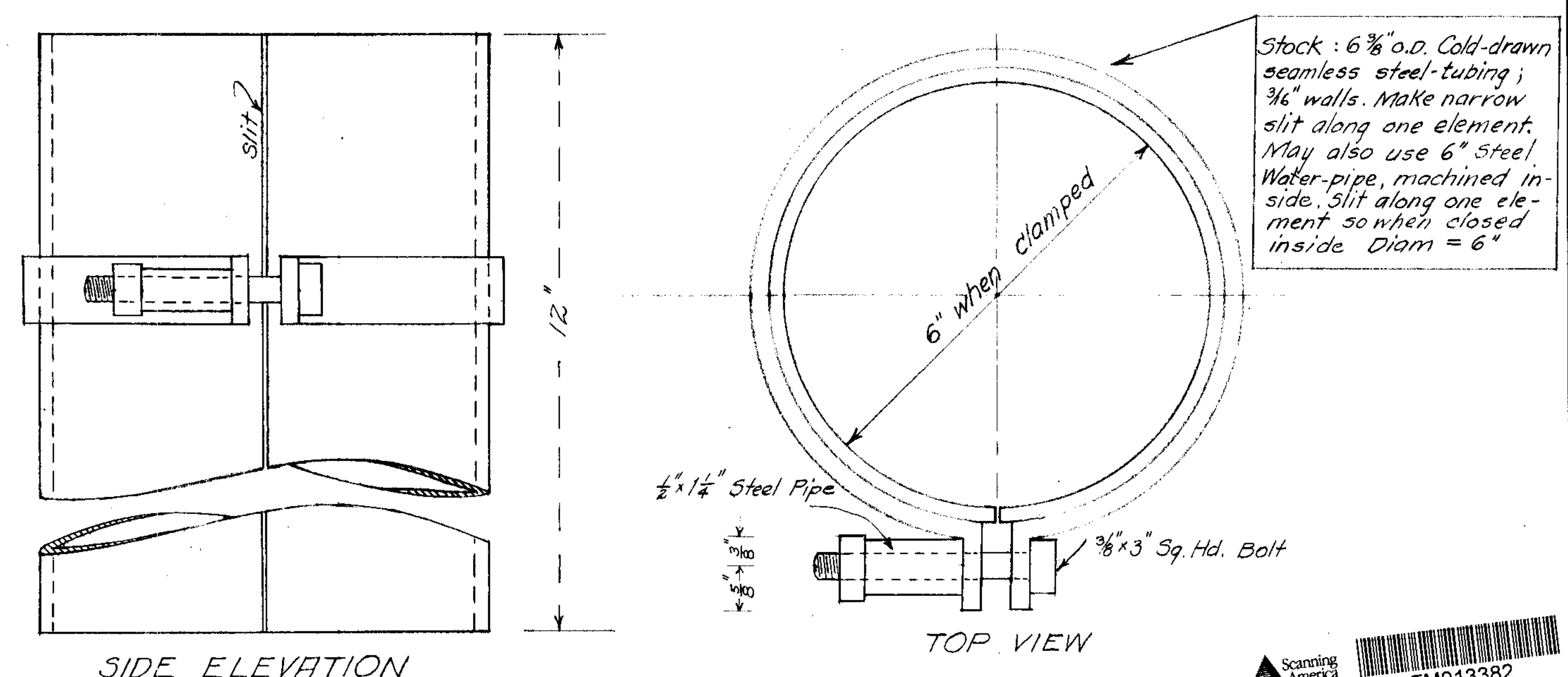
DETAIL OF SLUMP CONE FOR TESTING CONSISTENCY OF CONCRETE.

Scale : 3/8" = 1"



DEVELOPMENT OF FRUSTRUM OF CONE.

Scale : 1/4" = 1"



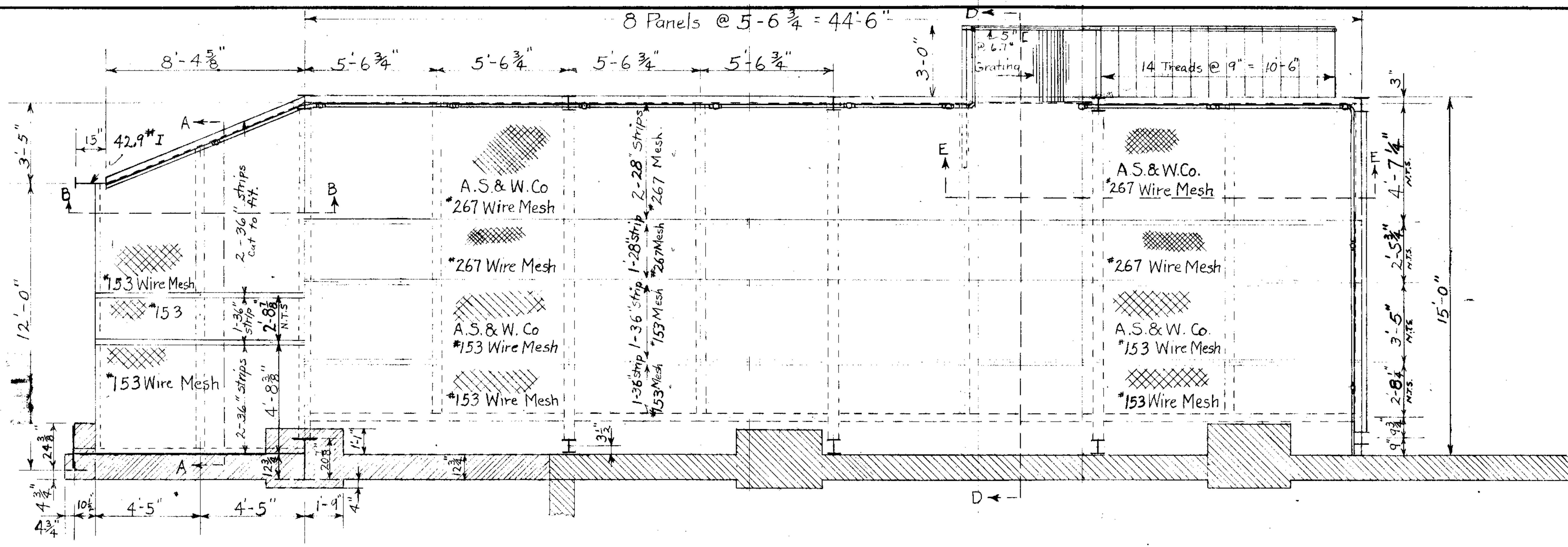
FORM FOR TEST-CYLINDER

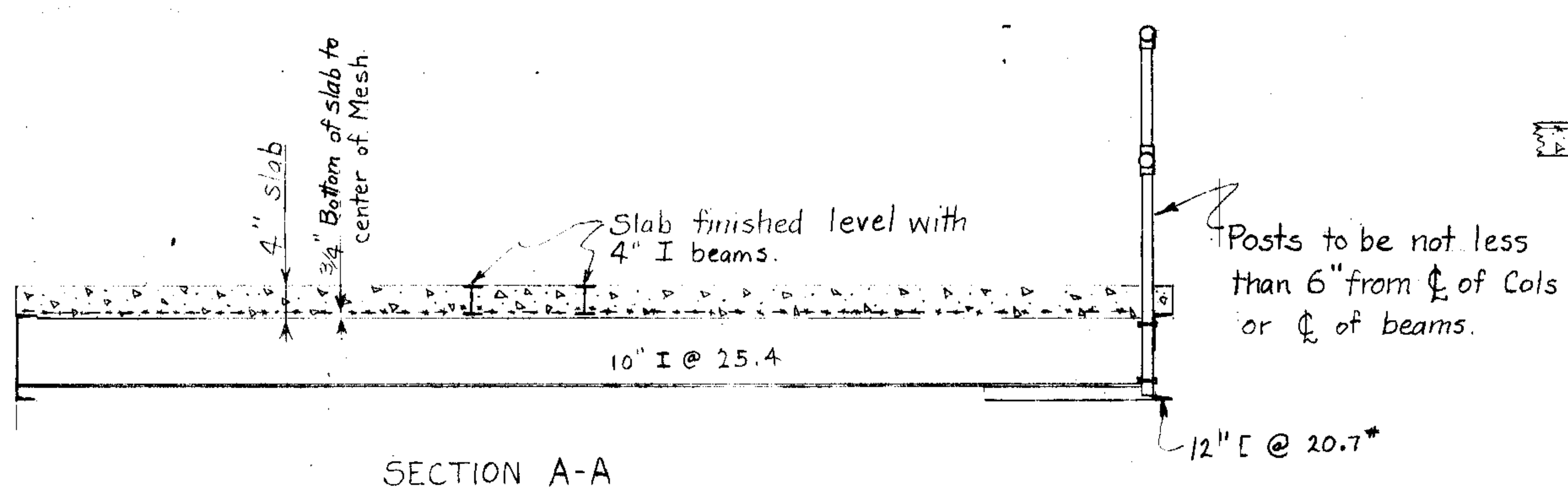
No.	REVISION	BY	DATE

THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

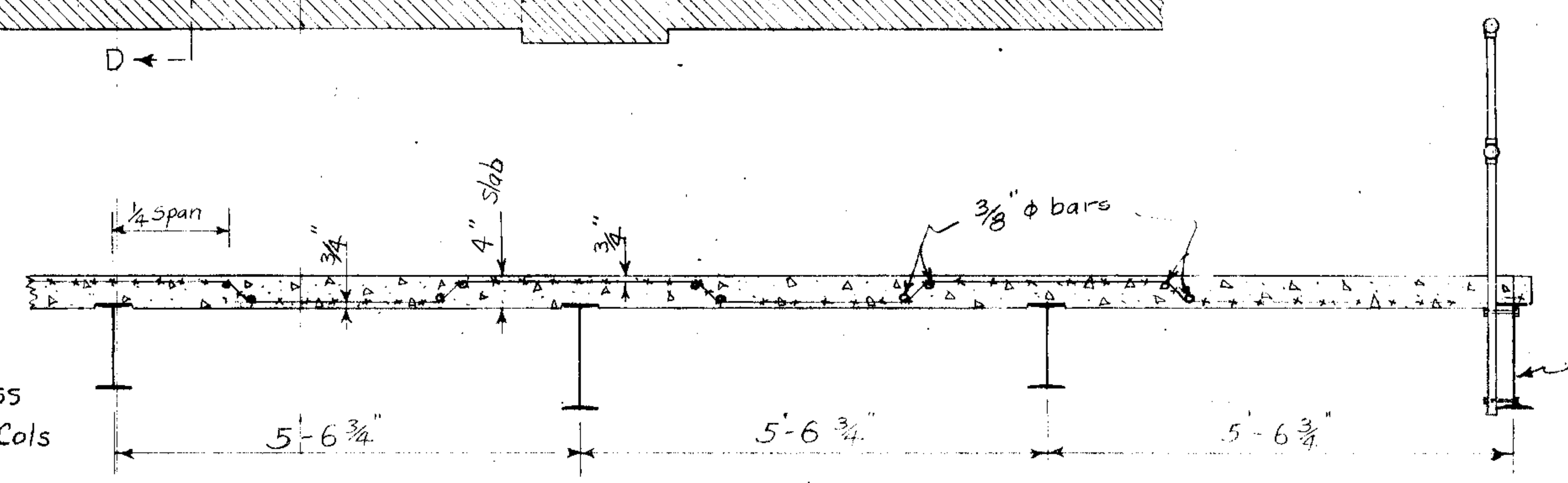
DETAILS OF CONCRETE-TEST APPARATUS

Dr. C.R.U.	Ch.	Scale As Noted	
Tr.	O. K.	C-5717	
App.	App.		
Date 7-20-29			

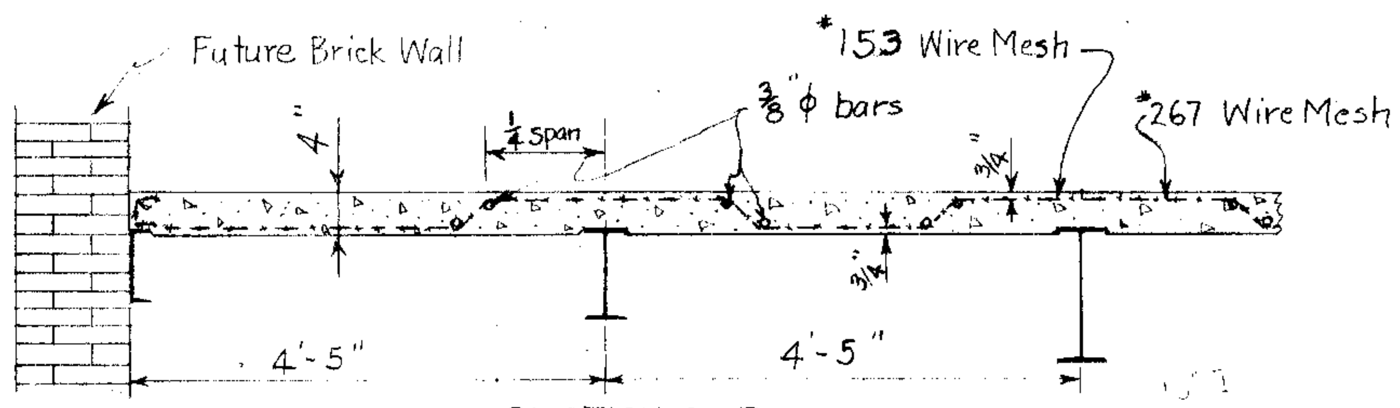




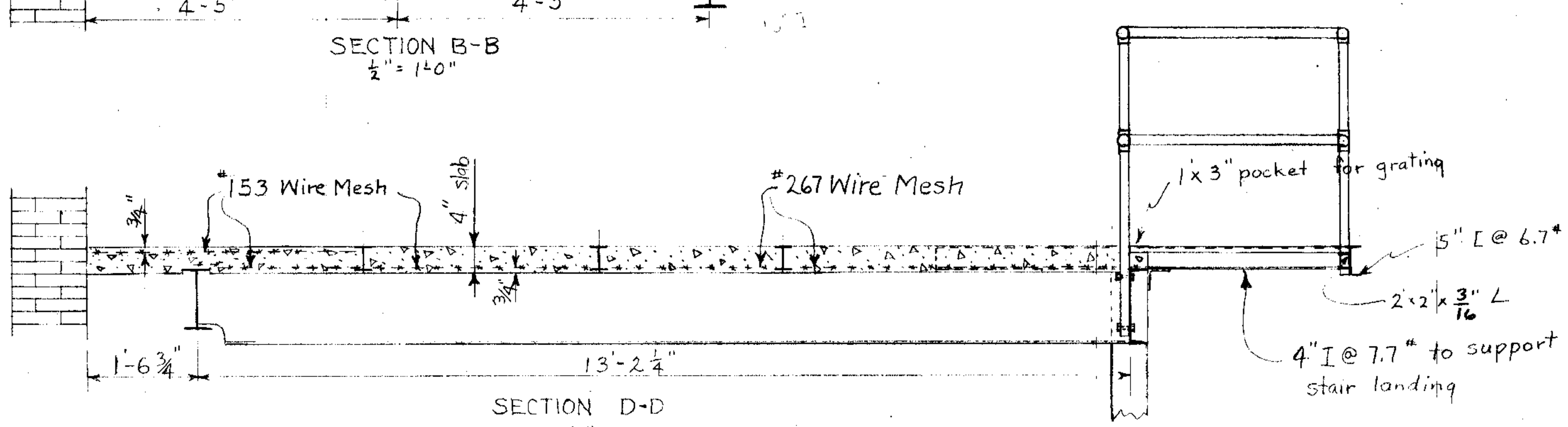
SECTION A-A
Scale 1/2" = 1'-0"



SECTION E-E
Scale 1/2" = 1'-0"



SECTION B-B
1/2" = 1'-0"



SECTION D-D
Scale 1/2" = 1'-0"

165 lin. ft. A.S. & W. Co #267 Triangle Mesh 28" Wide
220 lin ft A.S. & W Co #153 Triangle Mesh 36" Wide
550 lin ft 3/8" ϕ reinforcing bars.
9.67 Cu. Yds Concrete

No.	REVISION	BY	DATE
1	Changed location of 4" I's in 4 S. Bays		9/3/29
2	" " " " N. Bay	ARL	9-9-29

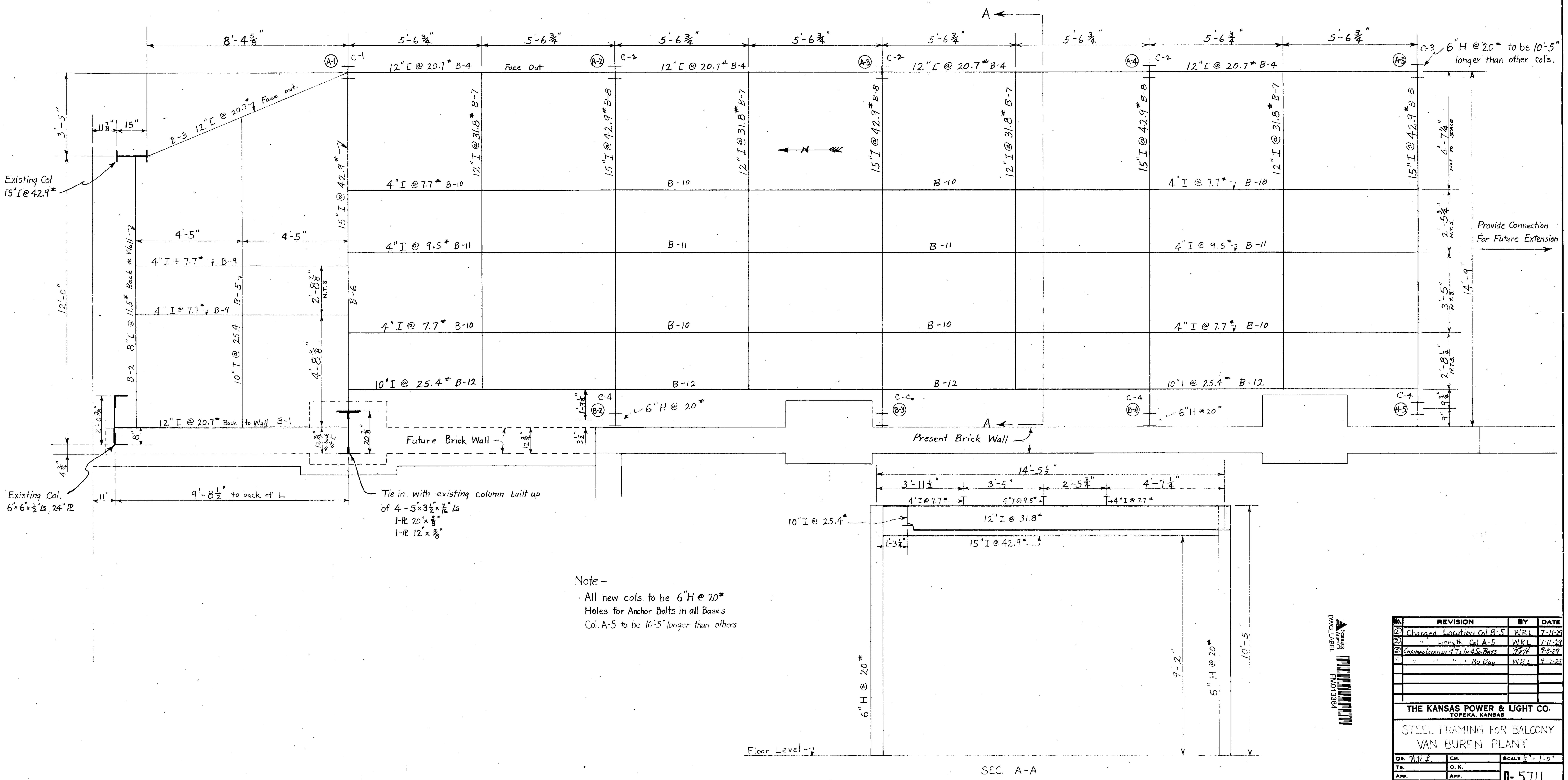
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

PLAN & DETAILS OF CONCRETE FLOOR OF BALCONY VAN BUREN PLANT.

Dr. ARL	Ch.	Scale 1/4" & 1/2" = 1'-0"	
Tr.	O. K.	C-5713	
App.	App.		
Date July 15, 1929			

DWG_LABEL FM013383

GALLUP—K. C., MO.



Note –
All new cols. to be 6"H @ 20#
Holes for Anchor Bolts in all Bases
Col. A-5 to be 10'-5" longer than others

No.	REVISION	BY	DATE
1	Changed Location Col B-5	WRL	7-11-29
2	" Length Col A-5	WRL	7-11-29
3	Changed Location 4"I's in 4 So. Bays	FGH	9-3-29
4	" " " " No Bay	WRL	9-7-29

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

STEEL FRAMING FOR BALCONY
VAN BUREN PLANT

DR. WRL	CH.	SCALE 1/2" = 1'-0"
TR.	O.K.	D-5711
APP.	APP.	
DATE July 11, 1929		

CONDUIT — WIRE & CABLE

13200 VOLT LINE No1.

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
501	4½"I	50	58	RACK ON ROOF	CELL No 8	MAIN LEADS	3	350MCM	15KV VCFP
502	¾"I	30	35	CELL No. 8	PANEL 307	POT. TRANS LEADS	4	12	600V SBRC
503	1"I	30	35	CELL No. 8	PANEL 307	CUR. TRANS. LEADS.	4	10	600V SBRC
504	1½"I	25	30	OCB No 8	PANEL 307	OCB. CONTROL	3	12	600V SBRC
						OPER. BUS	2	4	600V DBRC

13200 VOLT LINE No2.

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
601	4½"I	50	58	RACK ON ROOF	CELL No 9	MAIN LEADS	3	350MCM	15KV VCFP
602	¾"I	29	34	CELL No 9	PANEL 308	POT. TRANS. LEADS	4	12	600V SBRC
603	1"I	29	34	CELL No 9	PANEL 308	CUR. TRANS LEADS	4	10	600V SBRC
604	1½"I	24	29	OCB No 9	PANEL 308	OCB CONTROL	3	12	600V SBRC
						OPER BUS	2	4	600V DBRC

13200 VOLT LINE No3

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
701	4½"I	20	28	RACK ON ROOF	CELL No10	MAIN LEADS	3	350MCM	15KV VCFP
702	¾"I	28	33	CELL No10	PANEL 309	POT. TRANS. LEADS	4	12	600V SBRC
703	1"I	28	33	CELL No10	PANEL 309	CUR. TRANS. LEADS	4	10	600V SBRC
704	1½"I	23	28	OCB No10	PANEL 309	OCB CONTROL	3	12	600V SBRC
						OPER BUS	2	4	600V DBRC

TRANSFER BUS TIE

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
1002	¾"I	31	36	CELL No7	PANEL 306	POT. TRANS LEADS	3	12	600V SBRC
1003	1"I	31	36	CELL No7	PANEL 306	CUR. TRANS. LEADS	4	10	600V SBRC
1004	1½"I	26	31	CELL No7	PANEL 306	OCB CONTROL	3	12	600V SBRC
						OPER BUS	2	4	600V DBRC

TRANSFORMER BANK No1 3-1667 KVA. 13200/2300V.

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
1101	1½"I	43	48	CELL No6	JUNCT. BOX IN SUB STA. ROOM	MAIN LEADS	3	350MCM	15KV VCFP
1102	¾"I	33	38	CELL No6	PANEL 305	POT. TRANS LEADS	3	12	600V SBRC
1103	1"I	33	38	CELL No6	PANEL 305	CUR. TRANS LEADS	4	10	600V SBRC
1104	1½"I	28	33	OCB No6	PANEL 305	OCB CONTROL	3	12	600V SBRC
						OPER BUS	2	4	600V DBRC
1105	4"I	26	31	JUNCT. BOX	No1 TRANS	MAIN LEADS	2	2/0	15KV VCFP
						SYN. STARTING TAP	1	1/0	15KV VCFP
1106	4"I	19	24	JUNCT BOX	No2 TRANS	MAIN LEADS	2	2/0	15KV VCFP
						SYN. STARTING TAP	1	1/0	15KV VCFP
1107	4"I	8	13	JUNCT. BOX	No3 TRANS	MAIN LEADS	2	2/0	15KV VCFP
						SYN. STARTING TAP	1	1/0	15KV VCFP
1108	4"I	59	65	JUNCT BOX	END OF CELL No1	SYN. STARTING LEADS	3	1/0	15KV VCFP

No.4 M.G SET 2300V. – 250 V.DC.

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
1601	—	—	—	PANEL 4-A	MOTOR	MAIN LEADS	1-3c		5KV VCLC
1602	—	—	—		MOTOR	FIELD LEADS	2	2	600V DBRC
1603	—	—	—	PANEL 8	GEN.	POSTIVE LEAD	2	1,500MCM	600V DBRC
1604	—	—	—	PANEL 8	GEN.	NEGATIVE LEAD	2	1,500MCM	600V DBRC

No5 MG SET 1500KW. 13200V – 250V. D.C.

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
1700	4"I	17	25	CELL No1	CELL No3	STARTING LEADS	3	1/0	15KV VCFP
1701	4"I	50	59	CELL No3	MOTOR	MAIN LEADS	3	1/0	15KV VCFP
1702	¾"I	40	45	CELL No3	PANEL 302	POT. TRANS LEADS	3	12	600V SBRC
1703	1"I	40	45	CELL No 3	PANEL 302	CUR. TRANS LEADS	4	10	600V SBRC
1704	1½"I	35	40	OCB No3	PANEL 302	OCB CONTROL	5	12	600V SBRC
						OPER BUS	2	4	600V DBRC
1705	1½"I	42	47	OCB No1	PANEL 302	OCB CONTROL	6	12	600V SBRC
						OPER BUS	2	4	600V DBRC
1706	¾"I	58	70	GEN SHUNT FIELD	RHEOSTAT	GEN. SHUNT FIELD	1	2	600V DBRC
1706A	¾"I			RHEOSTAT	PANEL 104	GEN. SHUNT FIELD	1	2	600V DBRC
1707	¾"I	53	58	SPEED LIMIT DEVICE	PANEL 102	SPEED LIMIT LEADS	2	10	600V SBRC
1708	OPEN 1½"I	15	80	MOTOR FIELD	RHEOSTAT	FIELD LEADS	2	2	600V DBRC
1708A	OPEN	—		RHEOSTAT	PANEL 104	FIELD LEADS	2	2	600V DBRC
1709	OPEN	—	15	COMP. TRANS.	GEN	COMPENSATOR LEADS.	3	1,000MCM	750V VCFP
1710	OPEN	—	55	GEN.	PANEL 102	POS. LEAD	6	2,000MCM	750V VCFP
1711	OPEN	—	57	GEN	PANEL 103	NEG. LEAD	6	2,000MCM	750V VCFP
1712	OPEN	—	60	GEN.	PANEL 104	NEUTRAL LEAD	1	1,000MCM	750V VCFP
1713	1½"I	64	69	PANEL 103	PANEL 9	RHEO CONTROL	3	12	600V SBRC
						CCB CONTROL	3	12	600V SBRC
1714	¾"I	40	45	PANEL 104	PANEL 302	FIELD AM. LEADS	2	SPEC	600V SBRC
1715	1"I	64	69	PANEL 103	PANEL 9	MAIN AM. LEADS	4	SPEC	600V SBRC

No. 6 M. G. SET. ROTARY CONVERTER

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
1801	3"I	26	34	CELL No5	ROT. TRANS. PRIMARY	MAIN LEADS	3	6	15KV VCFP
1802	¾"I	37	42	CELL No5	PANEL 304	POT. TRANS LEADS	3	12	600V SBRC
1803	1"I	37	42	CELL No5	PANEL 304	CUR. TRANS. LEADS	4	10	600V SBRC
1804	1½"I	32	37	OCB No5	PANEL 304	OCB CONTROL	3	12	600V SBRC
						OPER BUS	2	4	600V DBRC
1805	4½"I	35	41	ROT. TRANS. SEC.	STARTING PANEL	A.C. RUNNING LEADS	3	1,000MCM	750V VCFP
1806	3"I	35	41	ROT. TRANS. SEC.	STARTING PANEL	A.C. STARTING LEADS	3	400MCM	750V VCFP
1807	4½"I	29	35	ROT. TRANS. SEC.	ROTARY	A.C. RUNNING LEADS	3	1,000MCM	750V VCFP
1808	OPEN	—	16	STARTING PANEL	ROTARY	A.C. RUNNING LEADS	3	1,000MCM	750V VCFP
1809	OPEN	—	100	ROTARY	PANEL 23	POS. LEADS	2	1,000MCM	750V VCFP
1810	OPEN	—	100	ROTARY	PANEL 23	NEG. LEADS	2	1,000MCM	750V VCFP
1811	OPEN	—	100	EQUALIZER SW.	PANEL 23	EQUALIZER LEAD	1	1,000MCM	750V VCFP
1812	¾"I	100	105	SPEED LIMIT SW.	PANEL 23	SPEED LIMIT LEADS	2	10	600V SBRC
1813	¾"I	100	105	ROTARY	PANEL 23	POSTIVE SHUNT	1	6	600V DBRC
1814	1"I	100	105	STARTING PANEL	PANEL 23	REACT. V.A. CUR. LEADS	2	10	600V SBRC
						REACT. V.A. POT. LEADS	2	10	600V SBRC
1815	¾"I	2	10	ROTARY	STARTING PANEL	V.M. LEADS	2	12	600V SBRC

No7 M.G. SET. 1000 KW. 13200V. — 250V. D.C.

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
1900	4"I	17	25	CELL No2	CELL No 4	STARTING LEADS	3	2	15KV VCFP
1901	4"I	57	66	CELL No4	SYN. MOTOR	MAIN LEADS	3	2	15KV VCFP
1902	¾"I	39	44	CELL No4	PANEL 303	POT. TRANS LEADS	3	12	600V SBRC
1903	1"I	39	44	CELL No4	PANEL 303	CUR. TRANS LEADS	4	10	600V SBRC
1904	1½"I	34	39	OCB No4	PANEL 303	OCB CONTROL	5	12	600V SBRC
						OPER BUS	2	4	600V DBRC
1905	1½"I	41	46	OCB No2	PANEL 303	OCB CONTROL	6	12	600V SBRC
						OPER BUS	2	4	600V DBRC
1906	¾"I	49	55	GEN FIELD	RHEOSTAT	GEN. SHUNT FIELD	1	6	600V DBRC
1906A	¾"I			RHEOSTAT	PANEL 107	GEN SHUNT FIELD	1	6	600V DBRC
1907	¾"I	41	46	SPEED LIMIT DEVICE	PANEL 105	SPEED LIMIT LEADS	2	10	600V SBRC
1908	OPEN 1½"I	13	62	MOTOR FIELD	RHEOSTAT	FIELD LEADS	2	2	600V DBRC
1908A	OPEN	—		RHEOSTAT	PANEL 107	FIELD LEADS	2	2	600V DBRC
1909	OPEN	—	12	COMP TRANS.	GEN	COMPENSATING LEADS	2	1,000MCM	750V VCFP
1910	OPEN	—	46	GEN.	PANEL 105	POS. LEAD	6	1,500MCM	750V VCFP
1911	OPEN	—	48	GEN	PANEL 106	NEG LEAD	6	1,500MCM	750V VCFP
1912	OPEN	—	60	COMP. TRANS	PANEL 107	NEUTRAL LEADS	1	1,000MCM	750V VCFP
1913	1½"I	63	68	PANEL 106	PANEL 8	RHEO. CONTROL	3	12	600V SBRC
						CCB CONTROL	3	12	600V SBRC
1914	¾"I	43	48	PANEL 107	PANEL 303	FIELD AM. LEADS	2	SPEC.	600V SBRC
1915	1"I	63	68	PANEL 106	PANEL 8	MAIN AM. LEADS	4	SPEC	600V SBRC

No1. & No2 BALANCING SETS.

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
2001	OPEN	—	(88)	BAL. No1 – A END		MAIN LEAD	1	1,000MCM	750V VCFP
2002	OPEN	—	(88)	BAL. No1 – A END		MAIN LEAD	1	1,000MCM	750V VCFP
2003	¾"I	[illegible]	[illegible]	BAL. No1 – A END		FIELD LEAD	1	6	600V DBRC
2004	OPEN	[illegible]	(70)	BAL. No1 – B END		MAIN LEAD	1	1,000MCM	750V VCFP
2005	OPEN	[illegible]	(70)	BAL. No1 – B END		MAIN LEAD	1	1,000MCM	750V VCFP
2006	¾"I	(66)	(60)	BAL. No1 – B END		FIELD LEAD	1	6	600V DBRC
2007	¾"I	(60)	[illegible]	BAL. No1 – MOTOR		MAIN LEAD	1	700MCM	750V VCFP
2008	OPEN	(72)	[illegible]	BAL. No1 – MOTOR		MAIN LEAD	1	700MCM	750V VCFP
2009	¾"I	(72)	(72)	BAL. No1 – MOTOR		FIELD LEAD	1	6	600V DBRC
2010	¾"I	(72)	(72)	BAL. No1 – MOTOR		FIELD LEAD	1	6	600V DBRC
2011	OPEN	—	(48)	BAL. No2 – A END		MAIN LEAD	1	4/0	600V DBRC
2012	OPEN	—	(38)	BAL. No2 – A END		MAIN LEAD	1	4/0	600V DBRC
2013	OPEN	—	(38)	BAL. No2 – B END		MAIN LEAD	1	4/0	600V DBRC
2014	OPEN	—	(84)	BAL. No2 – B END		MAIN LEAD	1	4/0	600V DBRC

MISCELLANEOUS

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
2201	1½"I	15	20	PANEL 106	OPER BUS PANEL	MAIN BUS TAP	2	2	600V DBRC
2202	1½"I	14	19	PANEL 103	OPER BUS PANEL	MG #5 TAP	2	4	600V DBRC
2203	1½"I	15	20	PANEL 106	OPER BUS PANEL	MG #7 TAP	2	4	600V DBRC
2204	1½"I	14	19	OPER BUS PANEL	PANEL 103	OPER BUS	2	2	600V DBRC
2205	1½"I	29	34	OPER BUS PANEL	PANEL 309	OPER BUS	2	2	600V DBRC

NUMBERS RETAINED FROM ORIGINAL INSTALLATION.

No.	Size Finish	Length Conduit	Length Run	From	To	For	No.	Size	Finish
5-A	3"F	140	166	TRANSFORMER SECONDARY	OIL SWITCH	MAIN LEAD	1	750MCM	5KV VCFP
5-B	3"F	140	166	TRANSFORMER SECONDARY	OIL SWITCH	MAIN LEAD	1	750MCM	5KV VCFP
5-C	3"F	140	166	TRANSFORMER SECONDARY	OIL SWITCH	MAIN LEAD	1	750MCM	5KV VCFP
5-D	3"F	140	166	TRANSFORMER SECONDARY	OIL SWITCH	MAIN LEAD	1	750MCM	5KV VCFP
5-E	3"F	140	166	TRANSFORMER SECONDARY	OIL SWITCH	MAIN LEAD	1	750MCM	5KV VCFP
5-F	3"F	140	166	TRANSFORMER SECONDARY	OIL SWITCH	MAIN LEAD	1	750MCM	5KV VCFP
5-G	3"F	140	—	TRANSFORMER SECONDARY	OIL SWITCH	FUTURE NEUTRAL	—	—	—
5-H	3"F	20	50	OIL SWITCH	OLD STATION BUS	MAIN LEAD	1	1,000MCM	5KV VCFP
5-I	3"F	20	50	OIL SWITCH	OLD STATION BUS	MAIN LEAD	1	1000MCM	5KV VCFP
5-J	3"F	20	50	OIL SWITCH	OLD STATION BUS	MAIN LEAD	1	1000MCM	5KV VCFP
5-K	1½"I	20	25	PANEL 5	JUNCT. BOX	O. S. CONTROL	4	19/22	600V DBRC
						CUR. TRANS	8	19/22	600V DBRC
						POT. TRANS.	3	19/22	600V DBRC
5-K-1	1½"I	10	21	JUNCT. BOX	OIL SWITCH	O.S. CONTROL	4	19/22	600V DBRC
						CUR. TRANS	4	19/22	600V DBRC
						POT. TRANS	3	19/22	600V DBRC
5-M	3"F	60	—	FUTURE TRANS.	FUT. O. S.	MAIN LEAD	—	—	—
5-N	3"F	60	—	FUTURE TRANS.	FUT. O. S.	MAIN LEAD	—	—	—
5-P	3"F	60	—	FUTURE TRANS.	FUT. O. S.	MAIN LEAD	—	—	—
5-Q	3"F	60	—	FUTURE TRANS.	FUT. O. S.	MAIN LEAD	—	—	—
5-R	3"F	60	—	FUTURE TRANS.	FUT. O. S.	MAIN LEAD	—	—	—
5-S	3"F	60	—	FUTURE TRANS.	FUT. O. S.	MAIN LEAD	—	—	—
5-T	3"F	60	—	FUTURE TRANS.	FUT. O. S.	NEUTRAL	—	—	—
7-A	—	—	70	PANEL 105	3 WIRE BUS	POSTIVE LEAD	6	¼"x4"	BAR
7-B	—	—	70	PANEL 106	3 WIRE BUS	NEGATIVE LEAD	6	¼"x4"	BAR
7-C	—	—	70	PANEL 107	3 WIRE BUS	NEUTRAL LEAD	1	¼"x4"	BAR
201-A	3"I	10	17	OIL SWITCH	NEW BUS STRUCTURE	CIR #1 MAINS	3	250MCM	5KV VCFP
201-B	3"I	35	42	NEW BUS STRUCTURE	REG	CIR #1 MAINS	3	250MCM	5KV VCFP
201-C	3"I	10	15	REGULATORS	LINE RACK	CIR #1 MAINS	3	250MCM	5KV VCFP
201-D	¾"I	10	17	REG. C.T. & P.T.	COMPENSATOR	COMP. LEADS	3	12	600V SBRC
202-A	3"I	10	17	O. SW.	NEW BUS STRUCT.	CIR. #2 MAINS	3	250MCM	5KV VCFP
202-B	3"I	20	27	NEW BUS STRUCT.	REG.	CIR #2 MAINS	3	250MCM	5KV VCFP
202-C	3"I	10	15	REGULATORS	LINE RACK	CIR #2 MAINS	3	250MCM	5KV VCFP
202-D	¾"I	10	17	REG. C.T. & P.T.	COMPENSATORS	COMP. LEADS	3	12	600V SBRC
203-A	3"I	10	17	O. SW.	NEW BUS STRUCT.	CIR #3 MAINS	3	250MCM	5KV VCFP
203-B	3"I	35	42	NEW BUS STRUCT.	REG.	CIR #3 MAINS	3	250MCM	5KV VCFP
203-C	3"I	10	15	REGULATORS	LINE RACK	CIR #3 MAINS	3	250MCM	5KV VCFP
203-D	¾"I	10	17	REG. C.T. & P.T.	COMPENSATOR	COMP. LEADS	3	12	600V SBRC
204-A	3"I	10	17	O. SW.	NEW BUS STRUCTURE	CIR #4 MAINS	3	250MCM	5KV VCFP
204-B	3"I	20	27	NEW BUS STRUCT.	REG	CIR #4 MAINS	3	250MCM	5KV VCFP
204-C	3"I	10	15	REGULATORS	LINE RACK	CIR #4 MAINS	3	250MCM	5KV VCFP
204-D	3"I	10	17	REG. C.T. & P.T.	COMPENSATOR	COMP. LEADS	3	12	600V SBRC
205-A	—	—	25	BUS.	O. SW.	CIR #5 MAINS	3	¼"x1½"	BAR
205-B	3"I	35	42	O. SW.	REG.	CIR #5 MAINS	3	250MCM	5KV VCFP
205-C	3"I	10	15	REGULATORS	LINE RACK	CIR #5 MAINS	3	250MCM	5KV VCFP
305	1"I	25	28	220V 3φ TRANS	S. SW. PANEL	REG. MOTORS	3	8	600V SBRC
305-A	1"I	40	43	S. SW. PANEL	E. REG. STRUCT.	E. REG. MOTORS	3	8	600V SBRC
305-B	1"I	30	33	S. SW. PANEL	W. REG. STRUCT.	W. REG. MOTORS	3	8	600V SBRC
310	—	—	130	ALONG W. WALL		MAIN GROUND BUS	1	¼"x1½"	BAR
310-A	—	—	25	MAIN GROUND	REG & 2300V STRUCT	GROUND BUS	1	¼"x1½"	BAR
310-B	—	—							
310-C	—	—							
310-D	—	—							
310-E	—	—	30	MAIN GROUND	1667 KVA TRANS	GROUND BUS	1	¼"x1½"	BAR
311	—	—	30	#310A	2300V STRUCT.	GROUND BUS	1	¼"x1"	BAR
312	—	—	30	#310A	E. REG STRUCT	GROUND BUS	1	¼"x1"	BAR
313	—	—	30	#310A	W. REG STRUCT	GROUND BUS	1	¼"x1"	BAR

" THIS DRAWING SUPERCEDES CHICAGO DRAWING B-18590

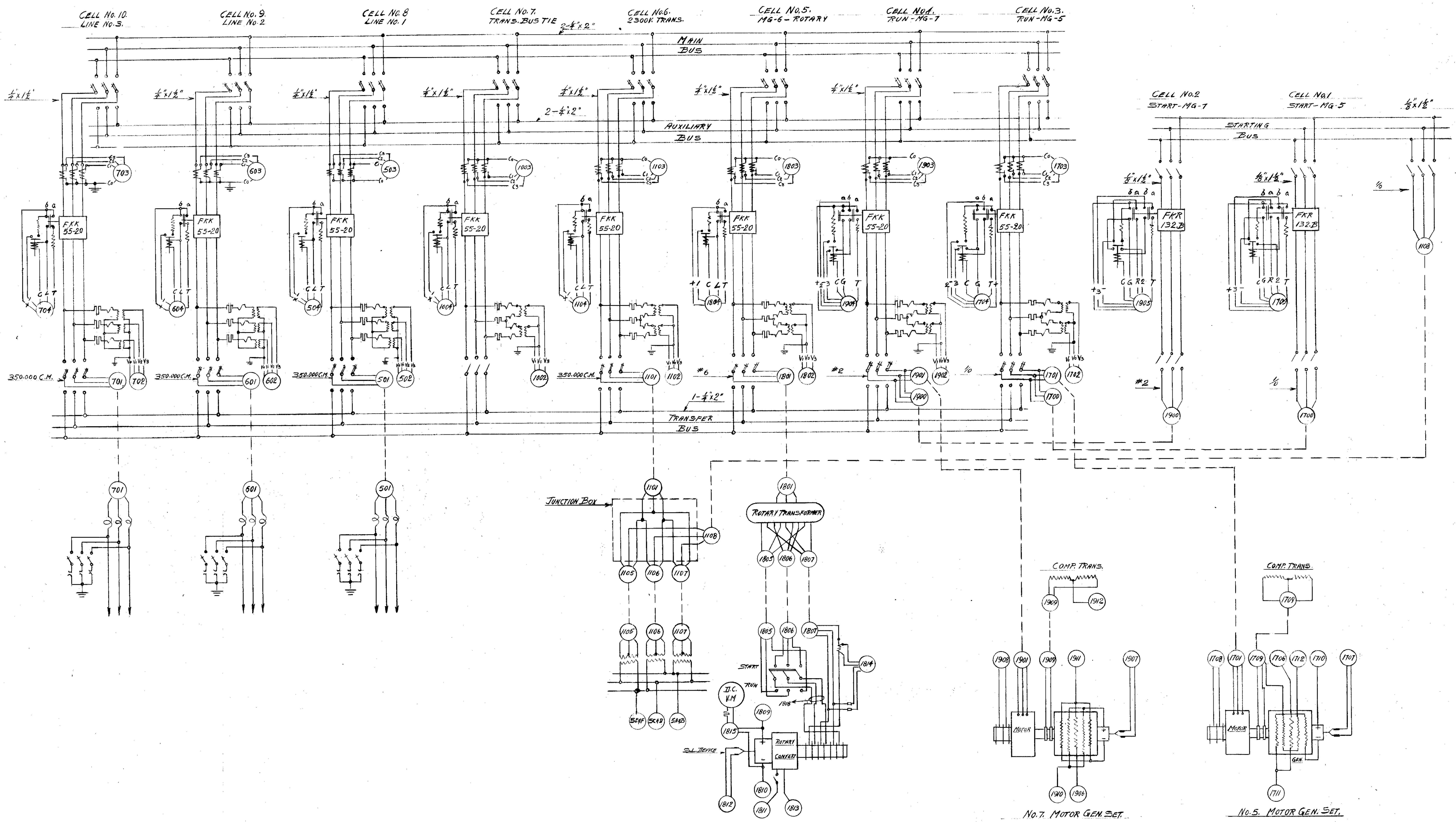
No.	REVISION	BY	DATE
1	Revised & Redrawn		

DWG_LABEL FM013385

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

CONDUIT AND WIRE TABLE — VAN BUREN STATION.

DR.	CH.	SCALE —
TR.	O. K.	
APP.	APP.	D-5707
DATE		



CONTINUATION OF CONDUITS					
CONDUIT No.	DWG.	CONDUIT No.	DWG.	CONDUIT No.	DRWG.
502	D-5748	1704	D-5748	1902	D-5748
503	D-5748	1705	D-5748	1903	D-5748
504	D-5748	1706	D-5747	1904	D-5748
602	D-5748	1707	D-5747	1905	D-5748
603	D-5748	1708	D-5747	1906	D-5747
604	D-5748	1710	D-5747	1907	D-5747
702	D-5748	1711	D-5747	1908	D-5747
703	D-5748	1712	D-5747	1910	D-5747
704	D-5748	1802	D-5748	1911	D-5747
1002	D-5748	1803	D-5748	1912	D
1003	D-5748	1804	D-5748	5A&B	D
1004	D-5748	1809	D	5C&D	D
1102	D-5748	1810	D	5E&F	D
1103	D-5748	1811	D		
1104	D-5748	1812	D		
1702	D-5748	1813	D		
1703	D-5748	1814	D		

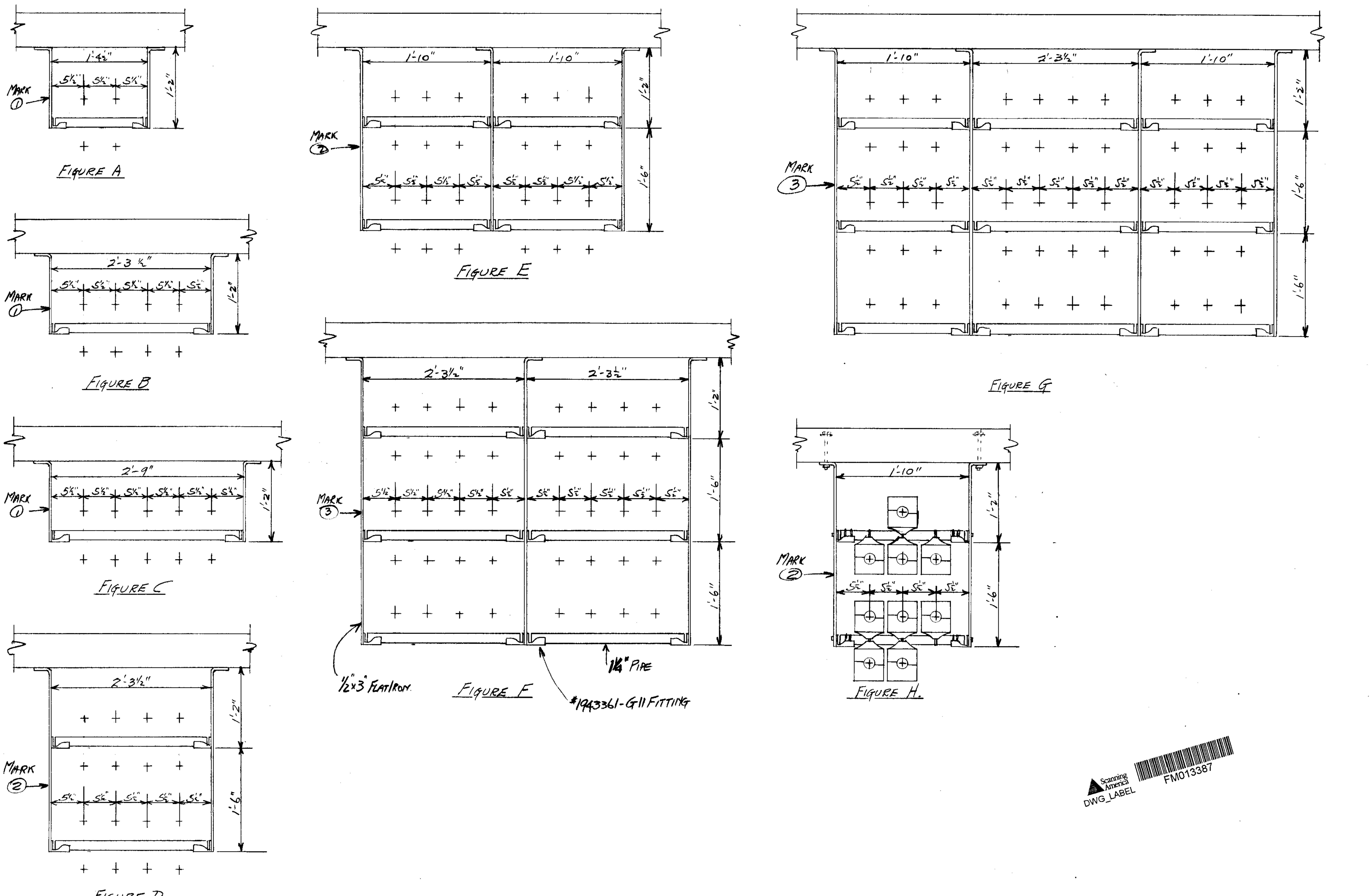
No.	REVISION	BY	DATE

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

WIRING DIAGRAM
VAN BUREN PLANT

DR. R. ZAHN | CH. | SCALE
TR. | O. K.
APP. | APP.
DATE MAY-6-1930

D-5703



SCHEDULE OF RACKS — C-5764

No.	REVISION	BY	DATE
1	REVISED & REDRAWN FROM D-5702	[illegible]	10-24-29

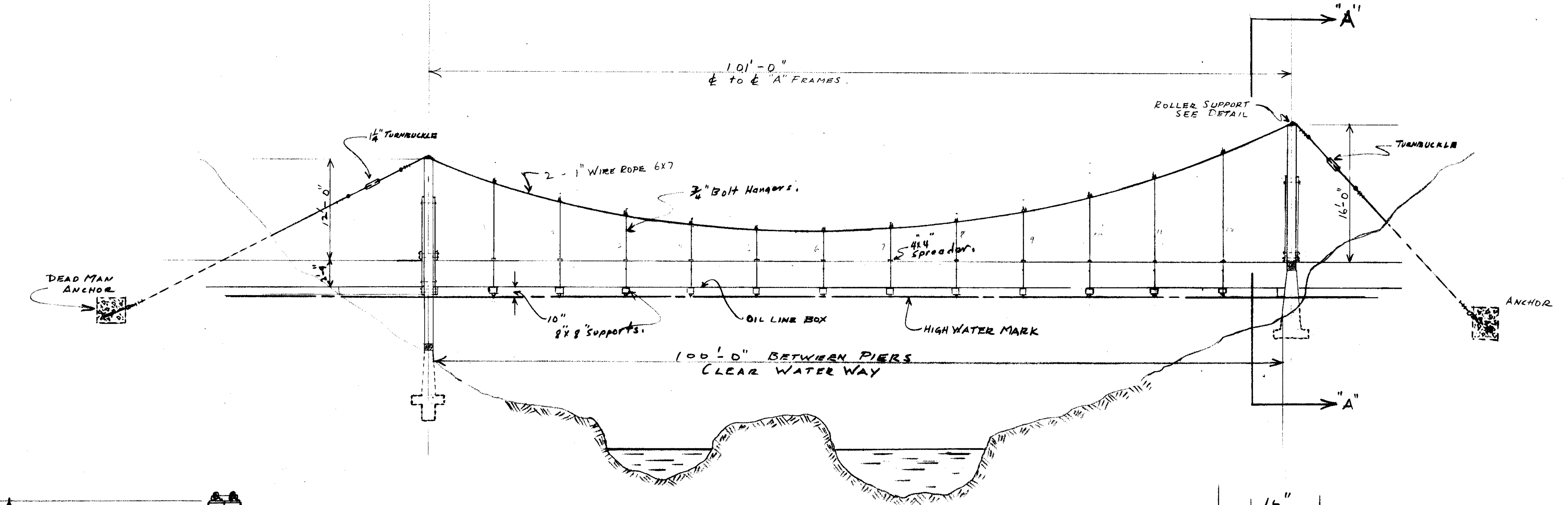
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

CABLE RACK DETAILS — VAN BUREN PLANT.

Dr. [illegible] Hart | Ch. | Scale 1" = 1'-0"
Tr. | O. K.
App. | App.
Date OCT. 24-1929 | C-5702

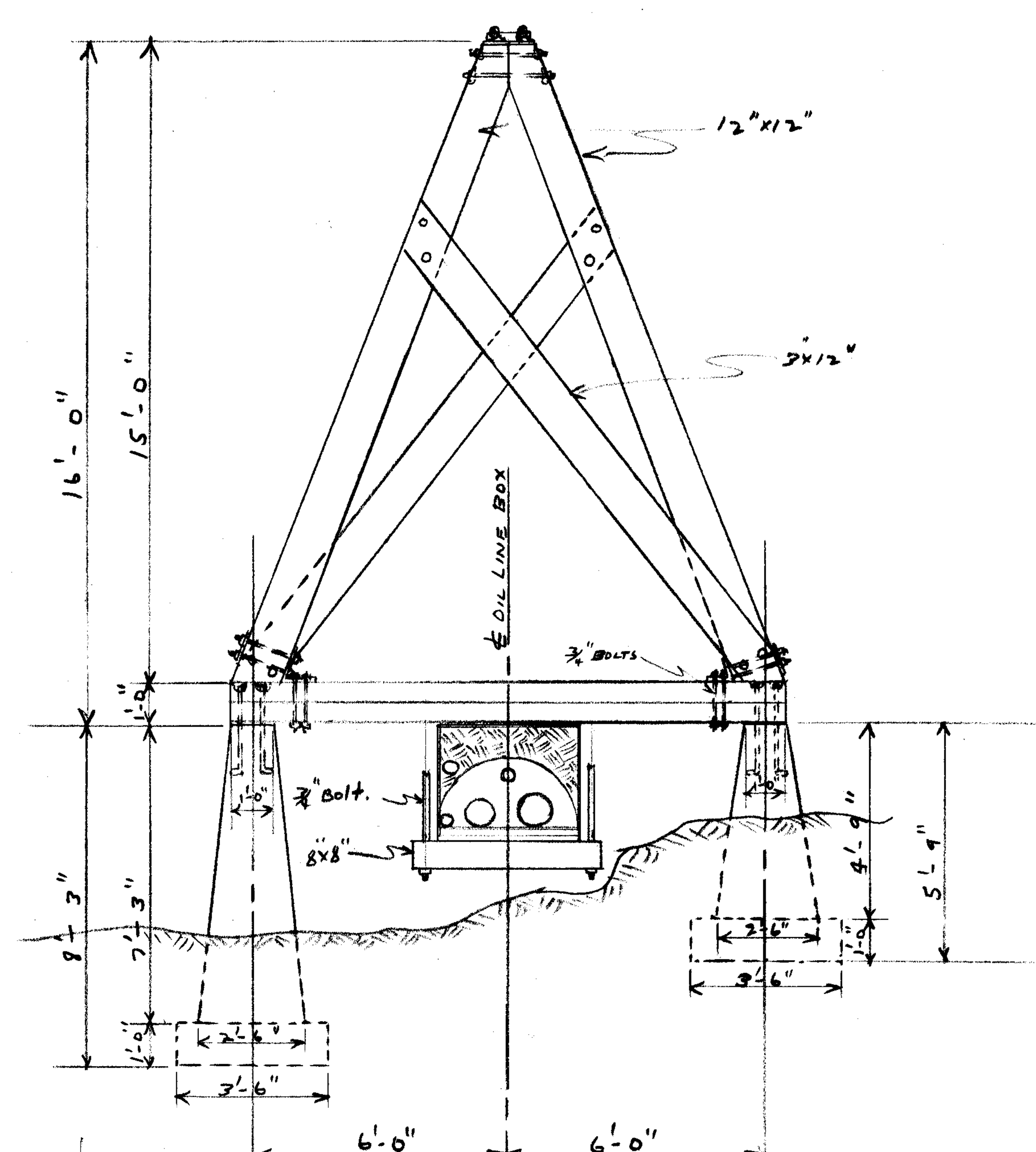
GALLUP—K. C., MO.

DWG_LABEL FM013387



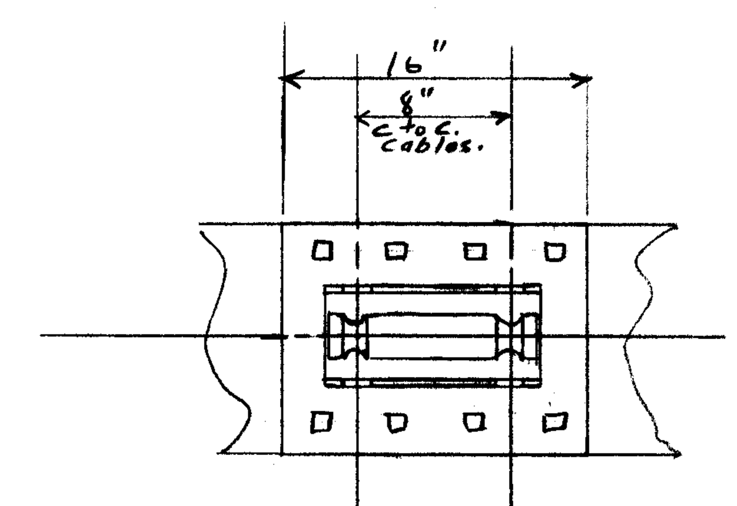
North Elevation

Scale ⅛"=1'-0"

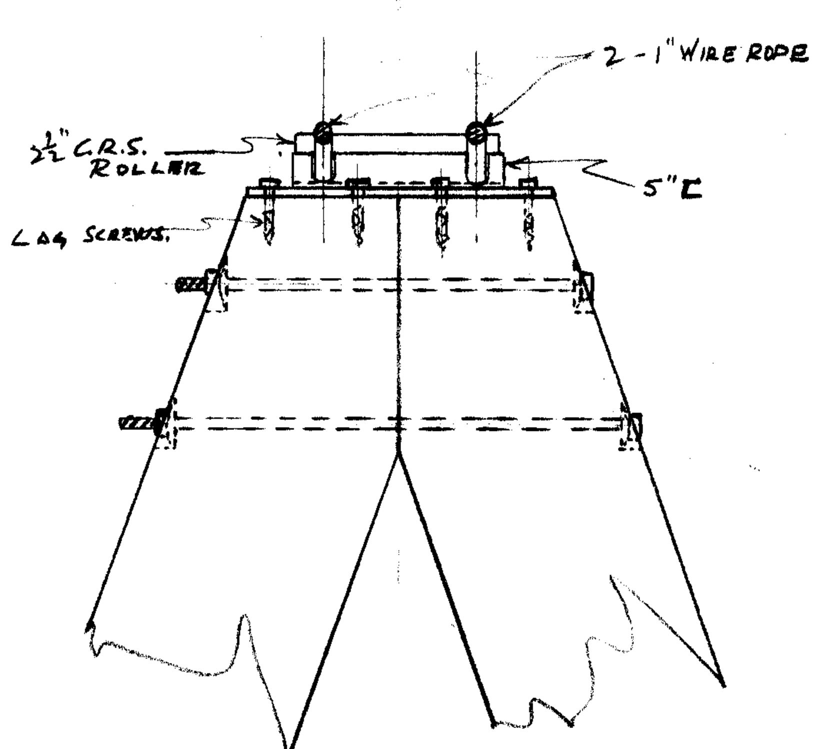


…ction "A – A"

…ale ⅜"=1'-0"



Plan



Elev.

Detail of Roller Support

Scale 1½"=1'-0"

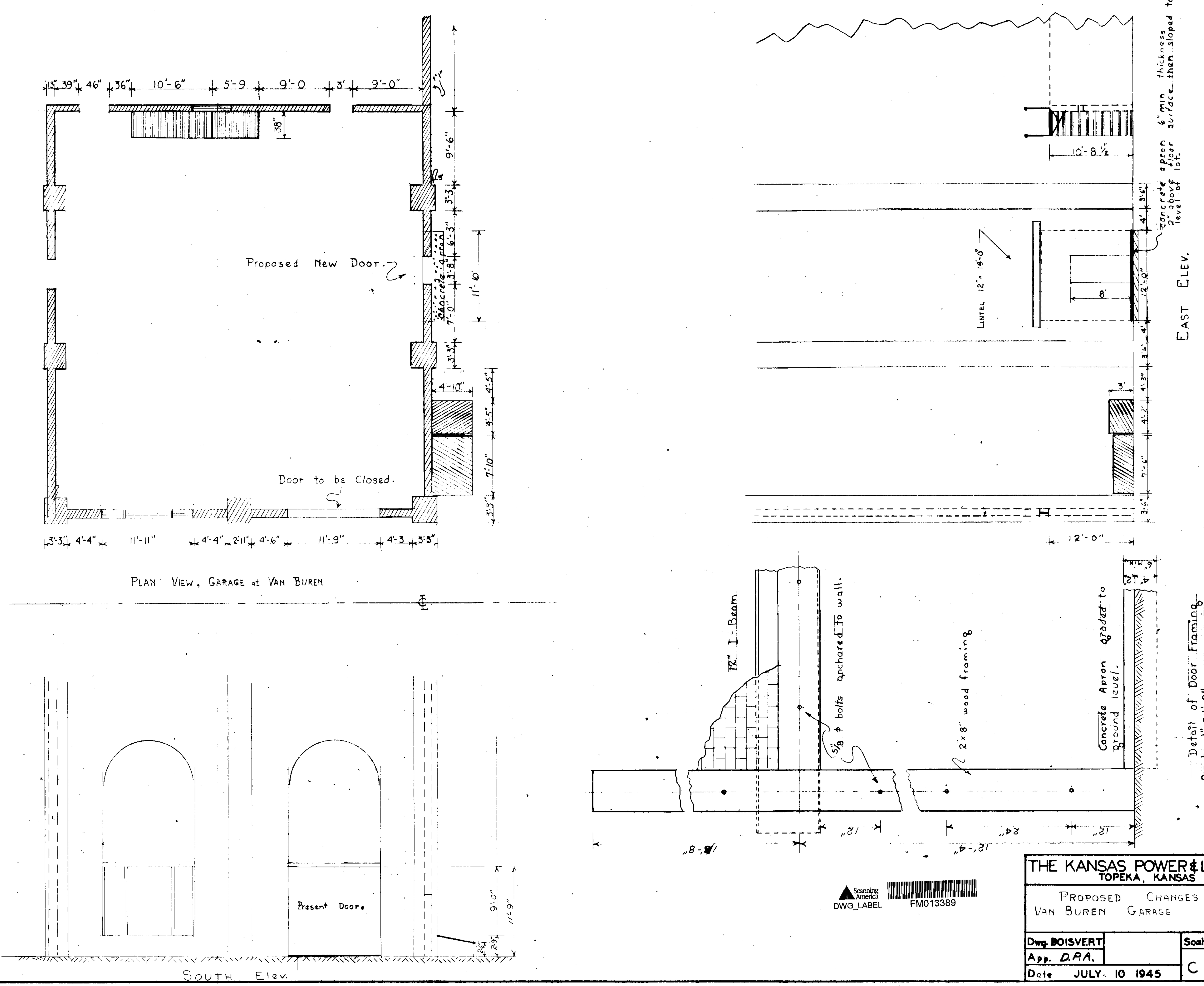
Note: High Water Mark shown as established by Kansas Engineering Co.

DWG_LABEL FM013388

THE KANSAS POWER AND LIGHT CO
TOPEKA, KANSAS

Cable Support for Fuel Oil Lines Spanning Shunganunga Creek. East 13th and Jefferson Sts. Topeka, Kansas.

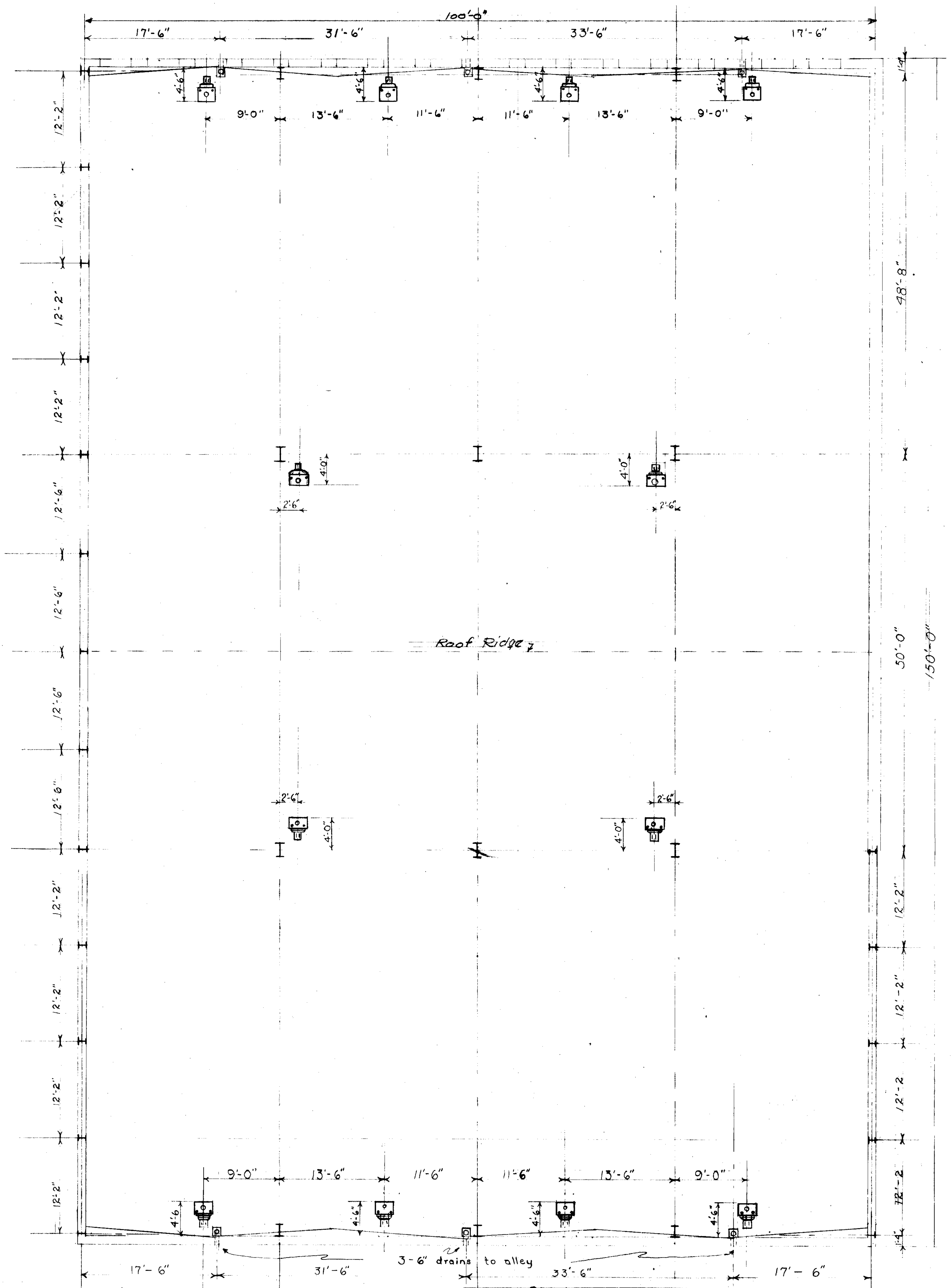
DR. OKJ	CH.	SCALE As Shown.
TR.	O. K.	D-5508
APP.	APP.	
DATE 2-6-28		



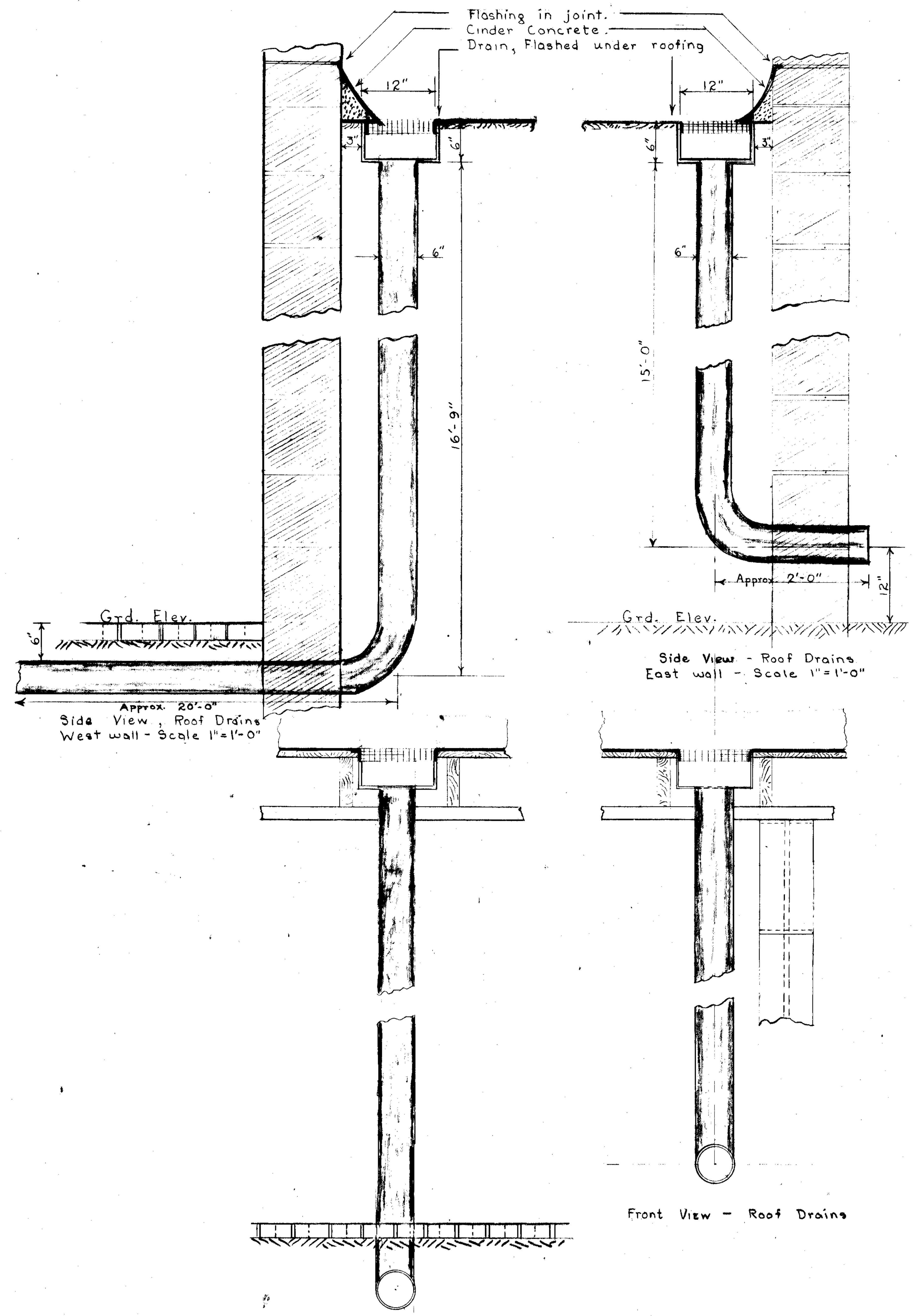
THE KANSAS POWER & LIGHT
TOPEKA, KANSAS

PROPOSED CHANGES AT
VAN BUREN GARAGE "1945"

Dwg. BOISVERT		Scale 1" = 8'
App. D.P.A.		C-7287
Date JULY 10 1945		



PLAN
Scale: 1/8" = 1'-0"



Side View, Roof Drains
West wall - Scale 1" = 1'-0"

Side View - Roof Drains
East wall - Scale 1" = 1'-0"

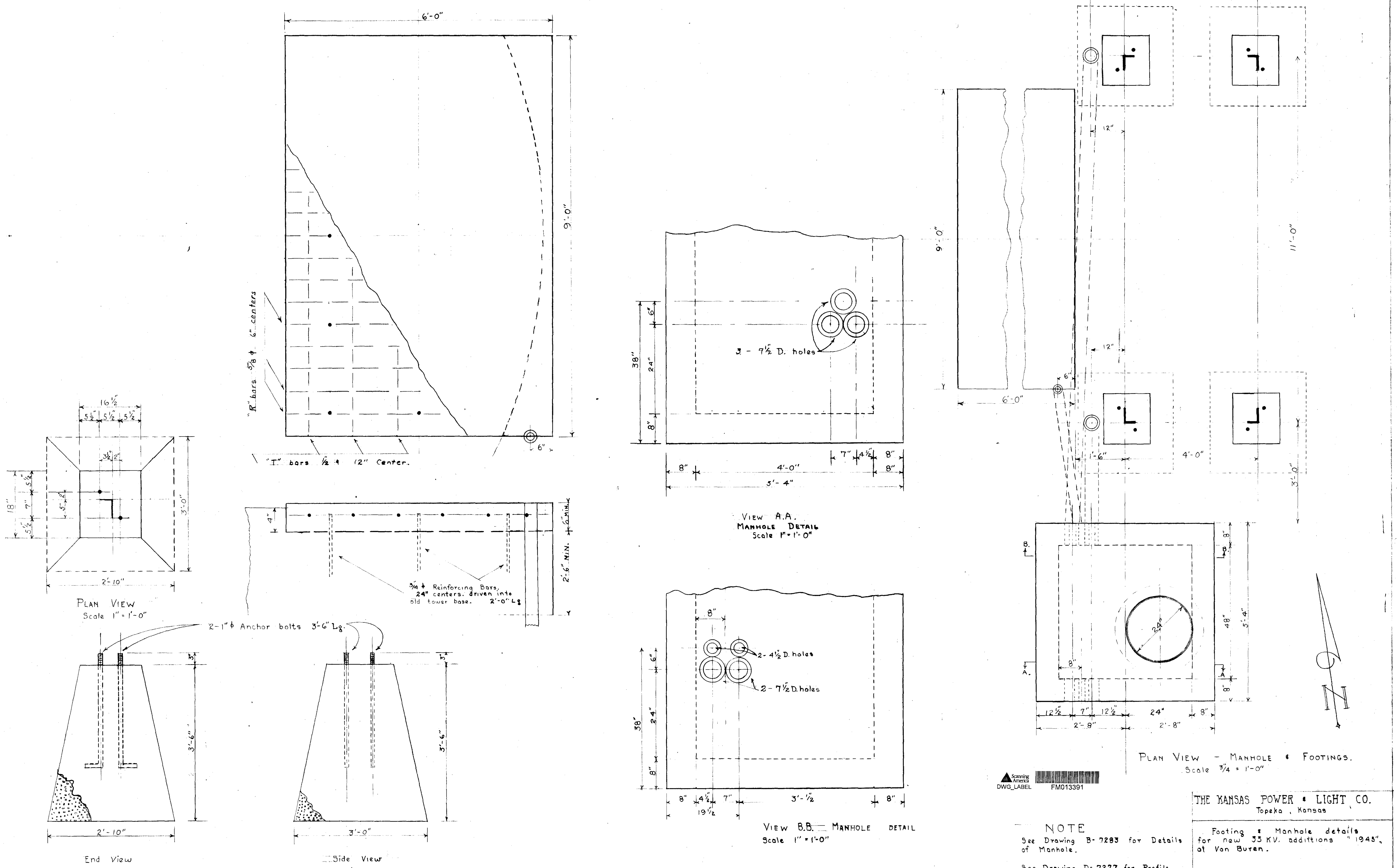
Front View - Roof Drains
West wall.

Front View - Roof Drains

Drain Location.
Heater Location.

DWG_LABEL FM013390

THE KANSAS POWER & LIGHT CO. Topeka, Kansas	
Details for Roof Drains & Locations for Gas-Heaters	
Dwg:	Scale: Shown
App.	D-7325
Date: 8-11-45	



NOTE

See Drawing B-7283 for Details of Manhole.

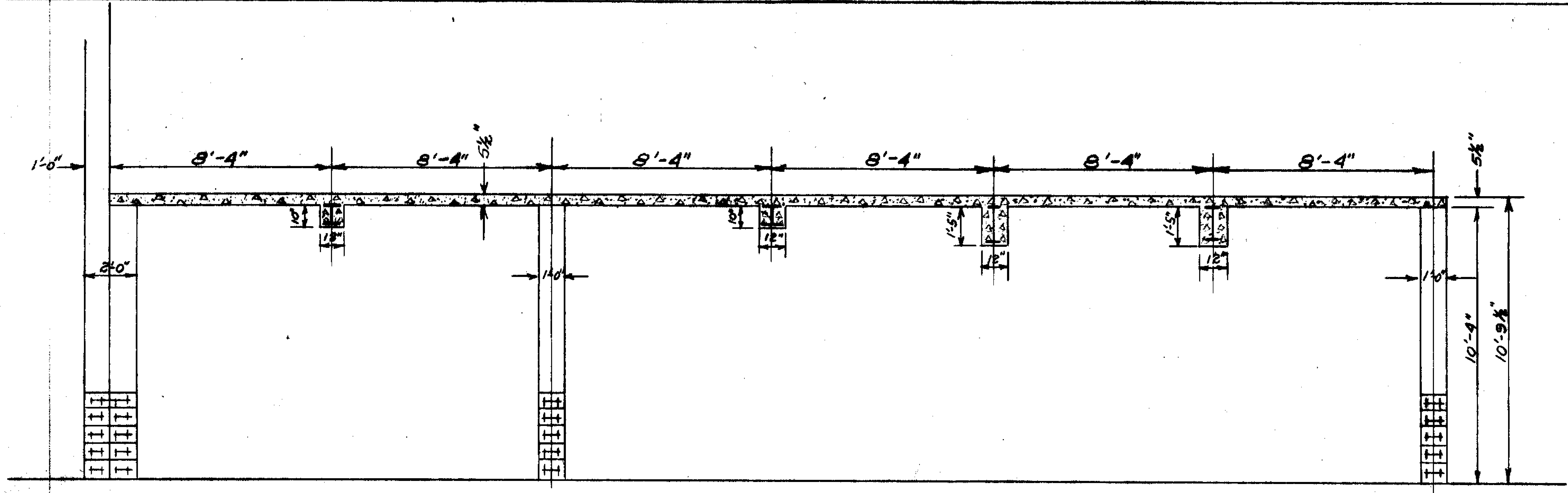
See Drawing D-7277 for Profile

THE KANSAS POWER & LIGHT CO.
Topeka, Kansas

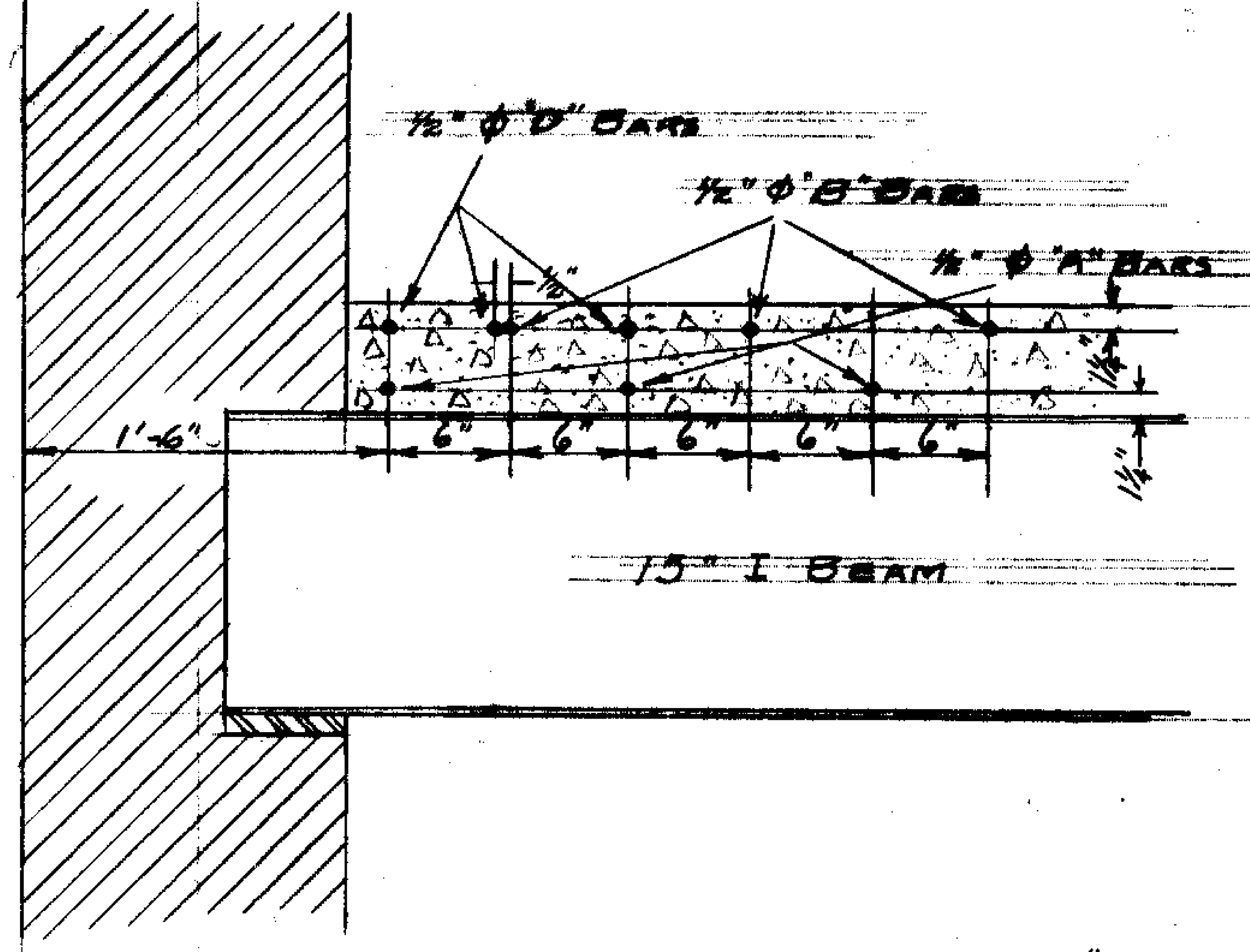
Footing & Manhole details for new 33 KV. additions "1945", at Van Buren.

Dwg. B	REVISIONS:	Scale - Shown
App. B		D-7342
Date:	Aug. 21, 1945	W.O. 8143

DWG_LABEL FM013391

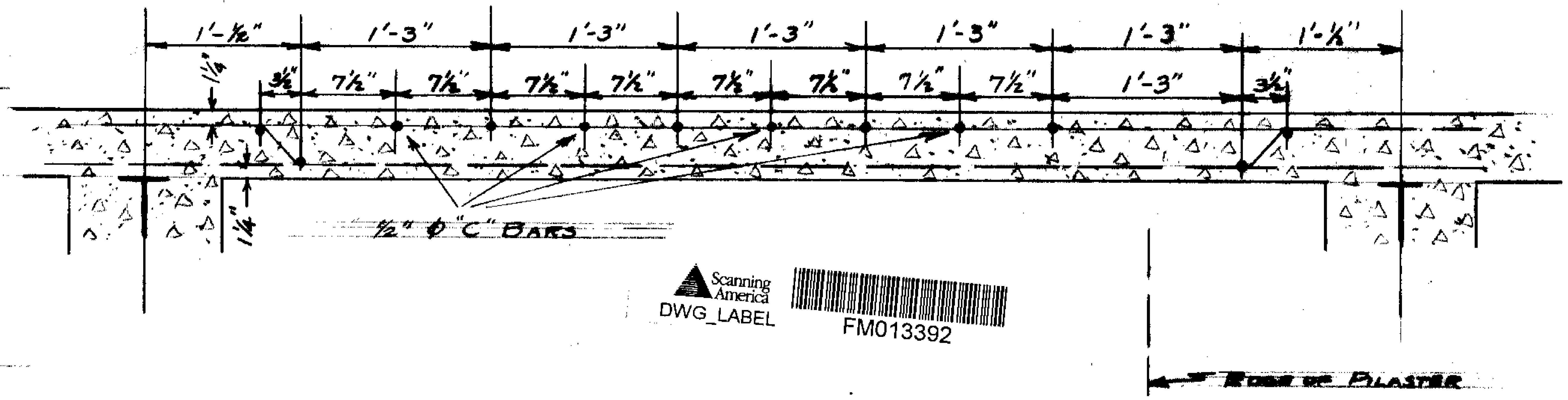


SECTION E-E
SCALE ¼" = 1'-0"



PILASTER

SECTION F-F SHOWING "D" BARS USED TO REINFORCE CANTILEVER PORTION OF SLAB AROUND PILASTER
SCALE 1" = 1'-0"



SECTION G-G SHOWING SPACING OF "C" BARS USED TO SUPPORT CANTILEVER PORTIONS OF SLAB BETWEEN SUPPORTING BEAM AND PILASTER
SCALE 1" = 1'-0"

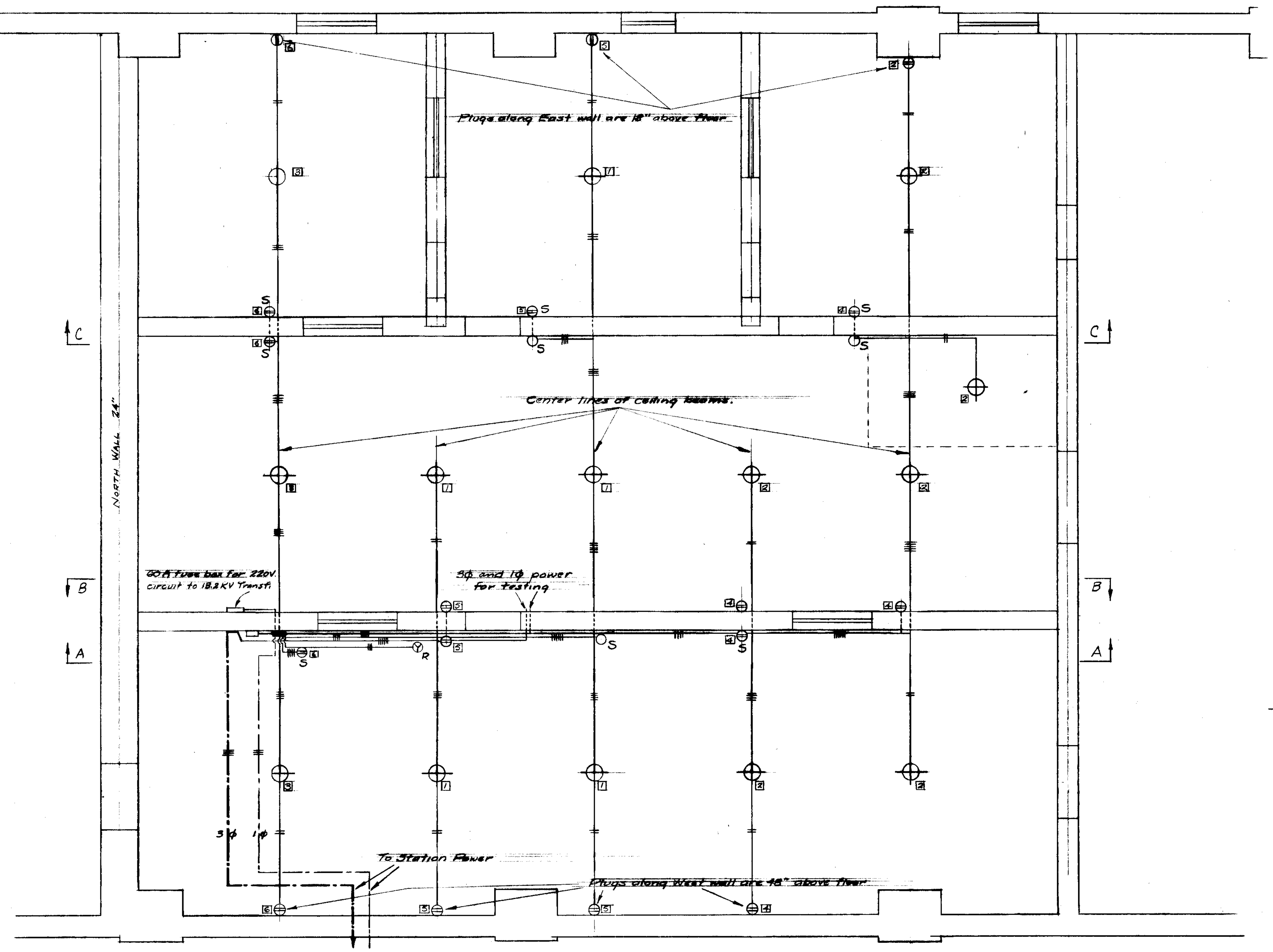
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

VAN BUREN PLANT REMODELING FOR SERVICE DEPARTMENT HEADQUARTERS

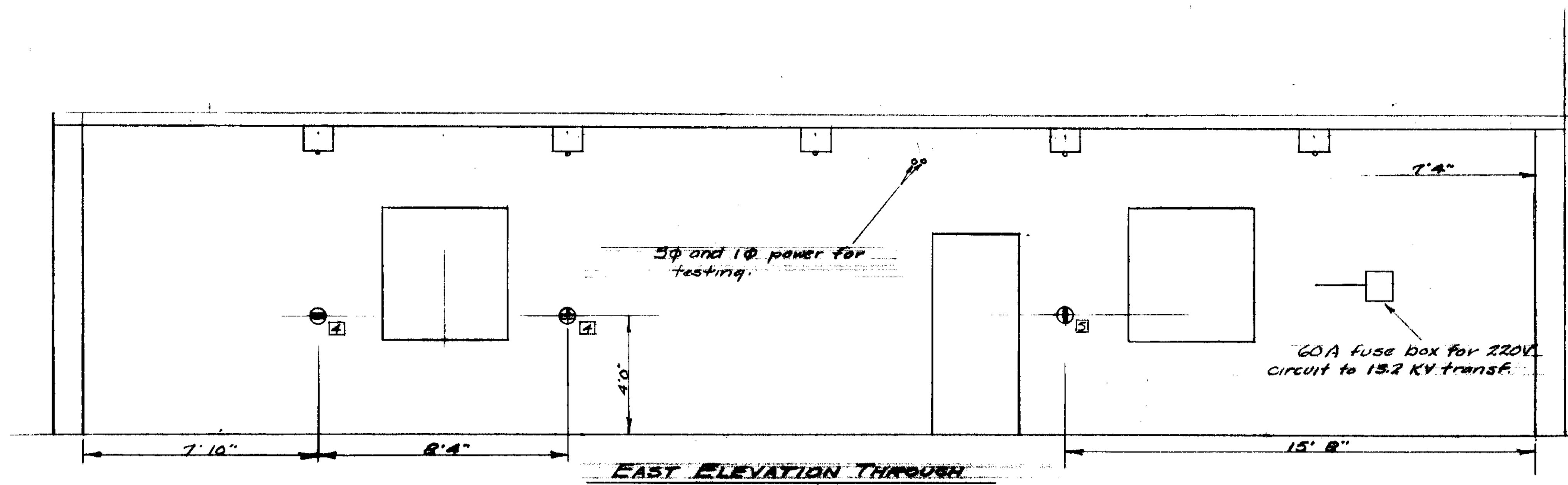
DR JSW	CK	SCALE - AS SHOWN
TR	APP	B-7058
CK	APP	
DATE 3-12-43		

DWG. No. 5973-2X

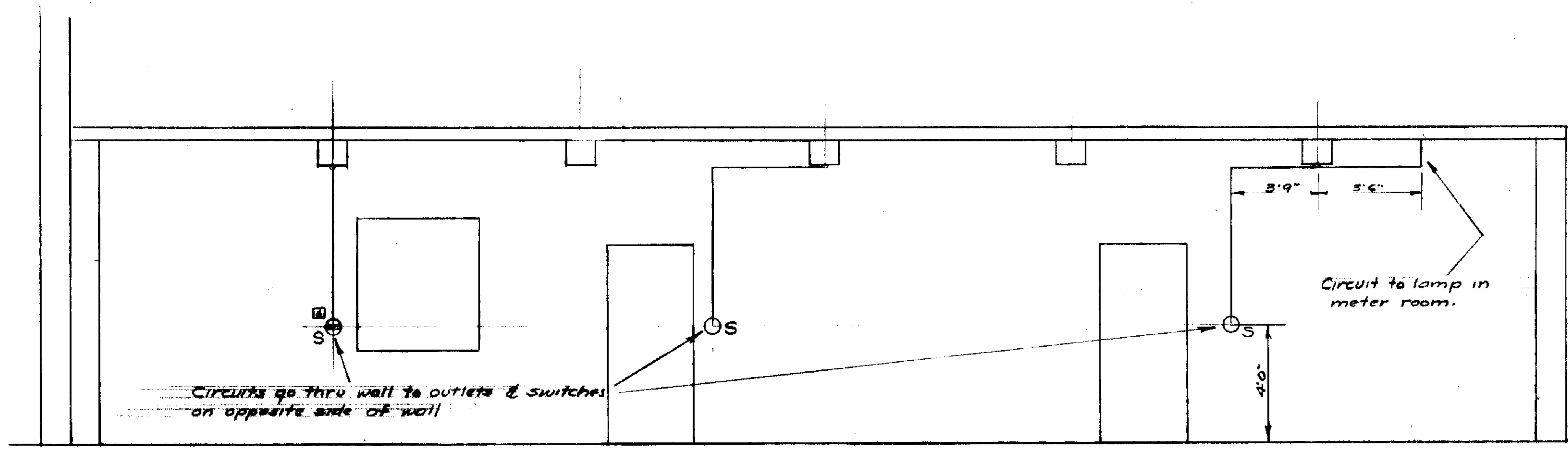
8



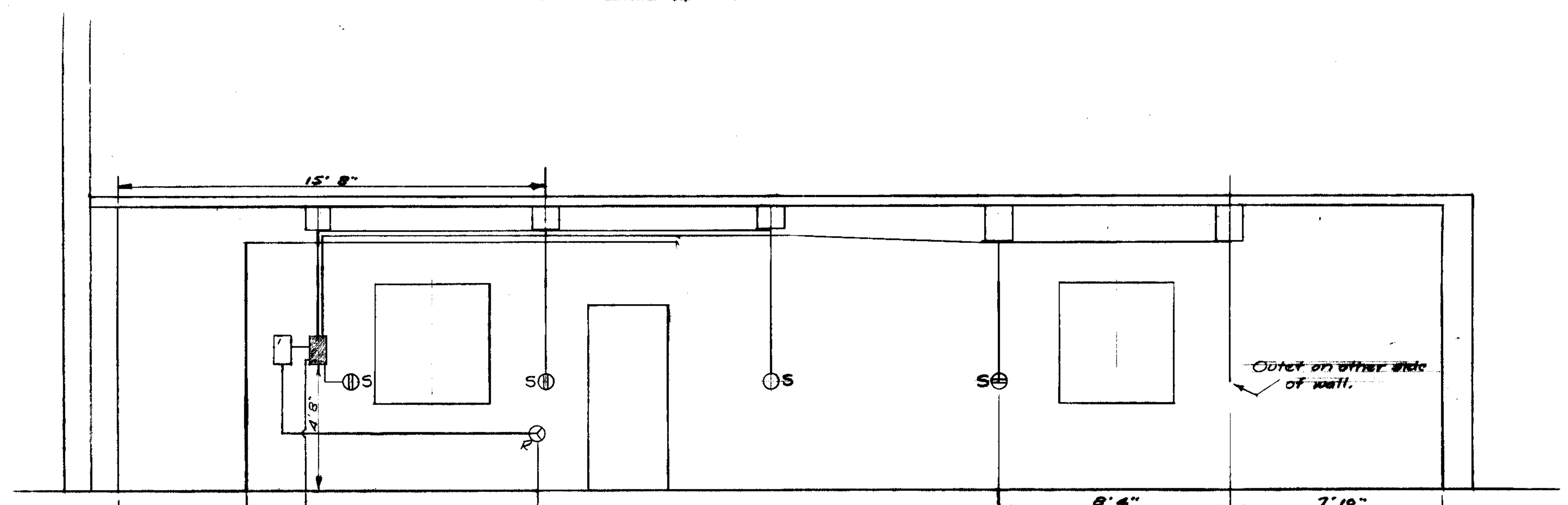
PLAN VIEW OF LIGHTING DIAGRAM FOR SERVICE DEPT. AT VAN BUREN PLANT
Scale 1/4" = 1'0"



EAST ELEVATION THROUGH
SECTION B-B



WEST ELEVATION THROUGH
SECTION C-C



WEST ELEVATION THROUGH
SECTION A-A

LEGEND

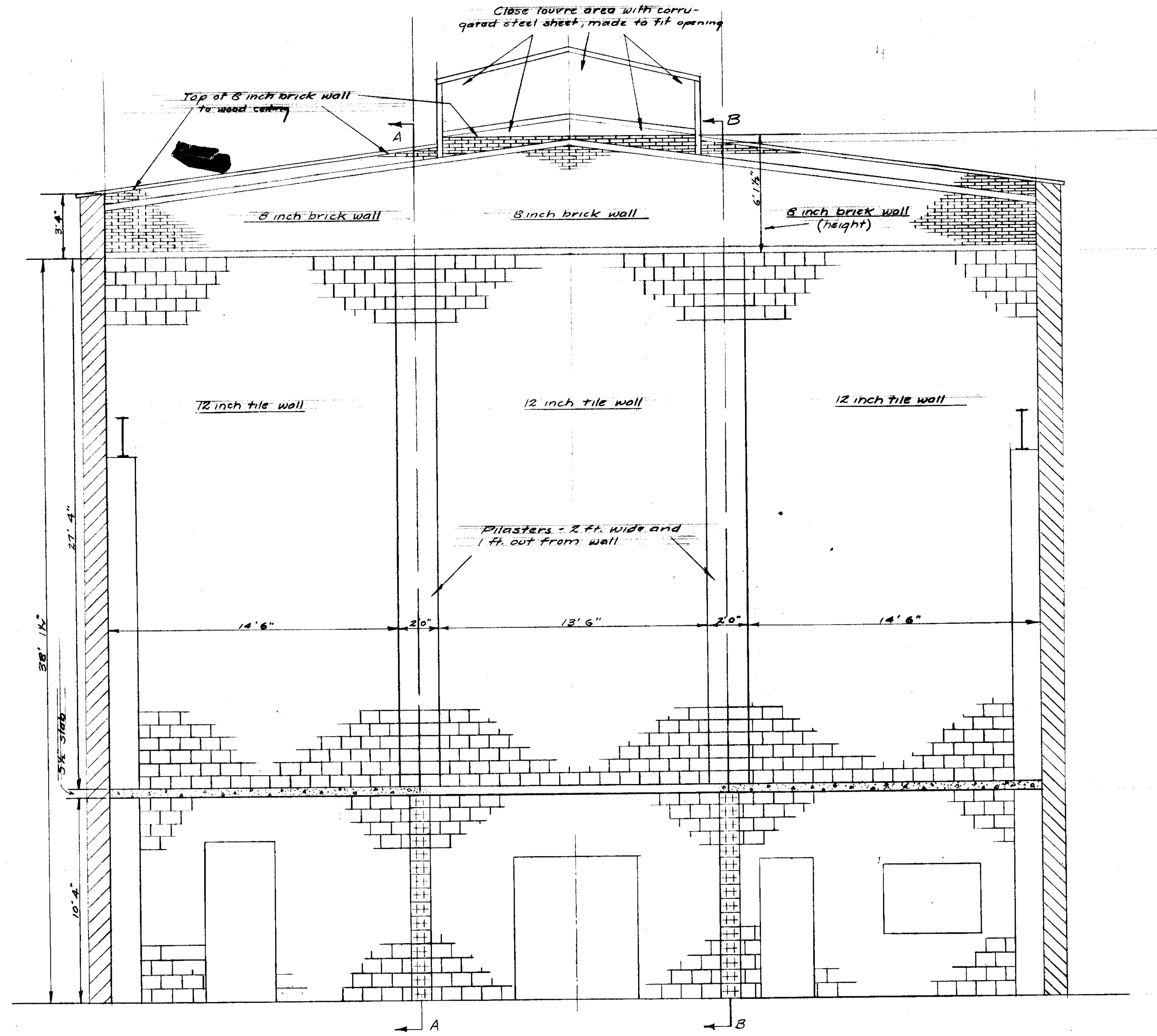
- Lamp location – 16" RLM Dome
- Convenience outlet
- S Convenience outlet and switch
- Indicates circuit number
- S Switch
- R Range outlet
- Lighting switch panel (8" x 12½" x 3¾")
- 220 volt switch panel for range

- Indicates conduits exposed
- Indicates conduits concealed in wall
- Indicates conduits concealed in floor
- Number of wires within conduit
- I L Condulet
- II Straight condulet
- III T Condulet
- IV X Condulet
- V X Condulet – bottom opening
- 4" J. box at each lamp.

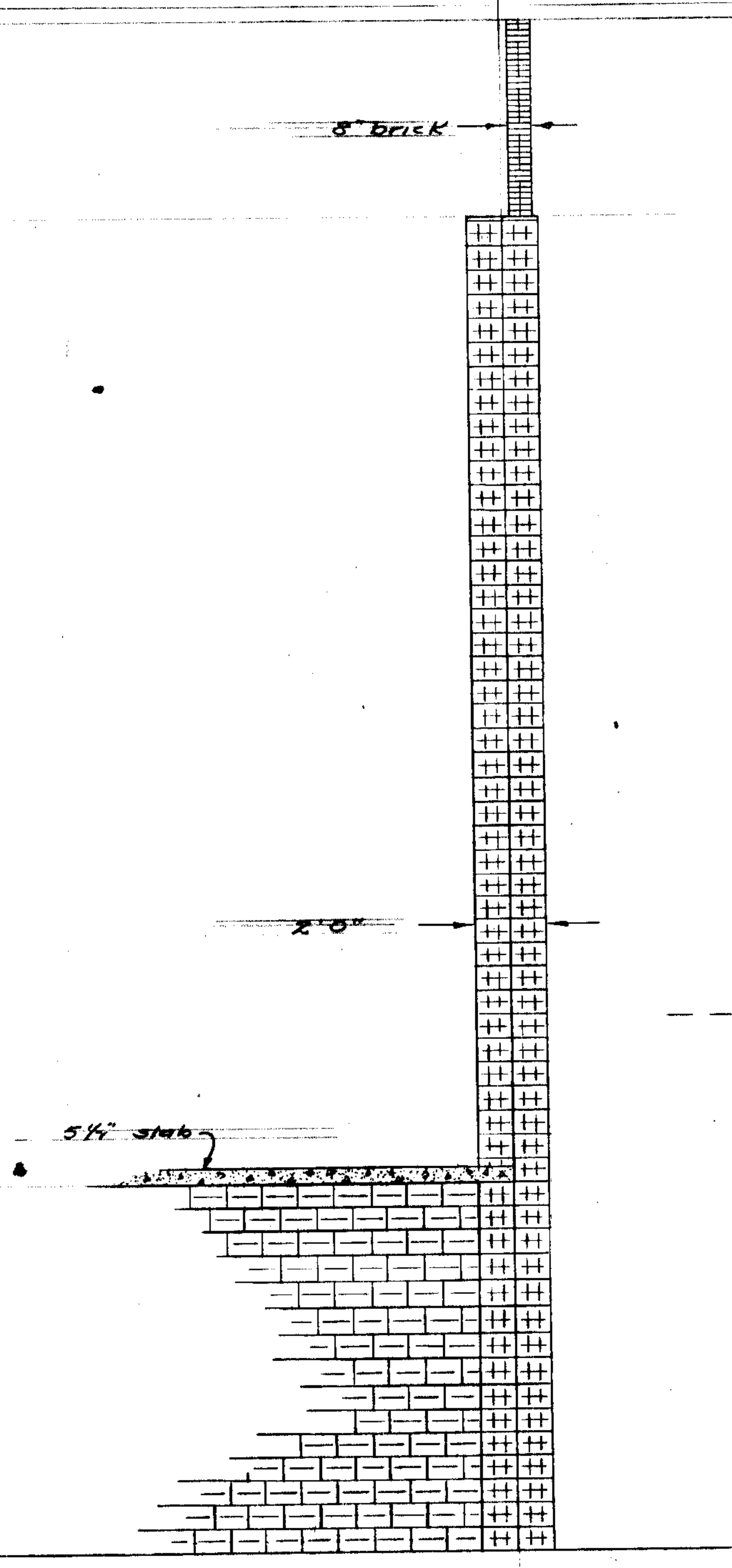
DWG_LABEL FM013393

Dwg. 5973 -

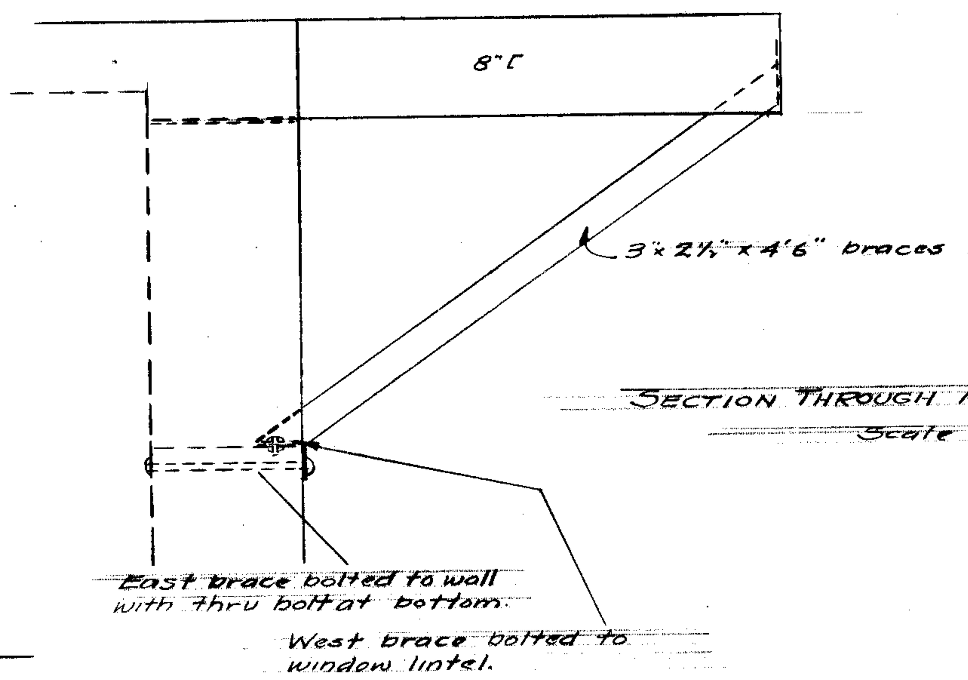
THE KANSAS POWER AND LIGHT COMPANY Topeka, Ks.		
Lighting Diagram for New Service Department Headquarters at Van Buren Plant		
Dr- Hill	CK-	Scale 1/4" : 1'0"
Tr-	CK-	D-7060
Date- March 10 1943		



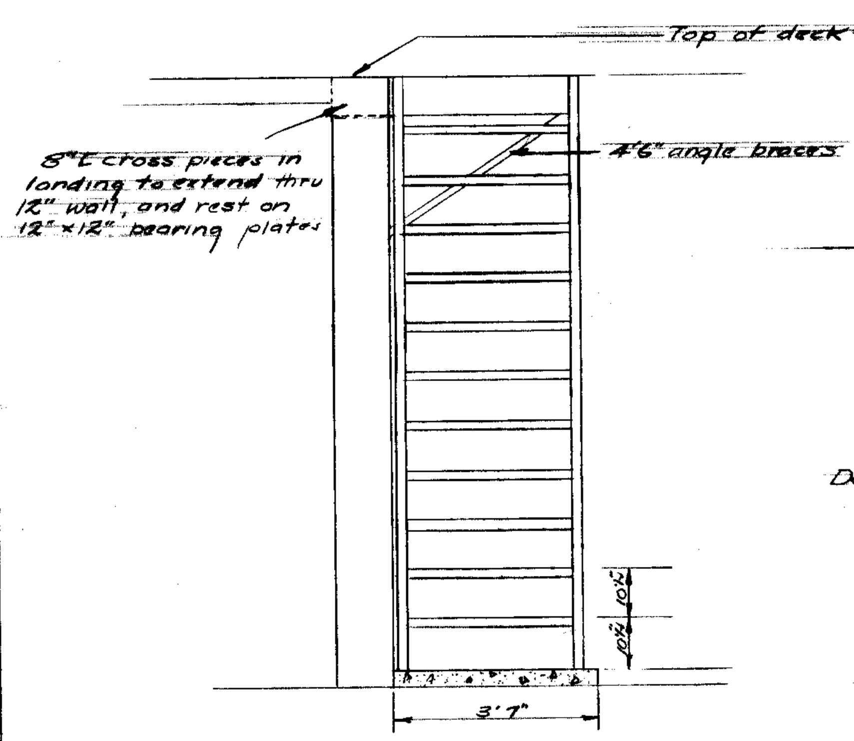
South Elevation of North Wall - Section through - Dwg. 5973-3 D-
Scale ¼" = 1'0"



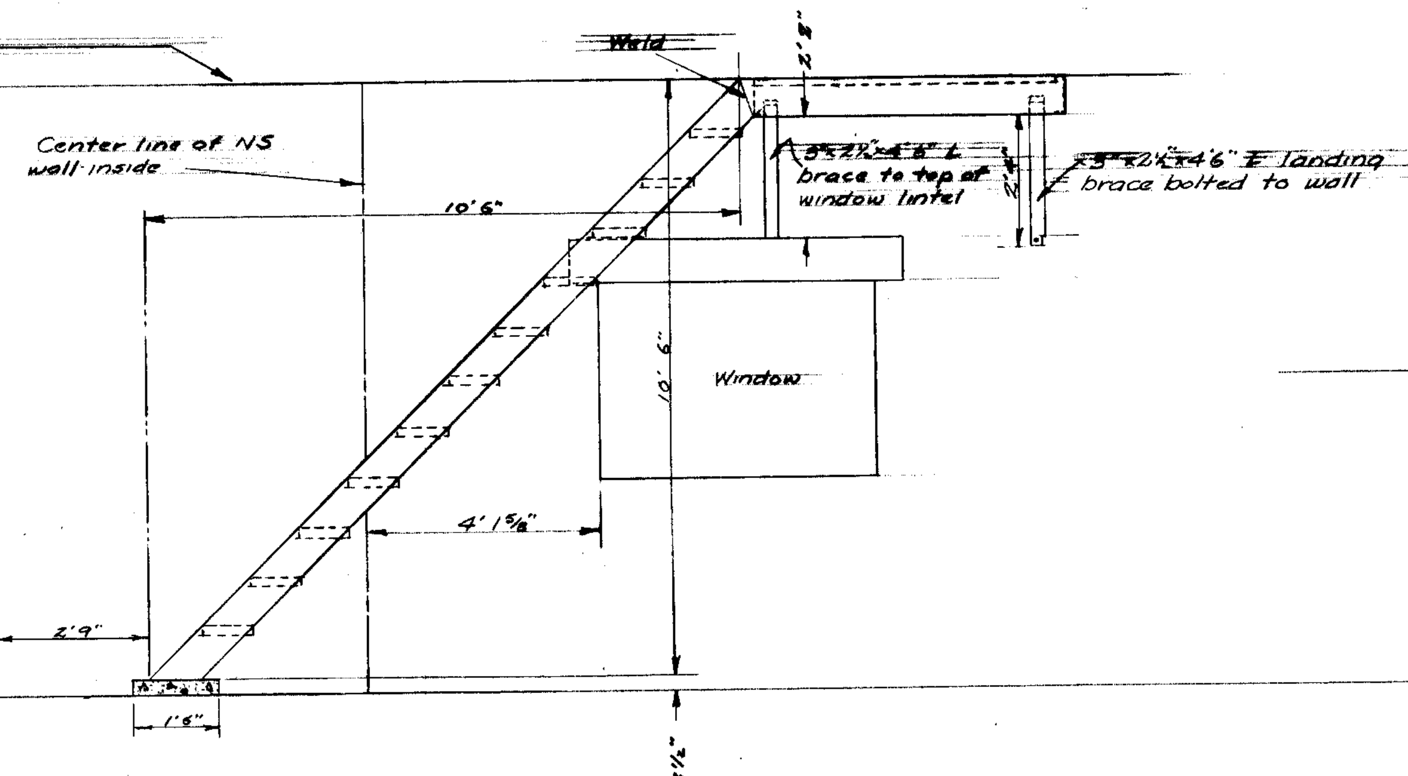
Section through "A-A" & "B-B"
Scale ¼" = 1'0"



Section through A-A - Landing Braces
Scale 1" = 1'0"

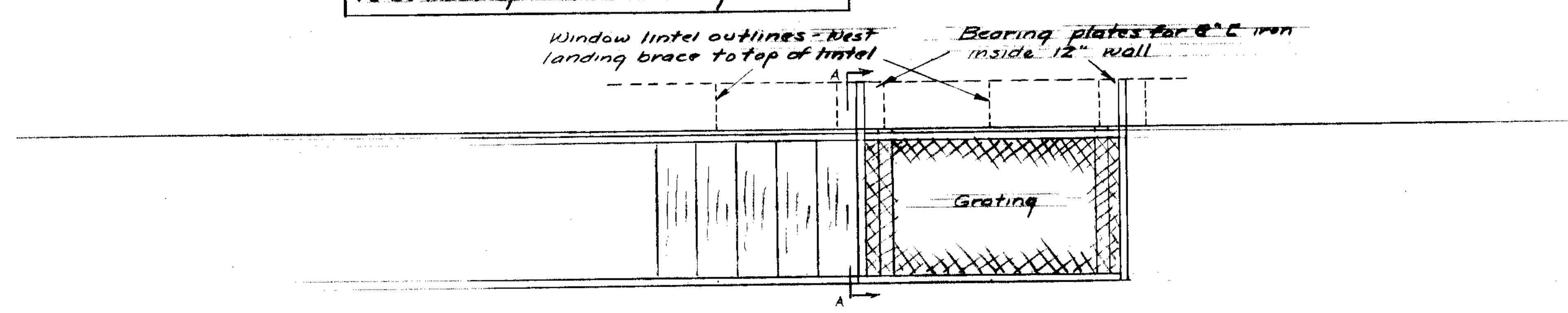


West Elevation - Stairway to Deck
Scale ⅜" = 1'0"



South Elevation - Stairway to Deck
Scale ⅜" - 1'0"

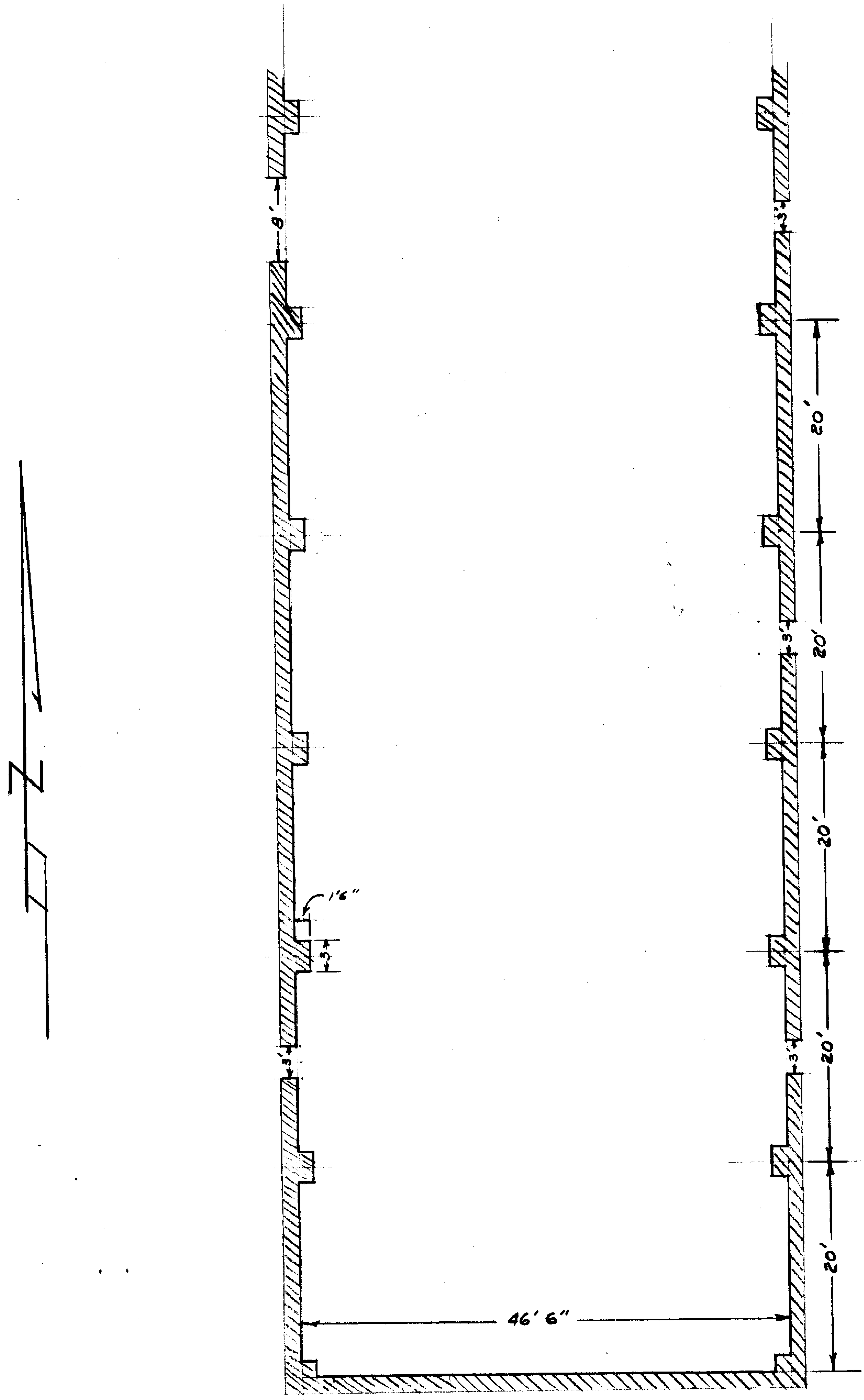
Note: Landing grate and stair-steps to be made up and installed by KPL



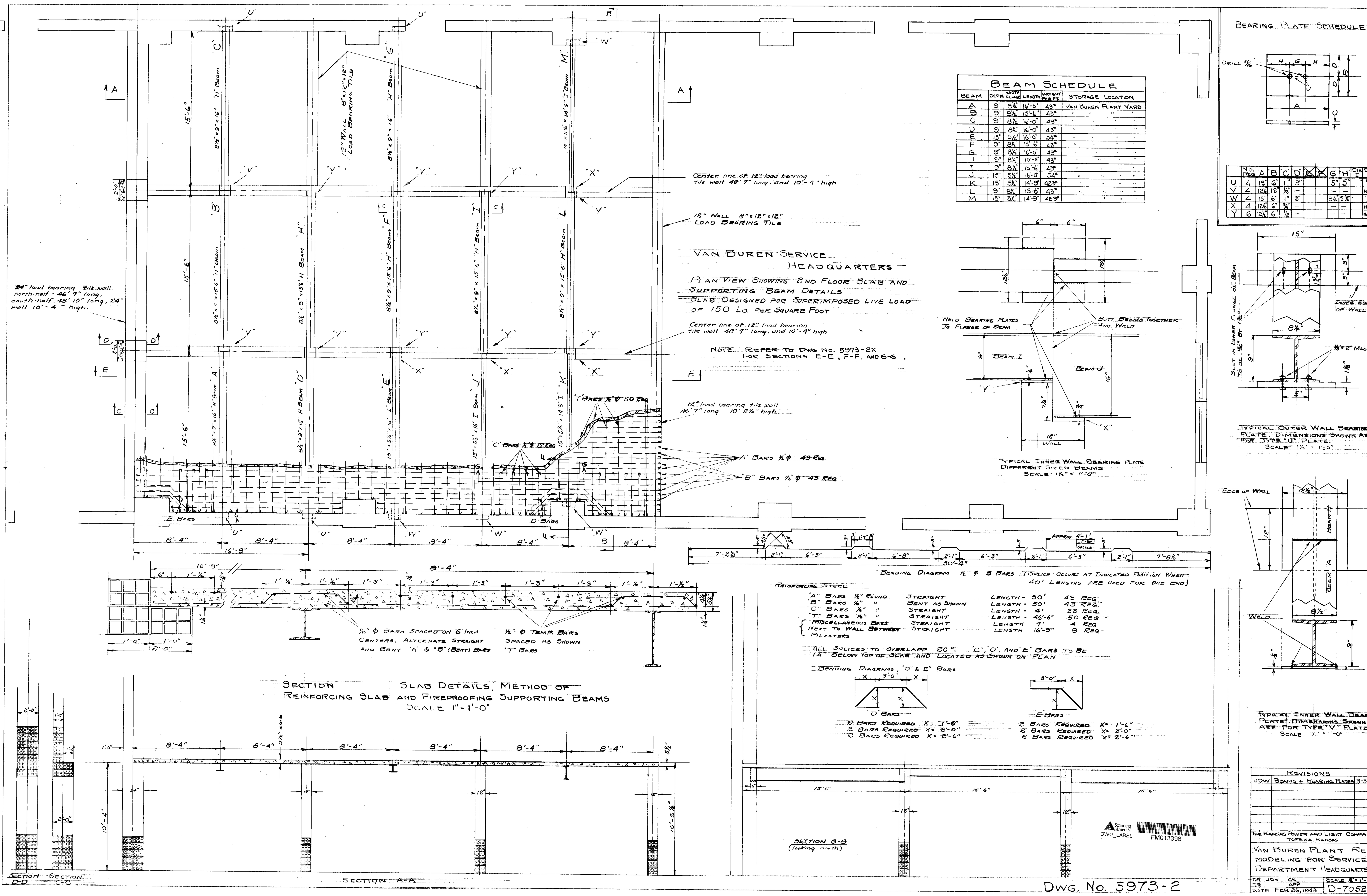
Plan - Stairway to Deck
Scale ⅜" - 1'0"

Dwg. No. 5973-4

THE KANSAS POWER AND LIGHT COMPANY		
Van Buren Plant Remodeling for Service Department Headquarters		
Dr: Hill	App:	Scale: as shown
Tr:	Ck:	D-7059
Date - March 13 1943		



THE KANSAS POWER & LIGHT CO. TOPEKA, KANSAS	DIV. NO. 1	
Van Buren Engine Room		
DR JDW	APP	Scale 1" = 10'
TR	APP	B-6984
CK		
DATE	1-28-48	



Beam Schedule					
Beam	Depth	Width Flange	Length	Weight per ft.	Storage Location
A	9"	8½"	16'-0"	43#	Van Buren Plant Yard
B	9"	8½"	15'-6"	43#	" " " "
C	9"	8½"	16'-0"	43#	" " " "
D	9"	8½"	16'-0"	43#	" " " "
E	15"	5½"	16'-0"	54#	" " " "
F	9"	8½"	15'-6"	43#	" " " "
G	9"	8½"	16'-0"	43#	" " " "
H	9"	8½"	15'-6"	43#	" " " "
I	9"	8½"	15'-6"	43#	" " " "
J	15"	5½"	16'-0"	54#	" " " "
K	15"	5½"	14'-9"	42.9#	" " " "
L	9"	8½"	15'-6"	43#	" " " "
M	15"	5½"	14'-9"	42.9#	" " " "

Bearing Plate Schedule

	No. Req	"A"	"B"	"C"	"D"	E	F	"G"	"H"	Dia I	Dia J
U	4	15"	6"	1"	3"			5"	5"	"	11/16"
V	4	12½"	12"	½"	—			—	—		None
W	4	15"	6"	1"	3"			3½"	5¾"		11/16"
X	4	12½"	6"	¾"	—			—	—		None
Y	6	12½"	6"	½"	—			—	—		None

Reinforcing Steel

"A" Bars ½" Round	Straight	Length - 50'	43 Req.
"B" Bars ½" "	Bent as Shown	Length - 50'	43 Req.
"C" Bars ½" "	Straight	Length - 4'	22 Req.
"T" Bars ½" "	Straight	Length - 46'-6"	50 Req
Miscellaneous Bars	Straight	Length 7'	4 Req
Next to Wall Between Pilasters	Straight	Length 16'-9"	8 Req

All Splices to Overlapp 20". "C", "D", and "E" Bars to Be 1¼" Below Top of Slab and Located as Shown on Plan

Bending Diagrams, "D" & "E" Bars

"D" Bars	"E" Bars
2 Bars Required X = 1'-6"	2 Bars Required X = 1'-6"
2 Bars Required X = 2'-0"	2 Bars Required X = 2'-0"
2 Bars Required X = 2'-6"	2 Bars Required X = 2'-6"

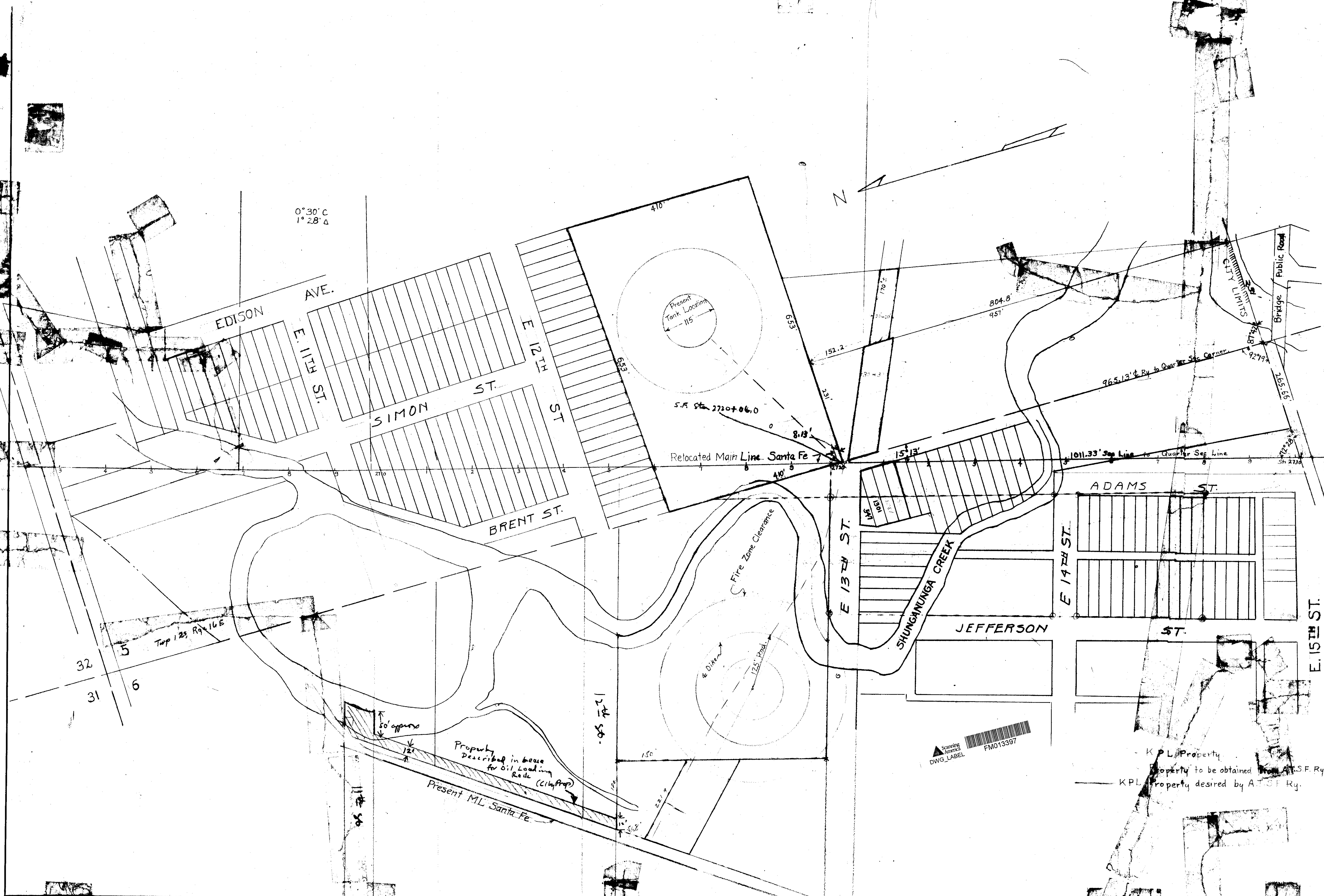
Revisions		
JDW	Beams + Bearing Plates	3-31-43

The Kansas Power and Light Company
Topeka, Kansas

Van Buren Plant Remodeling for Service Department Headquarters

DR JDW CK
TR APP
Date Feb. 26, 1943
Scale ¼" = 1'-0"
D-7052

Dwg. No. 5973-2



KPL Property
Property to be obtained from A.T.S.F. Ry.
KPL Property desired by A.T.S.F. Ry.

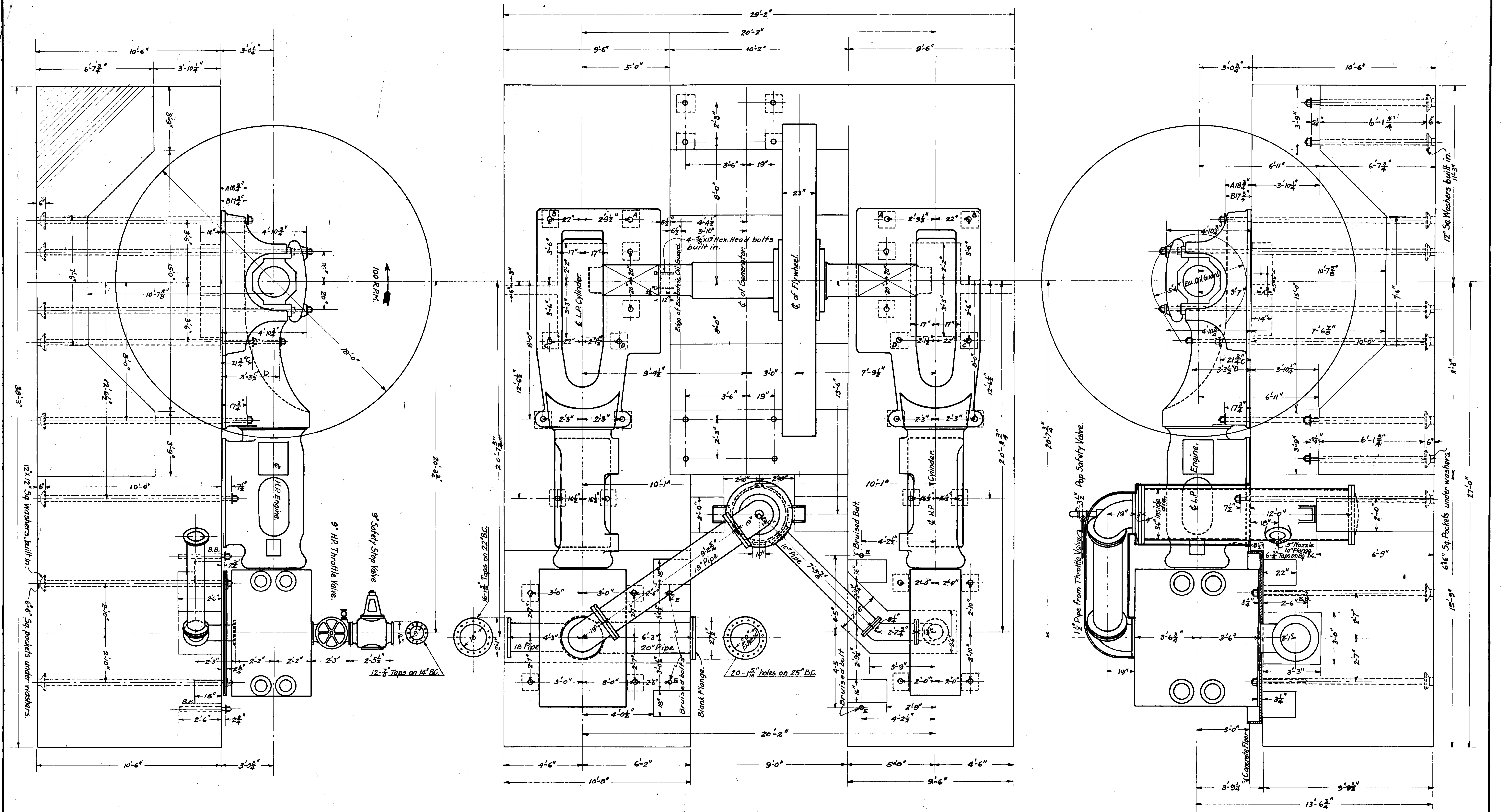
No.	REVISION	BY	DATE

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

NEW LOCATION FOR FUEL OIL STORAGE TANK-CAUSED BY SANTE FE CHANGES

DR.	CH.	SCALE
TR.	O.K.	
	APP.	D-


STATION BATTERY
USL-60 CELL TYPE JSF-13
120 AMP HR
12'-4 3/4"
23'-6"
43'-9"
3-#10-SBRC 600V. 3/4" COND.
2-#10 SBRC 600V. 3/4" COND.
2-4/0 DBRC 600V. 2" COND.
For Emergency Lights
Run service to lighting
cabinets for Engine Room
and Boiler Room and
install 2 pole D.T. Switches.
PLAN
SCALE 1/4" = 1'-0"
DC PANEL
OPERATING
BUS.
125 V. DC. OPER. BUS
FOR DC. SWITCHING.
125 V. DC. OPER. BUS
FOR AC SWITCHING.
SCHEMATIC WIRING DIAGRAM.
CR 2810-1854-D2
42A
ALL OTHER HOLES 9/32
ALL HOLES .201 UNLESS OTHERWISE SPECIFIED.
CR 2800-1132-D1.
72A.
RELAY CR 2824 TC-121C
49A
REAR VIEW AUTOMATIC CONTROL PANEL
SCALE 3" = 1'-0"
Safety Sw.
42A
49A
72A
RHEO.
Motor
Gen.
SCHEME OF CONTROL WIRING.
BATTERY
OPER. BUS.
EM. LIGHTS
GENERATOR
Normally Open.
TIE SWITCH.
RHEOSTAT.
GEN. FIELD.
CONTROL PANEL FRONT
CONTROL PANEL REAR.
SCALE 1" = 1'-0"
REFERENCE G.E.C. PRINTS.
KK 3848257
K 2844480
K-2844431
L-2699021
K-2183213
DWG_LABEL
FM013398
No. | REVISION | BY | DATE
1 | Control Panel & Wiring. | B.S.C. | 4/19/32
2 | Ammeter Switches | " | "
THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
BATTERY CHARGING M-G. SET.
AT VAN BUREN PLANT.
DR. B.S.C.
CH.
SCALE AS SHOWN.
TR.
O. K.
APP.
APP.
DATE March 31 1932
D-6236
GALLUP, K. C. MO.



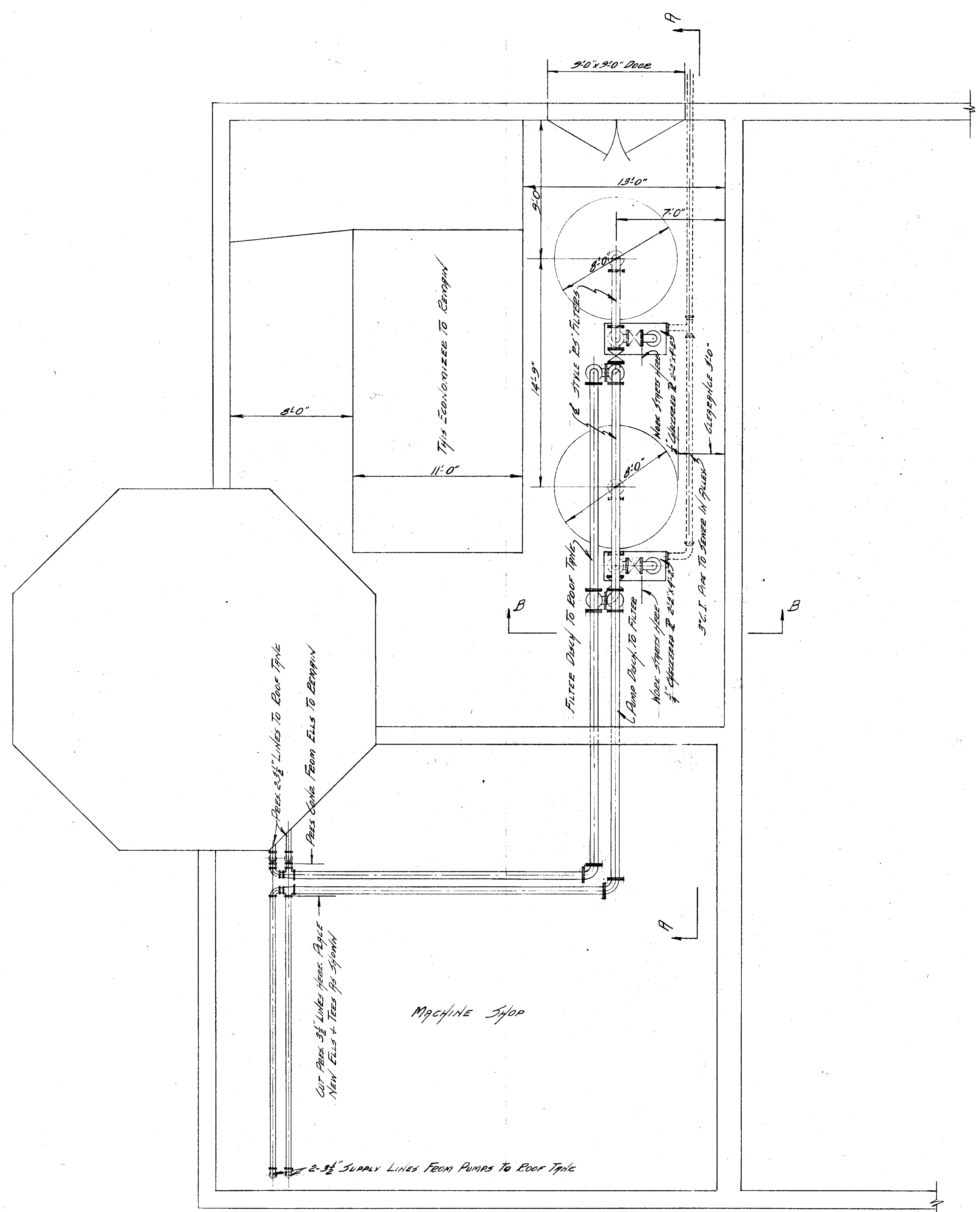
3/4" Has been allowed between metal & masonry for joint.
All engine foundation bolts are 2" dia. 3 1/4" well casing, except bolts marked "E" = 1 1/4".
All generator " " " 2" " . 3 1/4" " " .

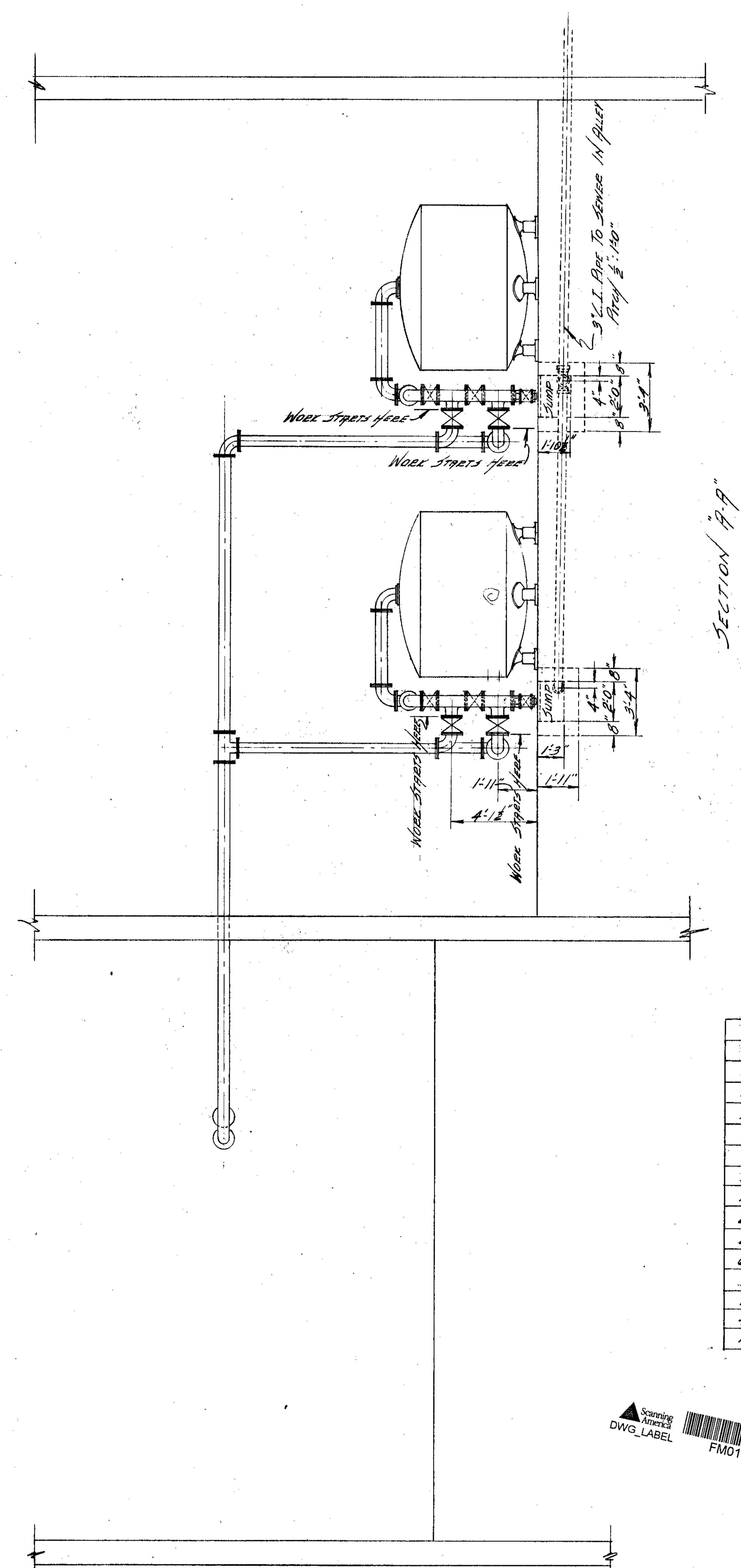
NOTE:- This drawing is simply a copy of Allis Chalmers drawing #76, dated 5-17-06. For working drawing of Foundation for Topeka installation see I.T.S. dwg. #1485. For Steam and Exhaust Piping for Topeka installation see I.T.S. dwg. 1556.

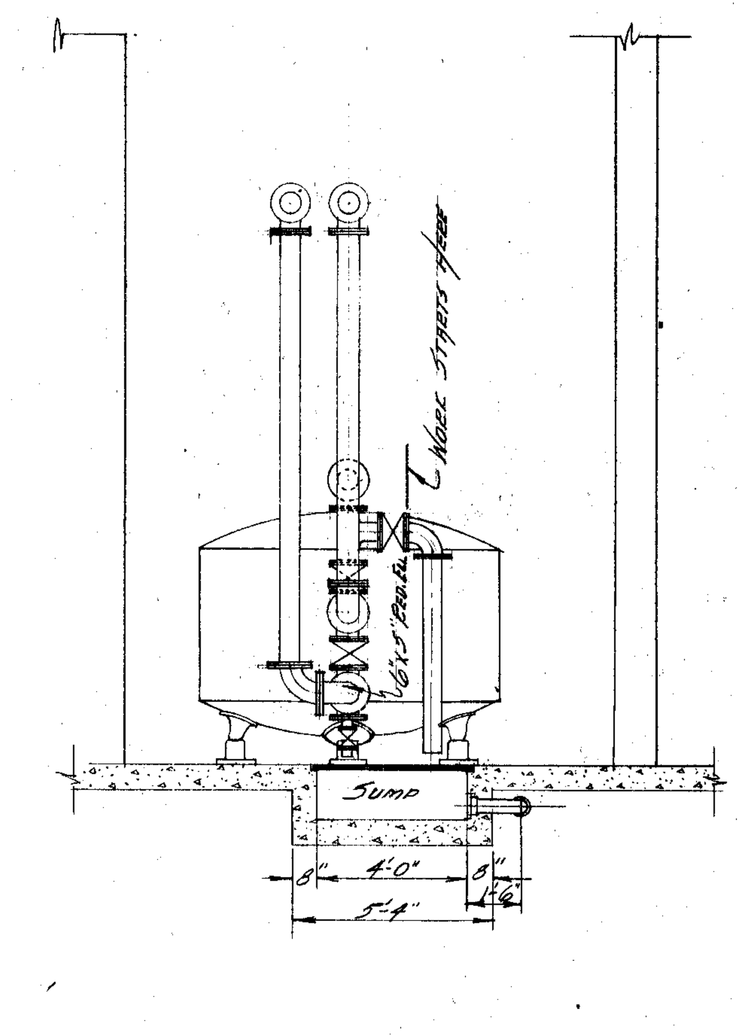
ALLIS CHALMERS 28"-50"-48" HEAVY DUTY CROSS COMPOUND ENGINE.
CROCKER WHEELER 1250 K.W., 60 CYCLE, 100 R.P.M., A.C. GENERATOR.

ILLINOIS POWER & LIGHT CORPORATION CHICAGO	
TOPEKA POWER STATION	
TOPEKA EDISON CO.	TOPEKA KANSAS
DR. TR. CH. O.K.	SCALE CONT. NO. SHEET NO. C-18522

Topeka
39 A
8-1







Section "B-B"

Material List
2-3½" Std. C.I Screwed Ells
2-6"x3½"x3½" Std. C.I Screwed Tees
4-3½"x6" Nipples
9-6" Std. C.I. Flanged Ells F.+D.
1-6"x6"x6" Std. C.I. Flanged Tee F.+D.
2-6"x5" Std. C.I Flanged Reducing Ells F.+D.
2-6" Std. O.S.+Y. Gate Valves F+D.
14-6"x11" Std. C.I. Screwed Flanges
20-6" Rain Bow Ring Gaskets
200-¾"x3¼" Bolts + Nuts-2½" Thread
6-20'-0" Lengths 6" Pipe
2-3" C.I. B.+S. Ells
1-3" C.I. B.+S. "Y"
45'-0"-3" C.I B.+S. Pipe
1# Red Lead. 25# Soldering Lead. 5# Oakum

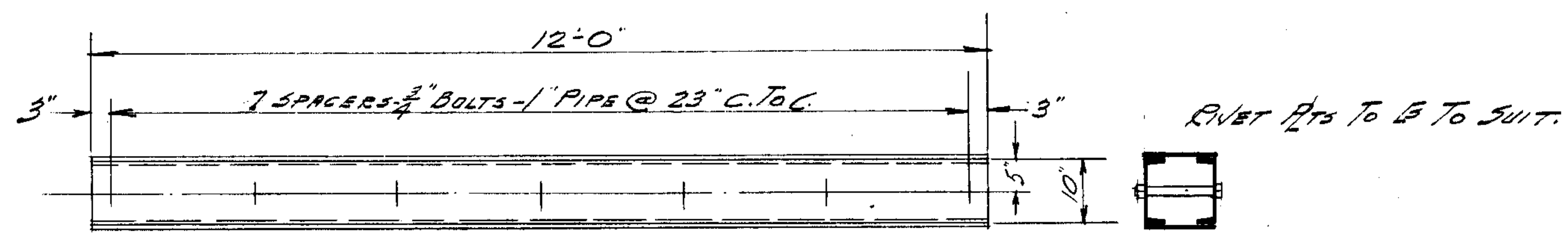
No.	Revision	By	Date

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

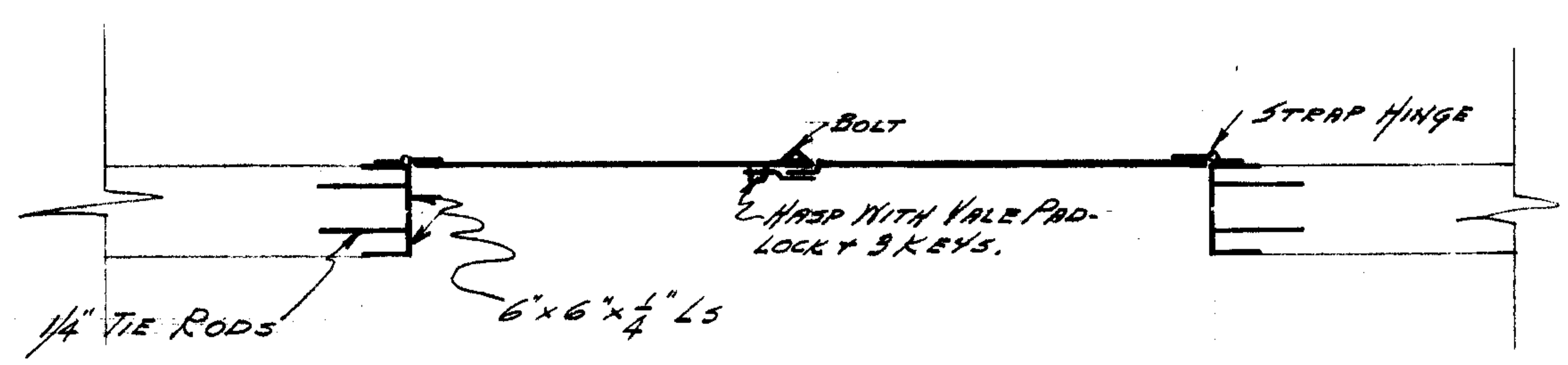
Van Buren Plant
Lay Out For Filters

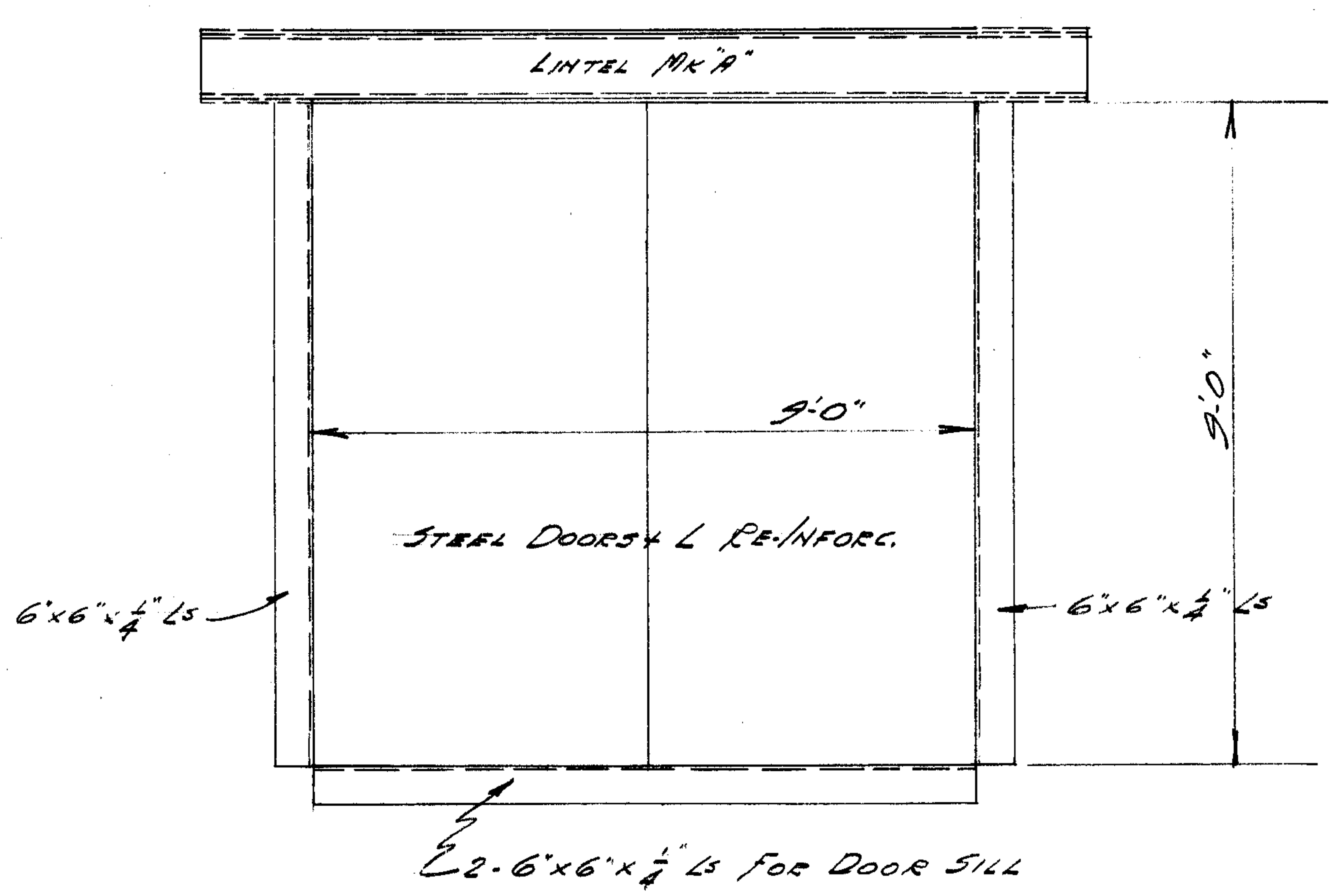
Dr. W.J.C.	Ch.	Scale ¼"=1'-0"
Tr.	O.K.	D-5969-A
App.	App.	
Date May 27, 1930		

GALLUP, K.C. MO.



DOOR LINTEL MK. A
2-10" @ 15.3# [s 12'-0" LONG
2- 1/4" x 12" PLTS. 12'-0" LONG
7- 1" x 11 1/2" PIPE SPACERS
7- 3/4" x 13" SQ. H/D BOLTS + NUTS.





DOOR ELEVATION

NO.	REVISION	BY	DATE

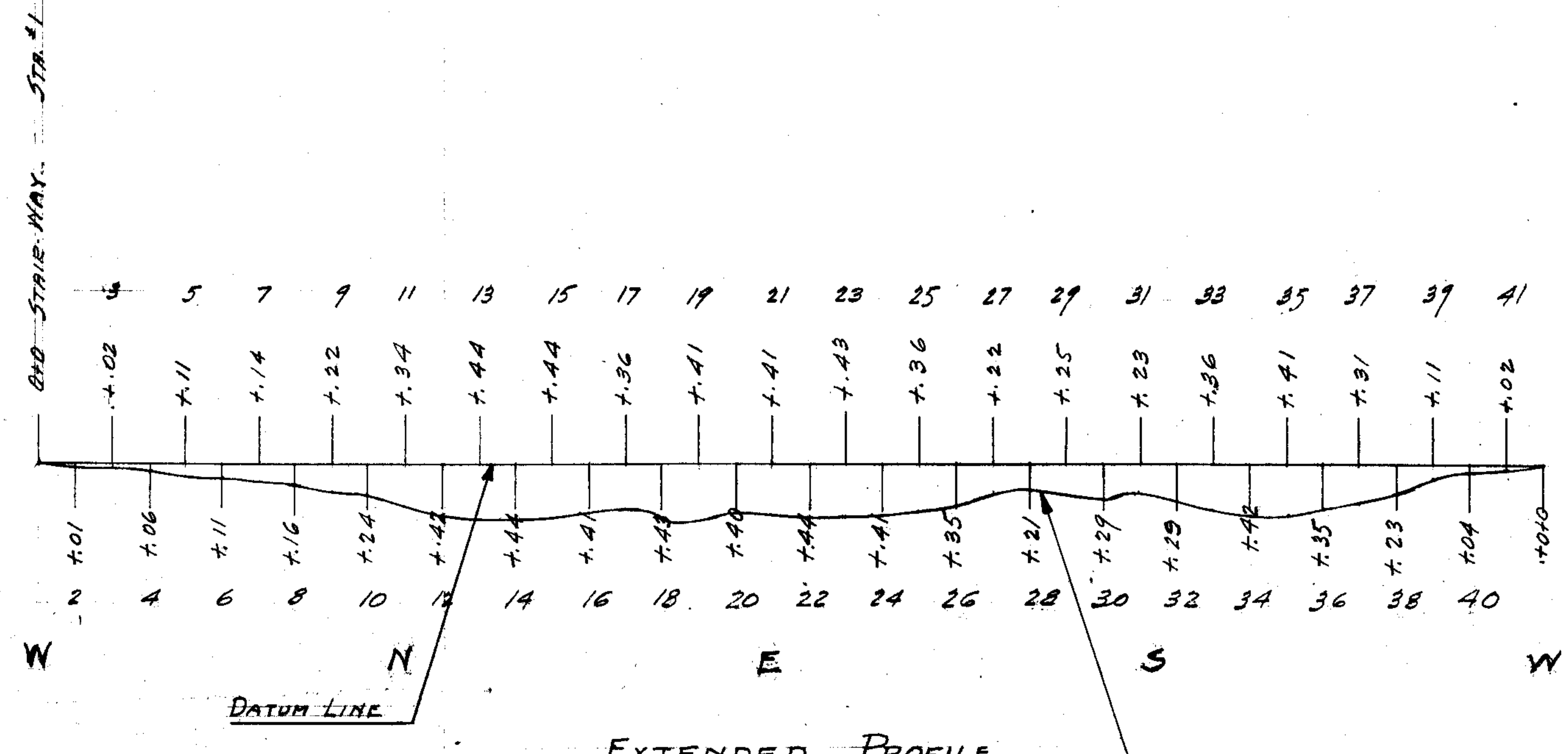
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

VAN BUREN PLANT
DOOR + LINTEL FOR FILTER ROOM

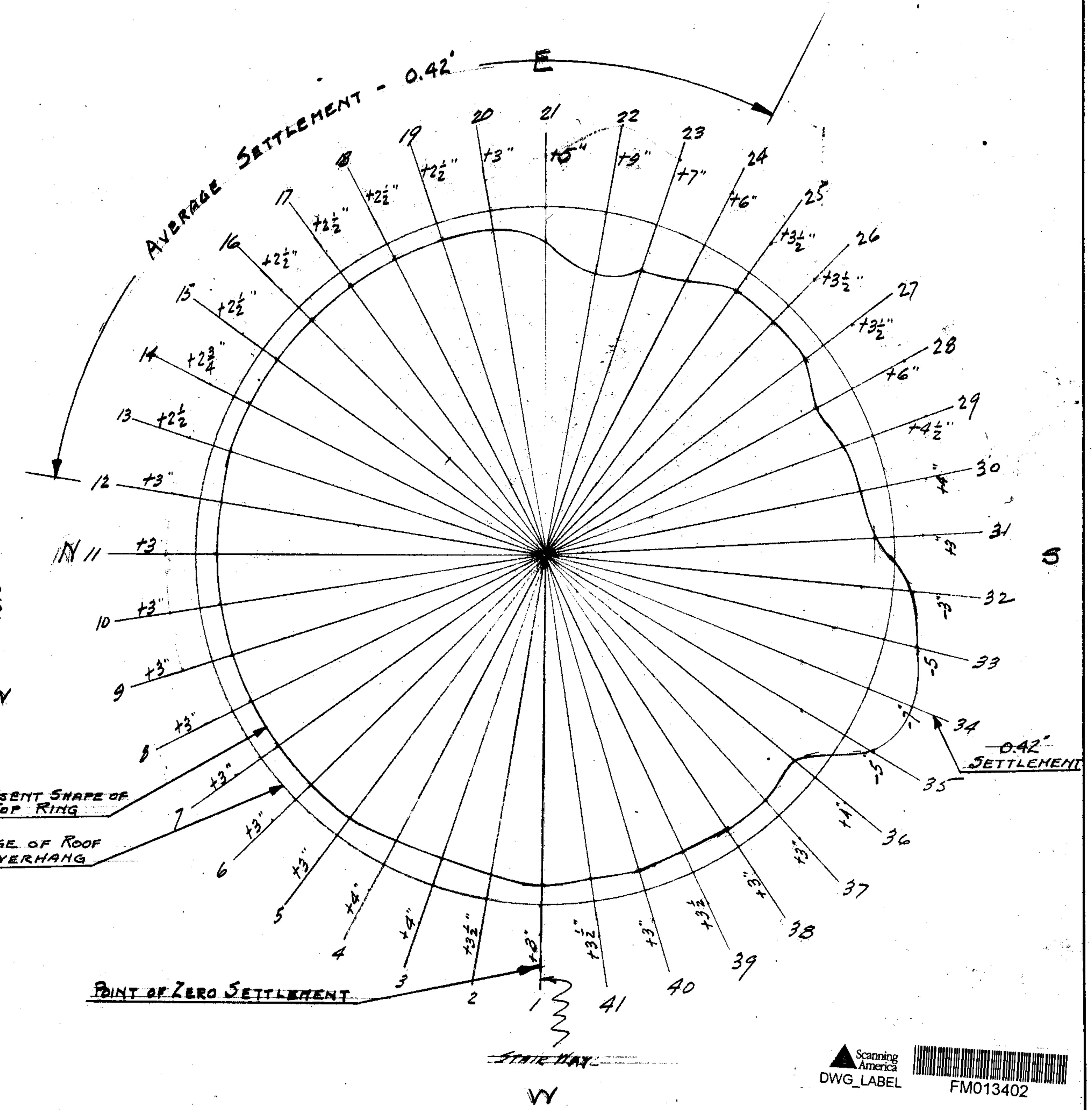
DR. T.E.McL.	CH.	SCALE 1/2" = 1'-0"
TR.	OK.	C-5993
APP.	APP.	
DATE 7/7/30		

2

GALLUP—K. C., MO.



EXTENDED PROFILE OF BOTTOM RING



DWG_LABEL FM013402

NO.	REVISION	BY	DATE

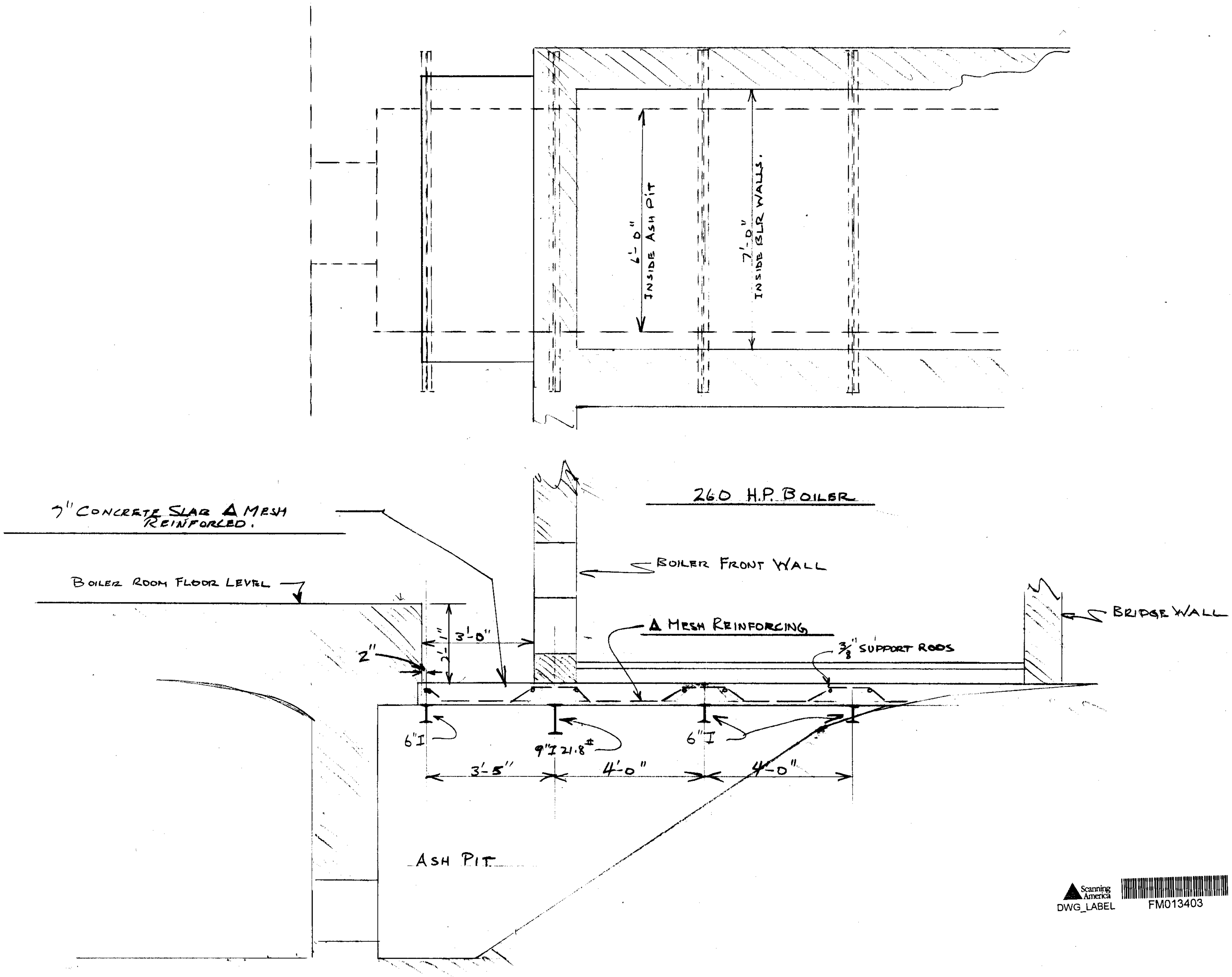
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

ELEVATIONS OF BOTT. SEAM + ROOF CO-ORDINATION OF OIL TANK VAN BUREN PLANT

DR. TEMC[illegible]	CH.	SCALE NONE
TR.	OK.	C-6098
APP. [illegible]	APP.	
DATE 7/23/30		

5770

GALLUP—K C., MO.

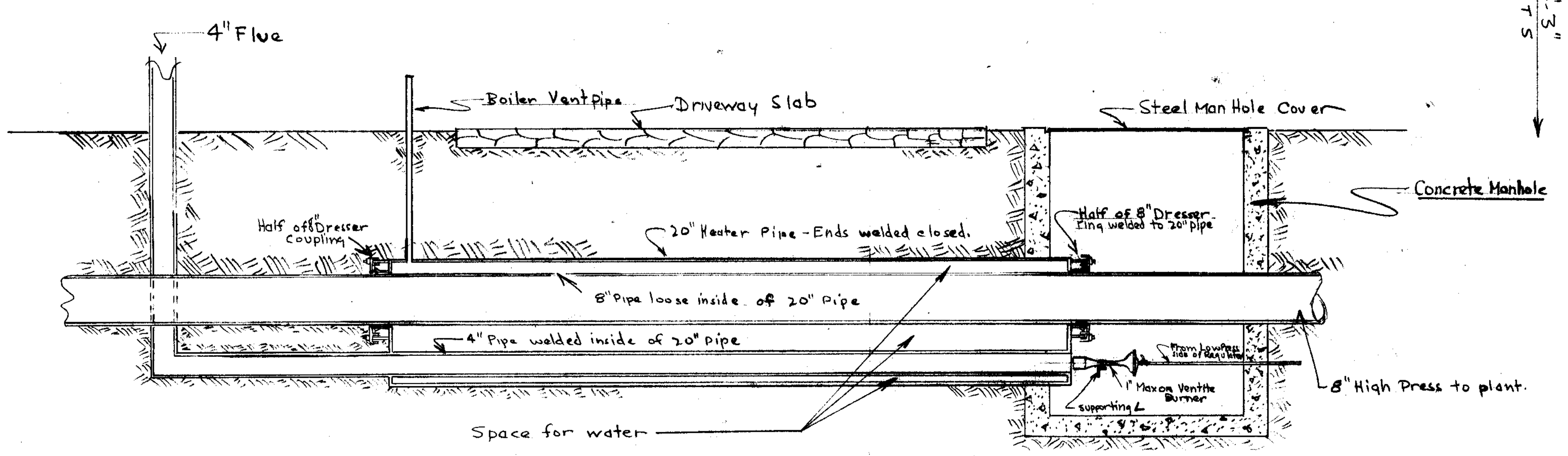


NO.	REVISION	BY	DATE

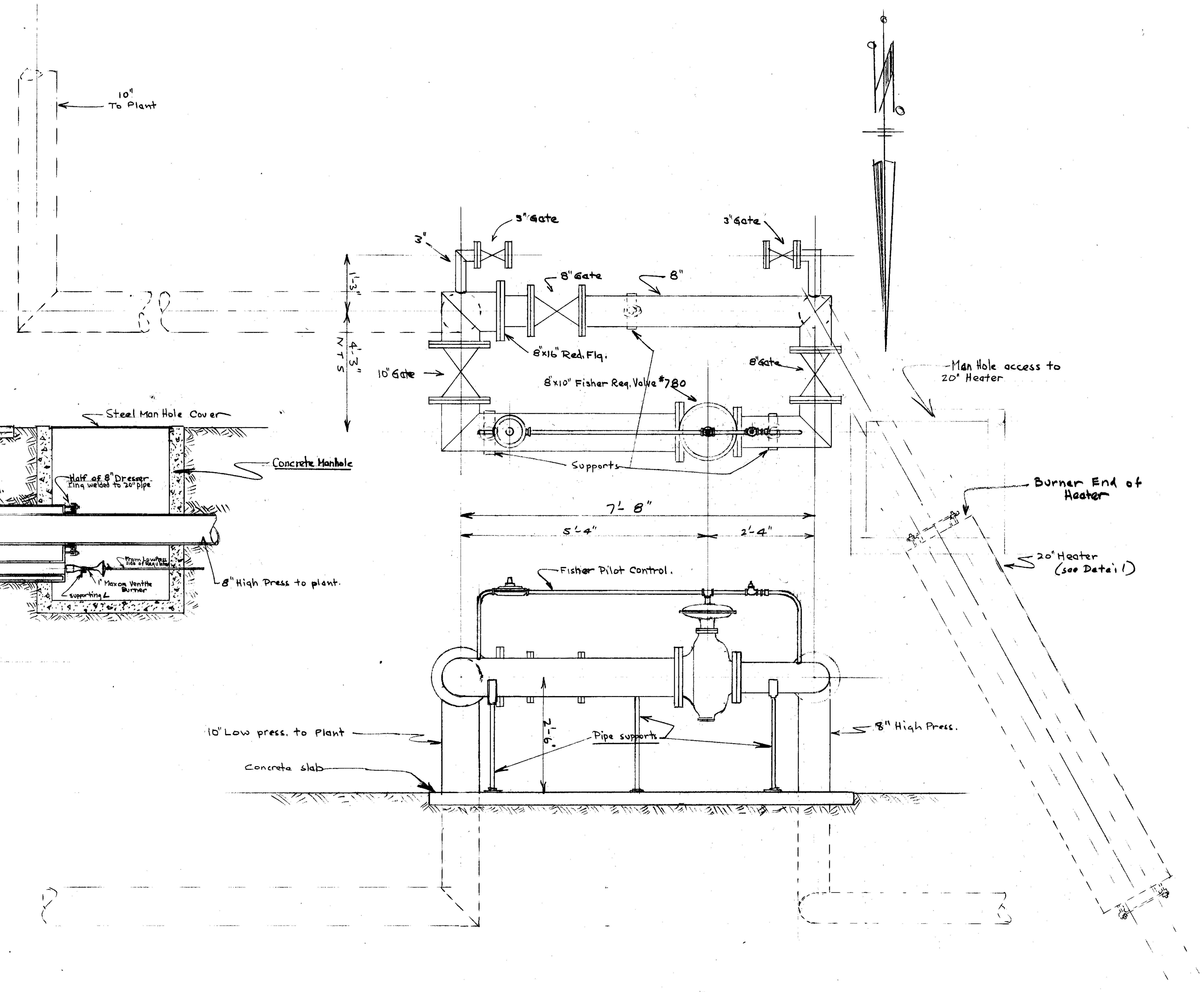
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

DETAIL OF BOILER FLOOR CONSTRUCTION ON 260 H.P. BOILERS VAN BUREN POWER STATION.

DR.	CH.	SCALE 1/2" = 1'-0"
TR.	OK.	C-6203
APP.	APP.	
DATE 12-9-31		



SECTION LOOKING EAST
DETAIL OF PIPE HEATER
SCALE 3/4"=1'-0"



DETAIL OF PRESSURE REGULATOR INSTALLATION
SCALE 3/4"=1'-0"

DWG_LABEL FM013404

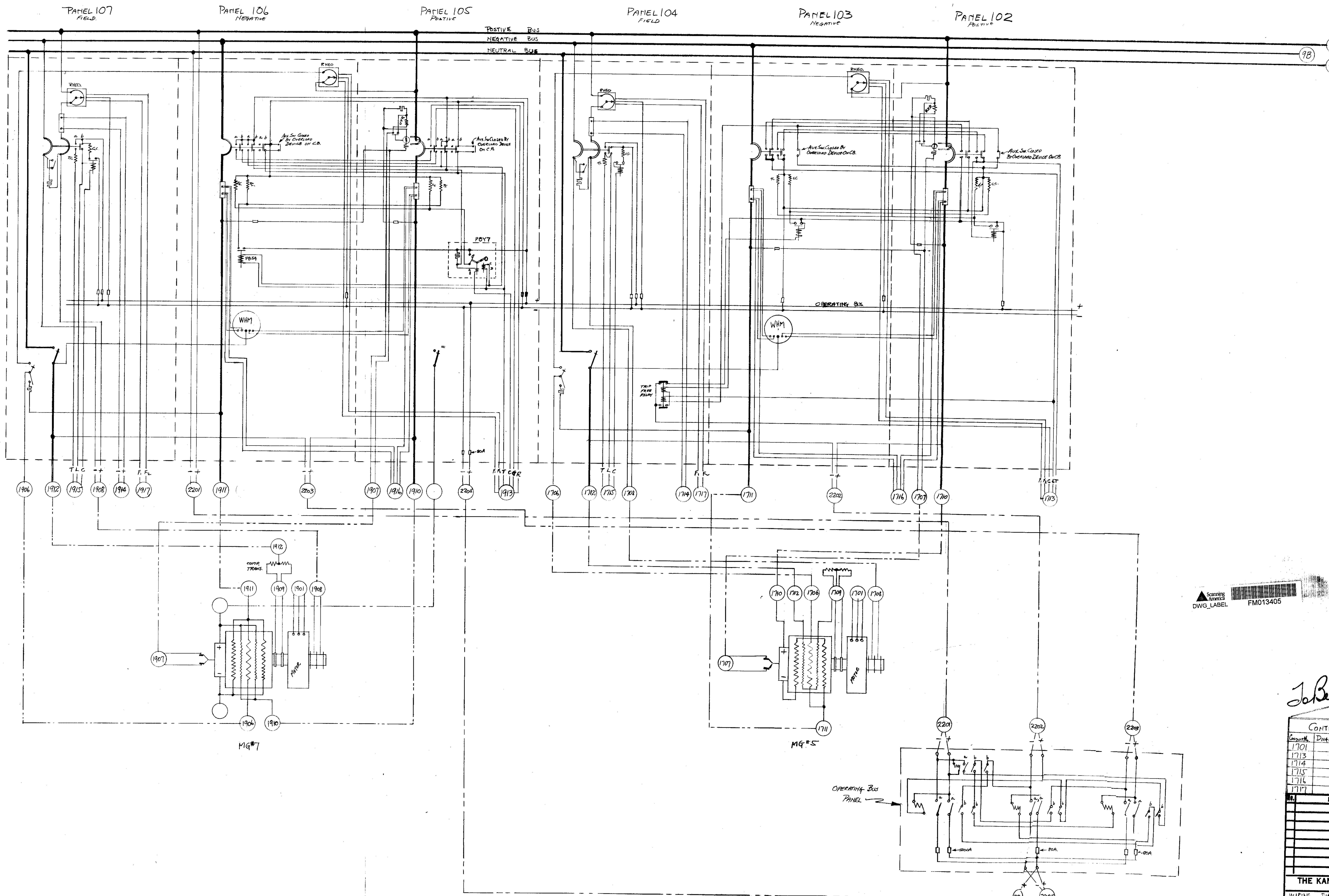
No.	REVISION	BY	DATE

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

DETAILS OF REGULATOR AND HEATER STATION AT VAN BUREN PLANT - GAS LINE TO BOILERS

DR. OKG	CH.	SCALE 3/4"=1'-0"
TR.	O. K.	D-6202
APP.	APP.	
DATE 11-25-31		

GALLUP, K. C. MO.



To Be Corrected

Continuation of Conduits

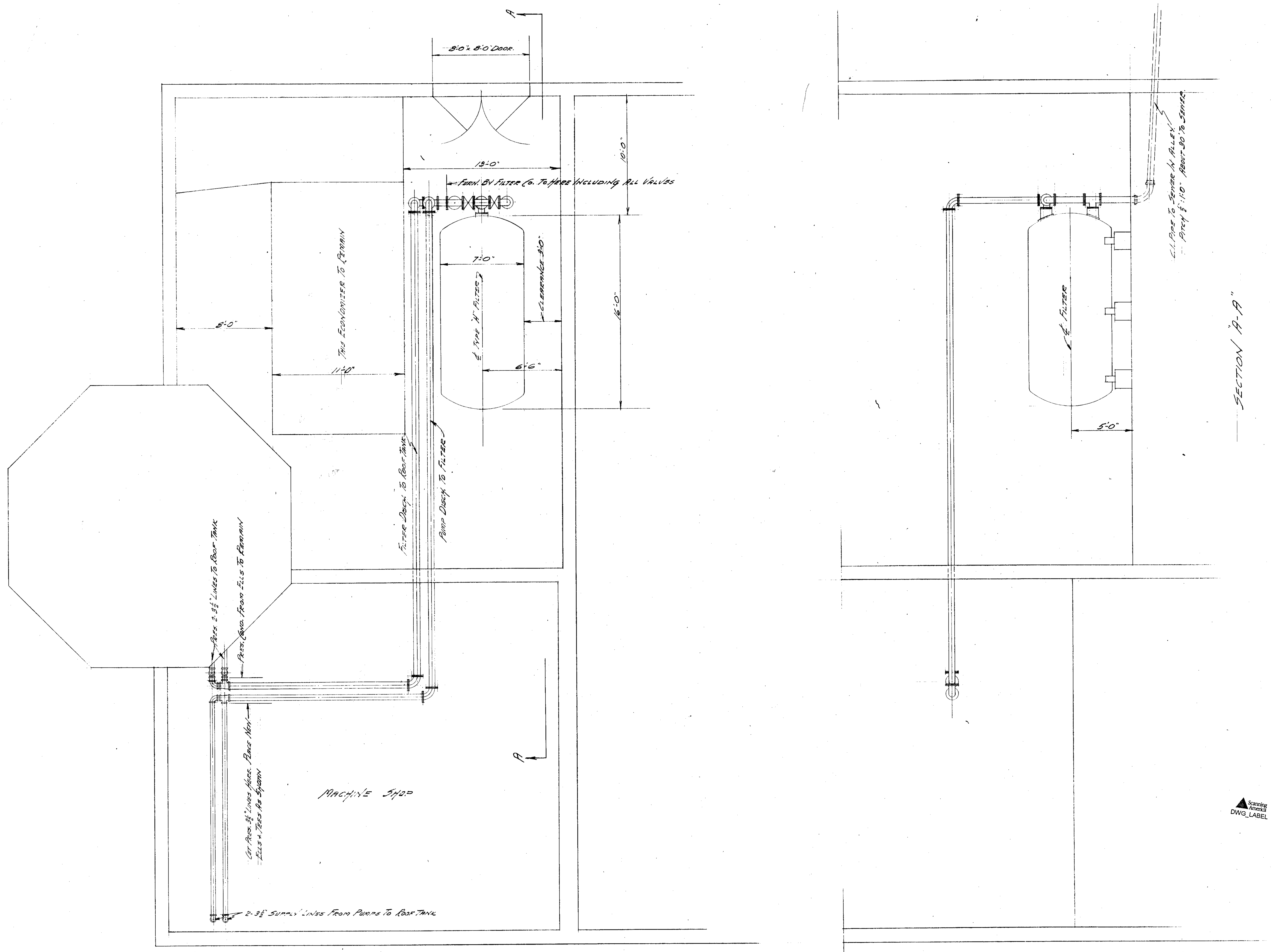
Conduit No.	Dwg.	Conduit	Dwg	Conduit	Dwg
1701		1901		2205	
1713		1913			
1714		1914			
1715		1915			
1716		1916			
1717		1917			

No.	Revision	By	Date

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

WIRING DIAGRAM —
PANELS 101, 102, 103 104, 105, 106, 107

Dr. F. Gstart	Ch.	Scale	
Tr.	O. K.	D-5747	
App.	App.		
Date Oct. 10-1929			



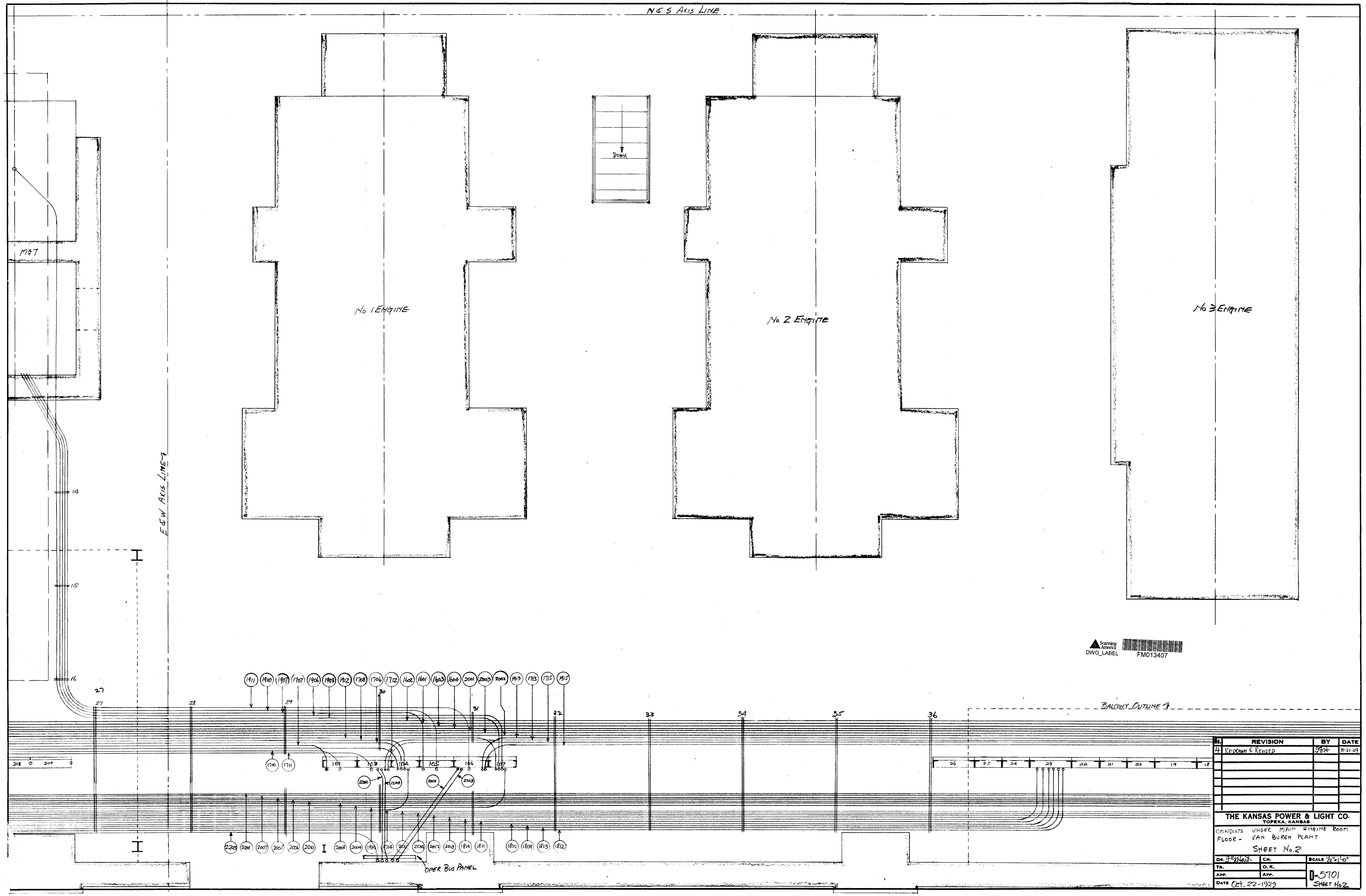
No.	REVISION	BY	DATE

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

Van Buren Plant

Tentative Layout For Filter

DR. T.E.Mc.	CH.	SCALE 1/4" = 1'-0"
TR.	O. K.	D-5969-B
APP. [signature]	APP.	
DATE May 6-1930		



No.	REVISION	BY	DATE
4	Redrawn & Revised	F.G.H.	10-22-29

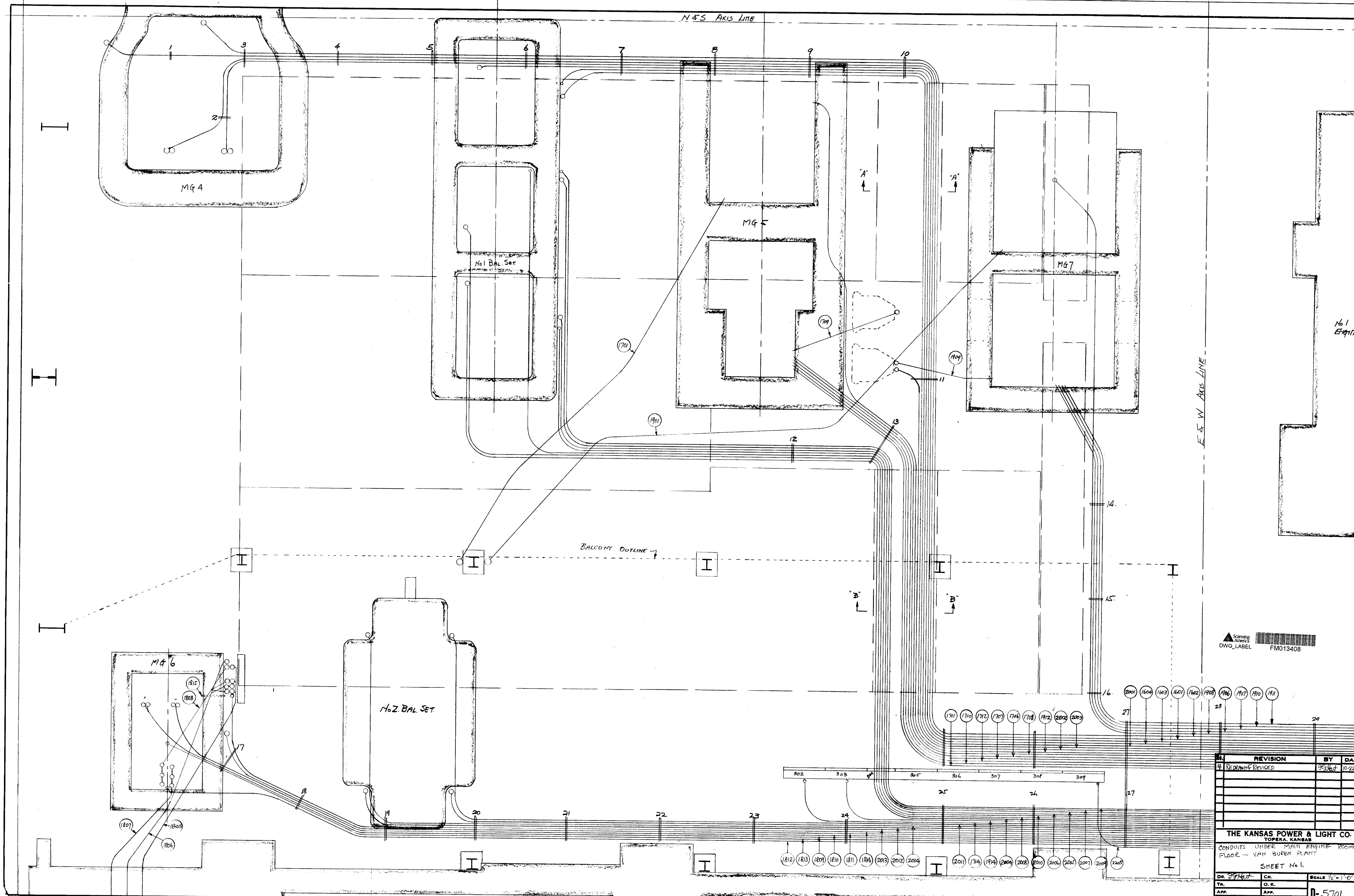
THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

CONDUITS UNDER MAIN ENGINE ROOM FLOOR - VAN BUREN PLANT

SHEET No. 2

DR. F.G. Hart	CH.	SCALE 1/2"=1'-0"
TR.	O. K.	D-5701
APP.	APP.	
DATE Oct. 22-1929		SHEET No 2

2



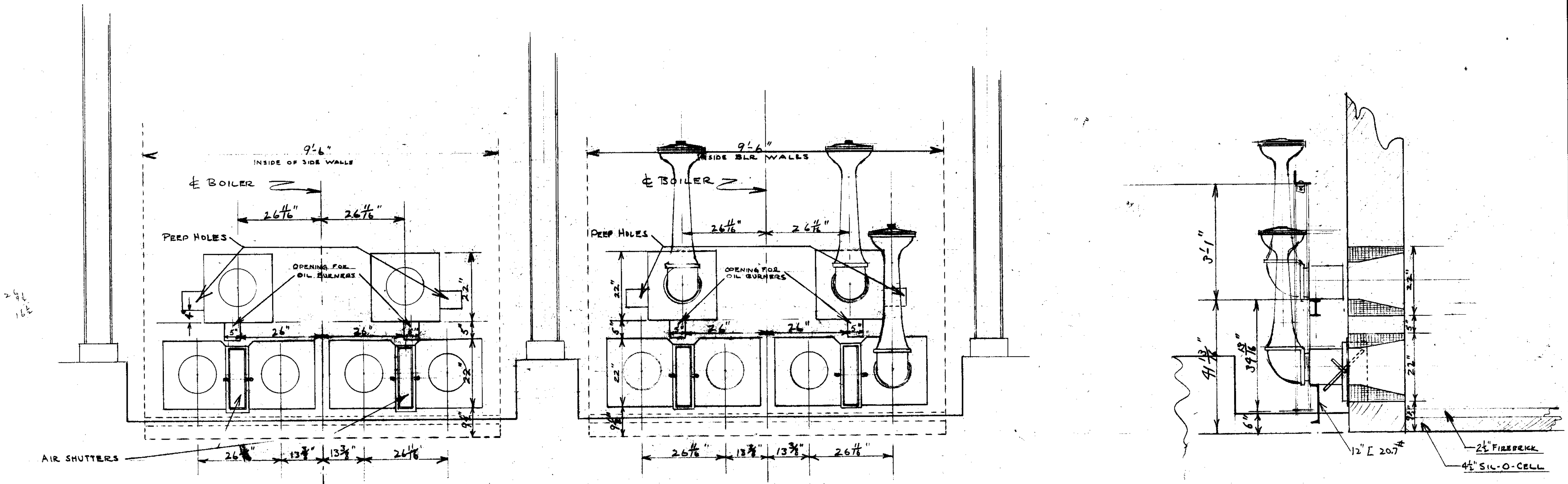
NO.	REVISION	BY	DATE
4	REDRAWN & REVISED	F. G. Hart	10-22-29

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

CONDUITS UNDER MAIN ENGINE ROOM FLOOR — VAN BUREN PLANT

SHEET No 1.

DR. F. G. Hart	CH.	SCALE 1/2" = 1'-0"
TR.	O. K.	D-5701 SHEET No 1
APP.	APP.	
DATE Oct 22-1929		



FRONT ELEVATION

SECTION THRU SIDE

DETAIL OF FRONT WALL ARRANGEMENT
300 H.P. BOILERS

DWG_LABEL FM013409

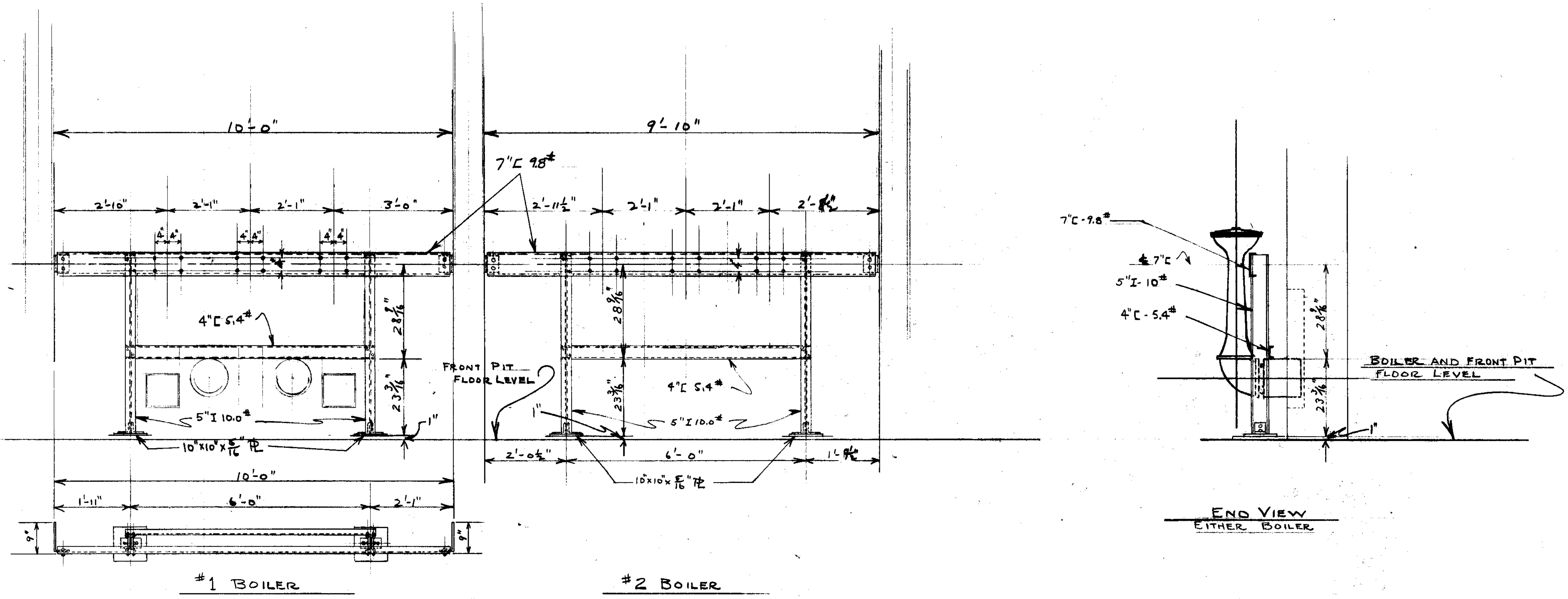
NO.	REVISION	BY	DATE
1	Ch'd location of peep holes and Lowered Blr. Floor	OKJ	12-18-31

THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

ARRANGEMENT OF GAS BURNERS ON 300 H.P. BOILERS
VAN BUREN ST. PLANT

DR. OKJ	CH.	SCALE 1/2" = 1'-0"
TR.	OK.	
APP.	APP.	C-6205
DATE 12-14-31		

GALLUP—K C., MO.

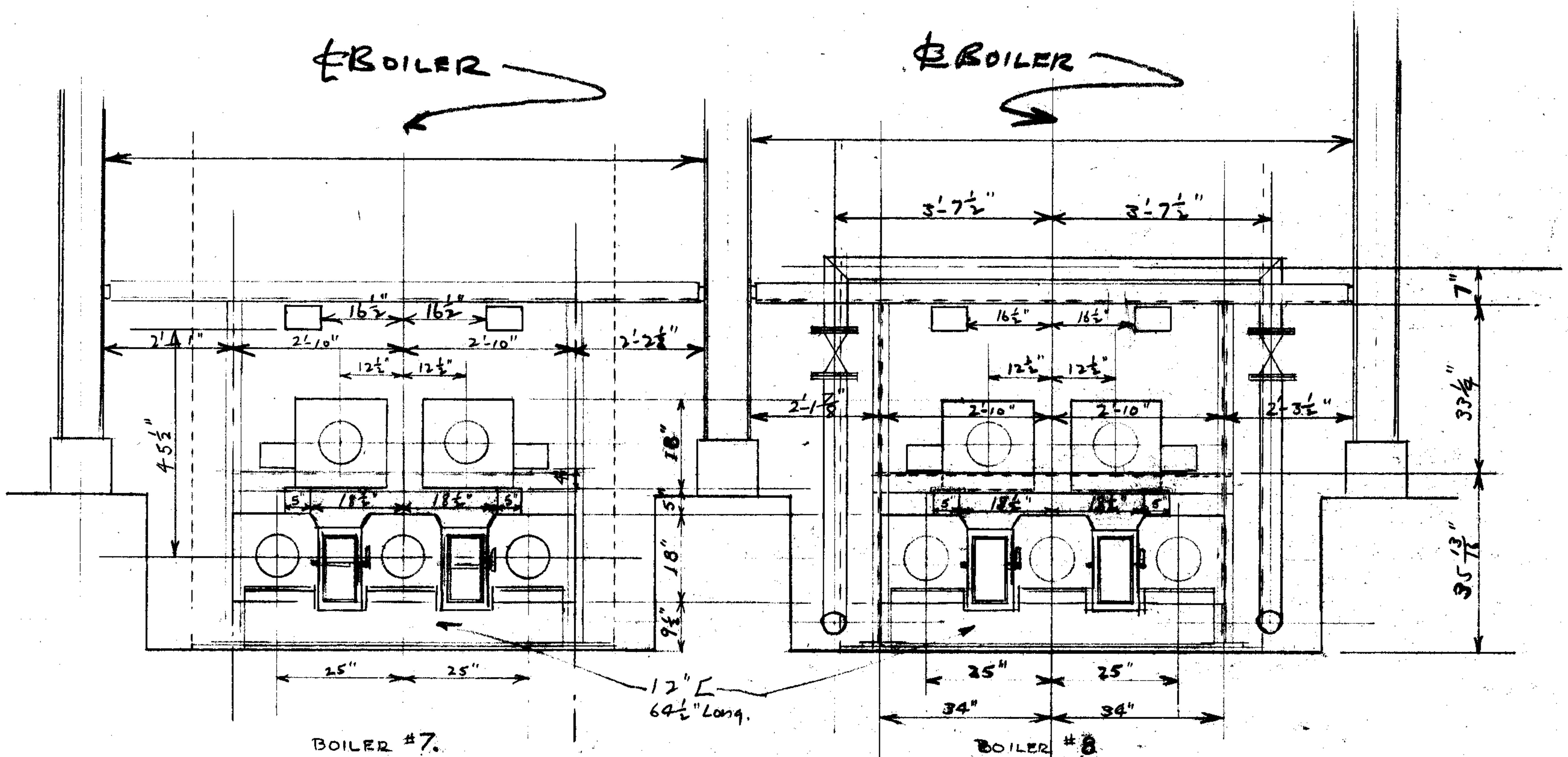


NO.	REVISION	BY	DATE

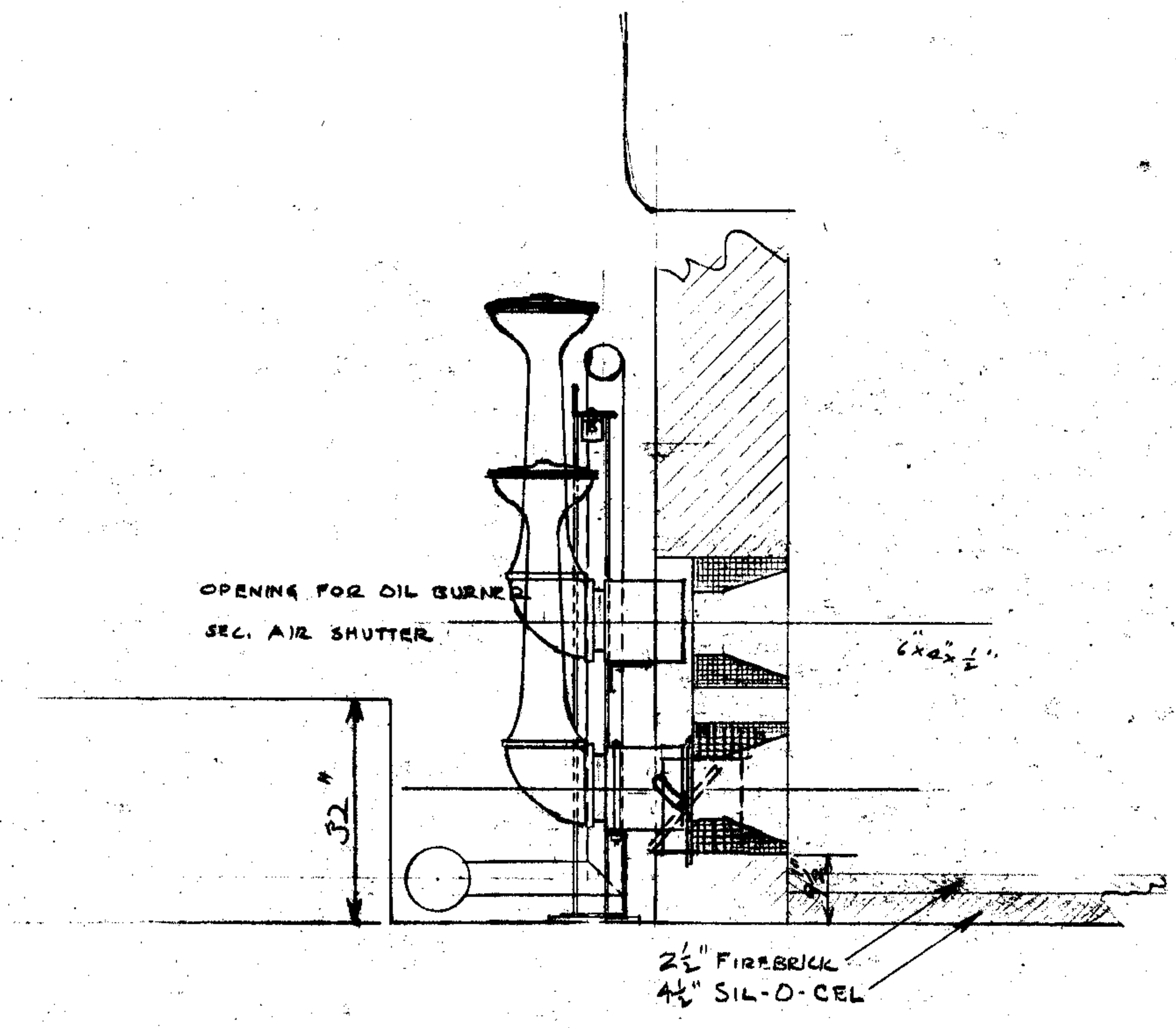
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

DETAILS OF SUPPORT FOR
MAXON PREMIX GAS BURNER
VAN BUREN ST. PLANT
BOILERS #1 AND #2

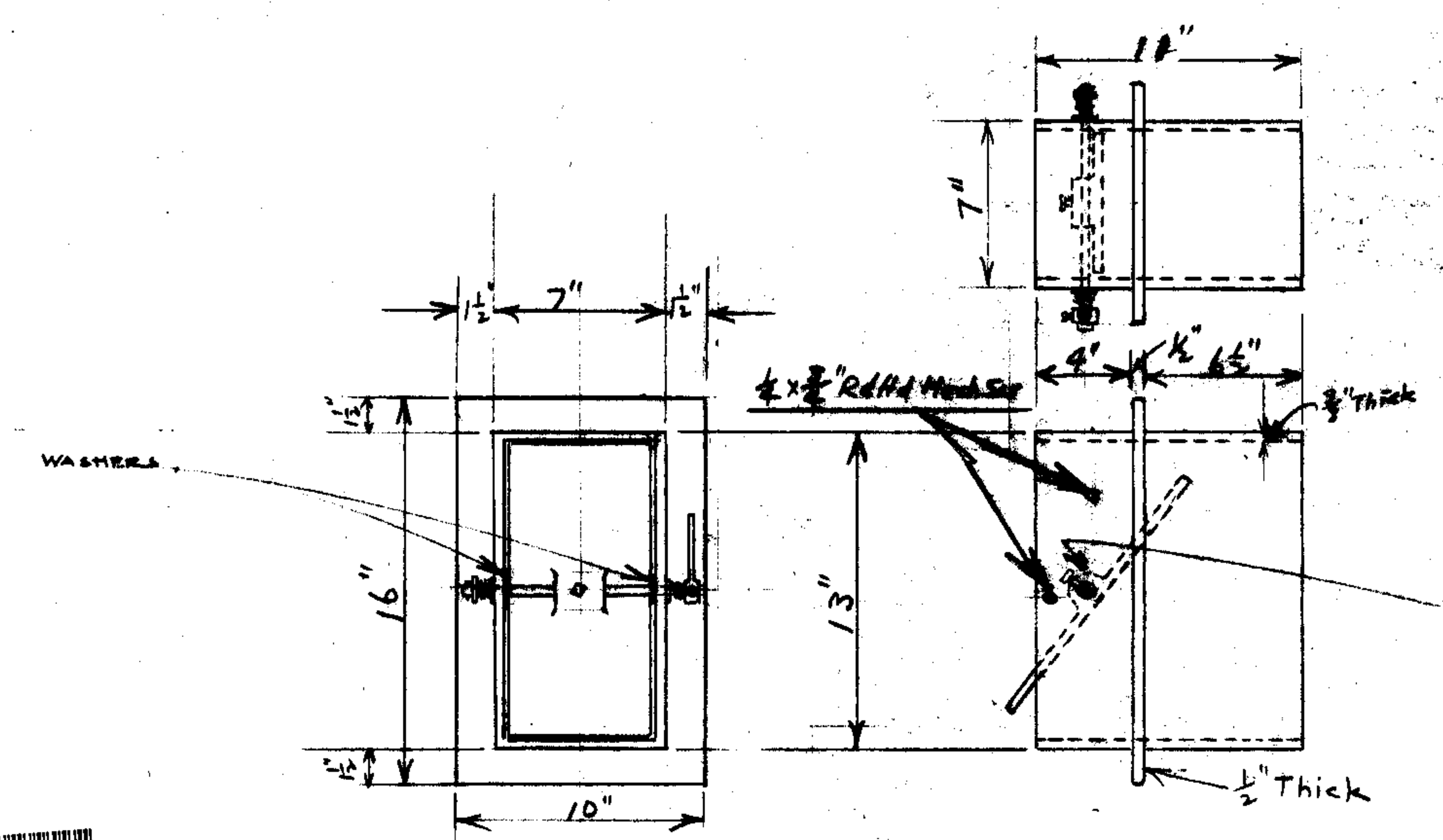
DR. OKV	CH.	SCALE ½"=1'-0"
TR.	OK.	C-6206
APP.	APP.	
DATE 12-16-31		



FRONT ELEVATION
SCALE – ½" = 1'-0"



SECTION THRU SIDE
SCALE – ½" = 1'-0"



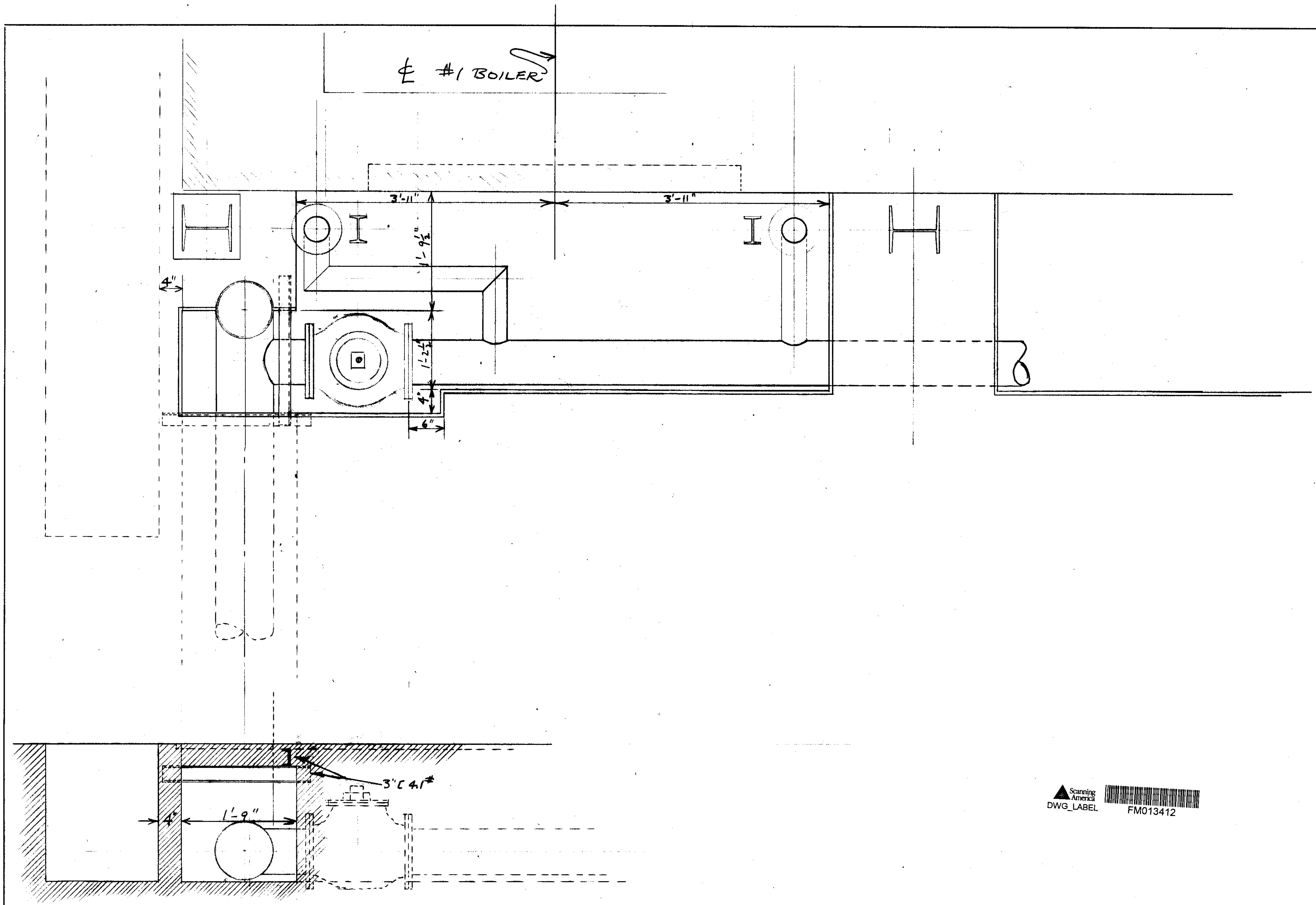
SECONDARY AIR SHUTTER
SCALE 1½" = 1'-0"

NO.	REVISION	BY	DATE
1	Changed Location of Insp. Doors	OKJ	12-19-31
2	Added Burner Supports + Changed Design of Air Shutters	OKJ	1-4-32
3	Lowered Insp. Doors 2½"	OKJ	1-7-32

THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

ARRANGEMENT OF GAS BURNERS
ON No 7. AND No 8 BOILERS
AND DETAIL OF AIR SHUTTER
VAN BUREN PLANT

DR. OKJ	CH.	SCALE As Shown
TR.	OK.	C-6208
APP.	APP.	
DATE 12-17-31		



Scanning America DWG_LABEL FM013412

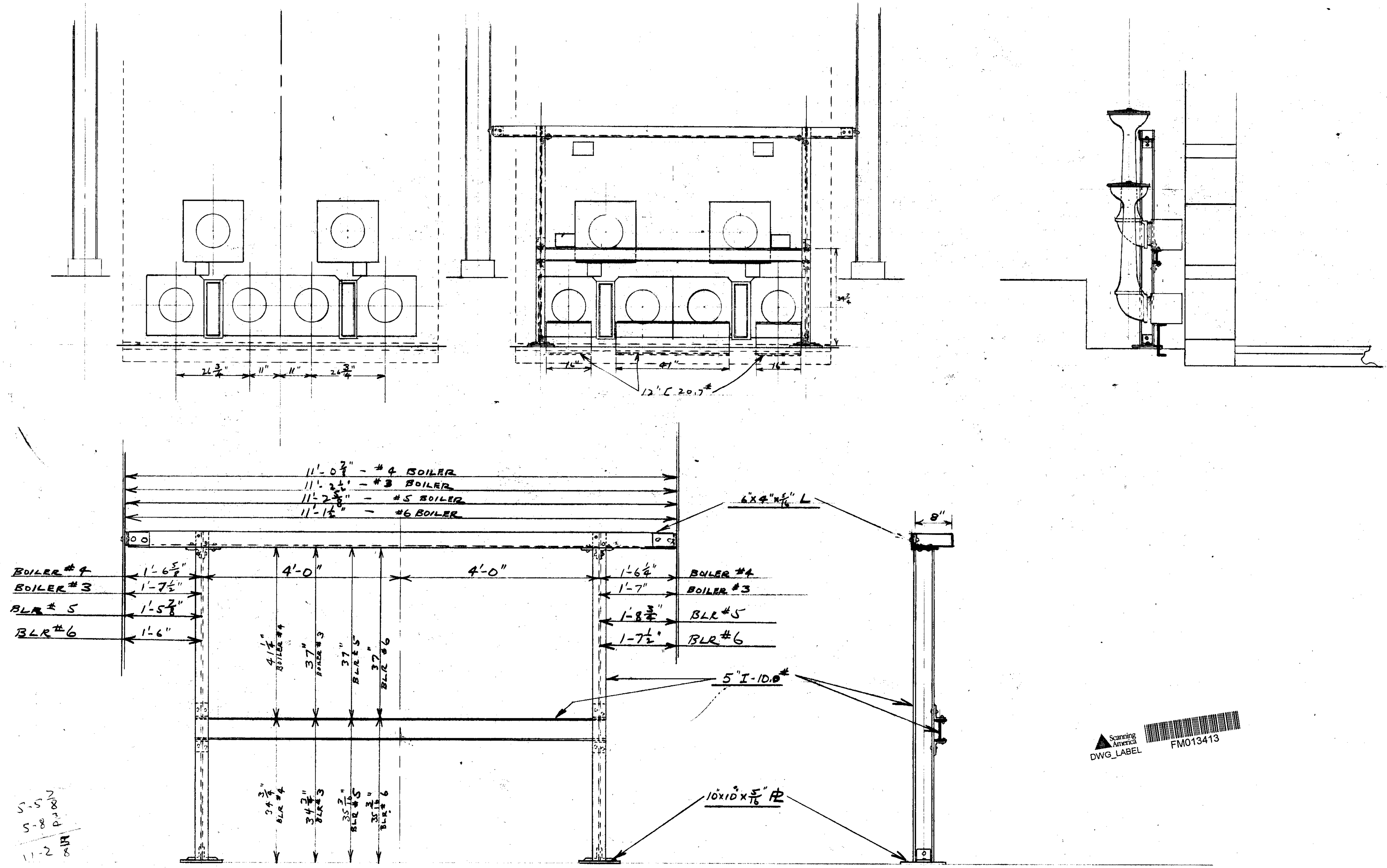
NO.	REVISION	BY	DATE

THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

DETAILS OF PIT IN FRONT OF BOILER #1.
VAN BUREN ST. PLANT

DR. OKJ | CH. | SCALE 1" = 1'-0"
TR. | OK.
APP. | APP.
DATE

C-6209



NO.	REVISION	BY	DATE

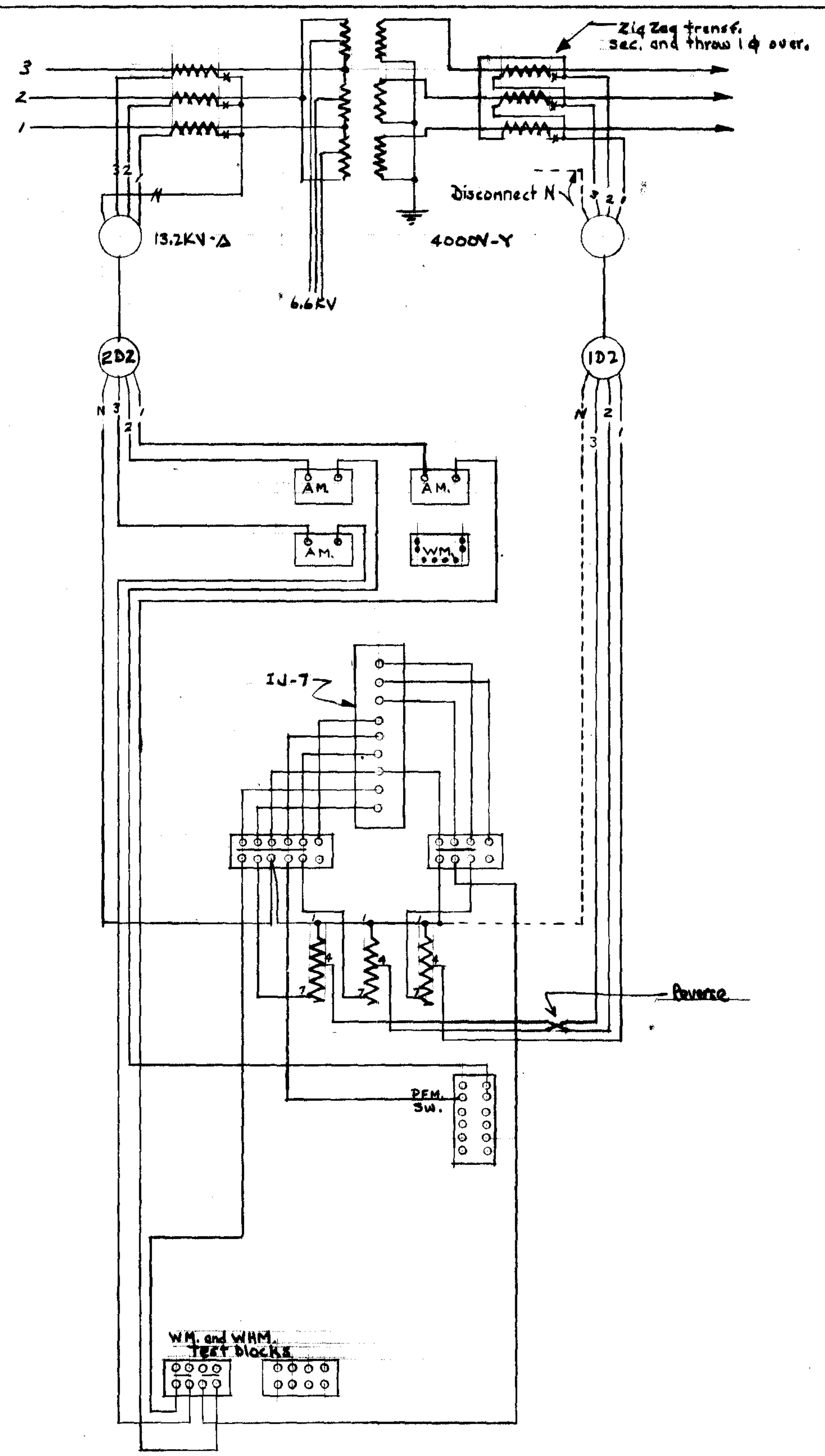
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

BURNER SUPPORTS FOR
300 HP BLRS
V.B. PLANT

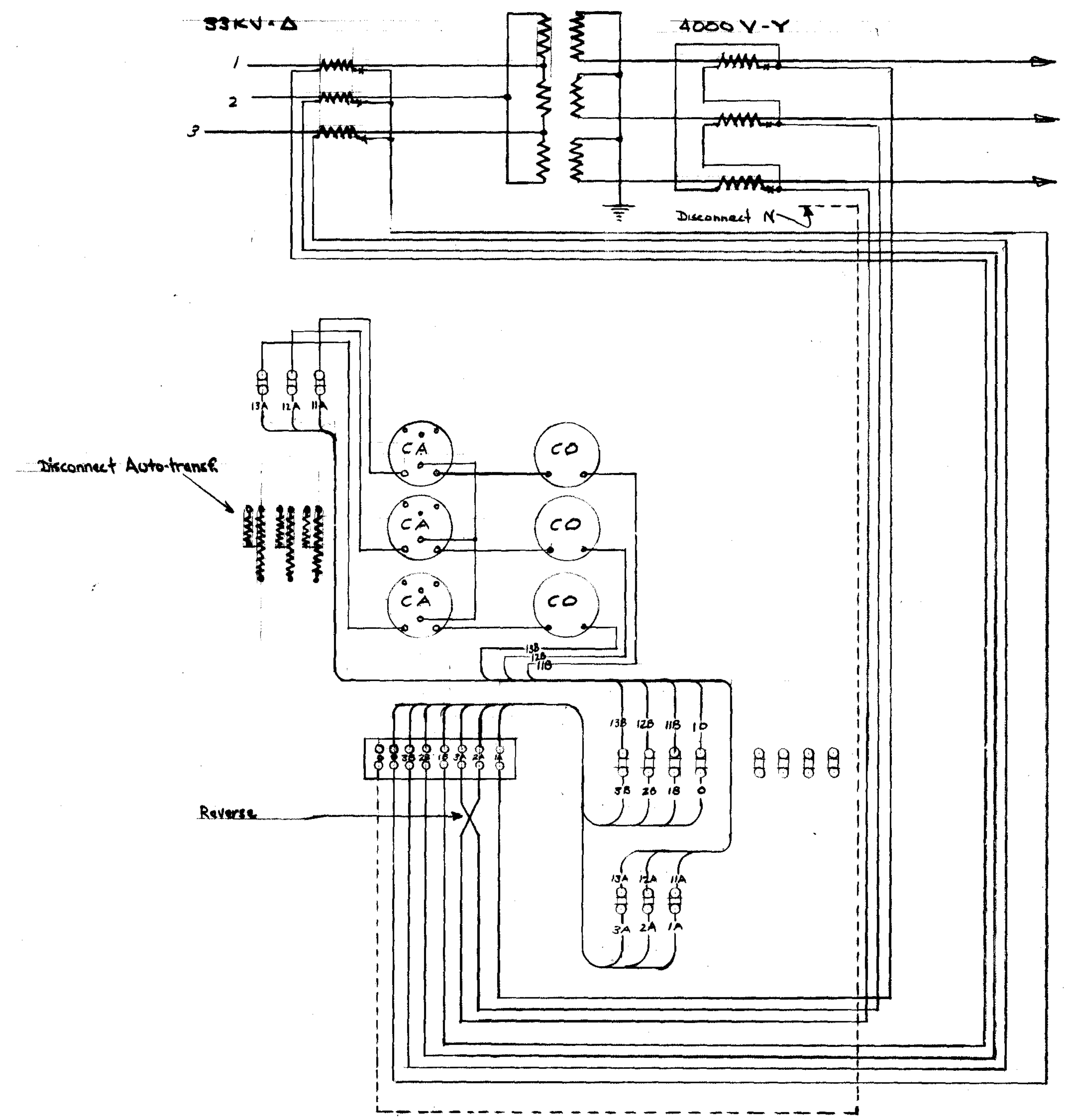
DR. OKN | CH. | SCALE 1/2" = 1'-0"
TR. | OK.
APP. | APP.
DATE 1-21-37

C-6213

GALLUP—K C., MO.

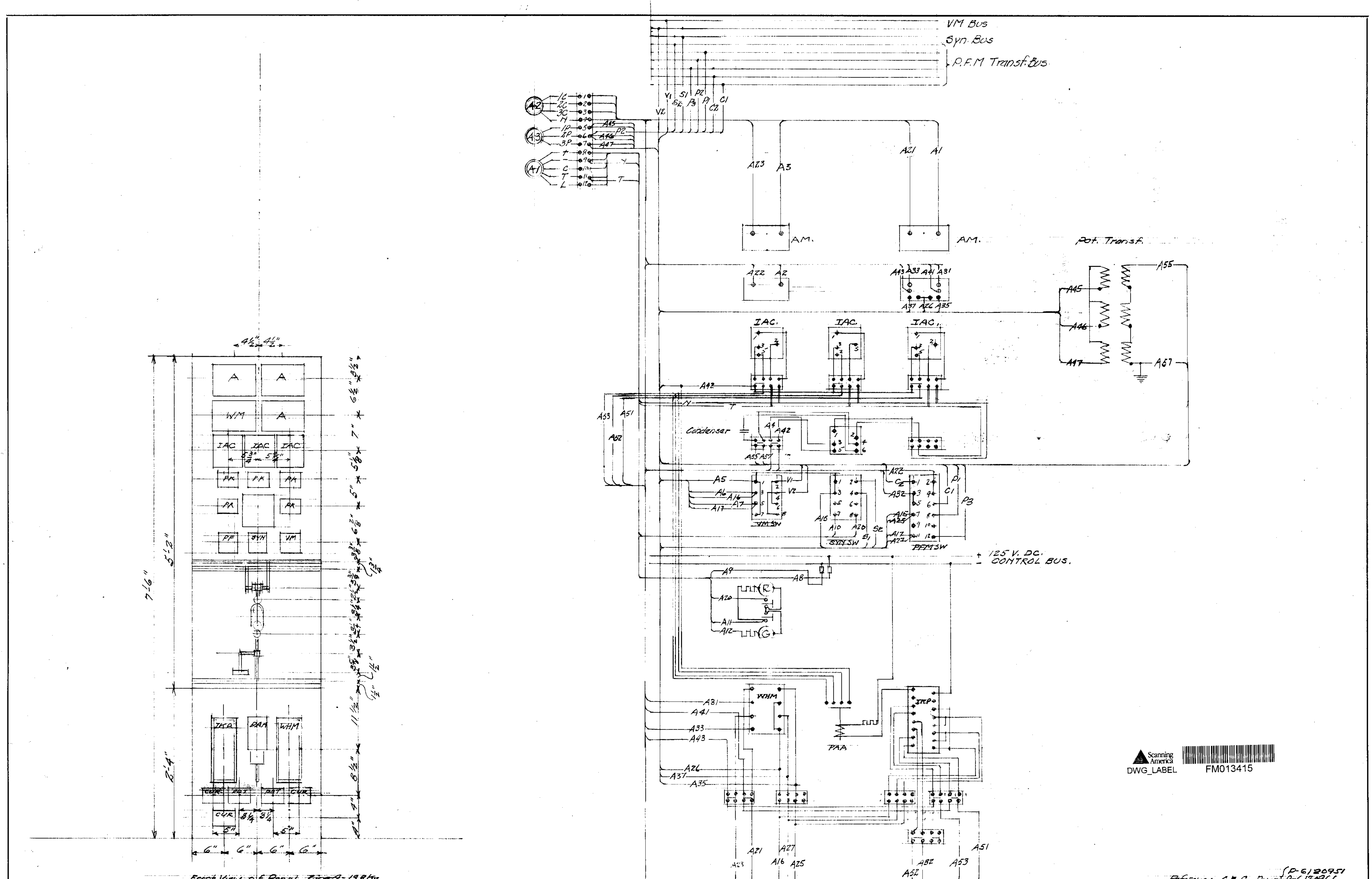


CONNECTIONS FOR DIFF. RELAYS
VAN BUREN ST. STATION



CONNECTIONS FOR DIFF. RELAYS
WESTBORO SUBSTATION.

THE KANSAS POWER AND LIGHT CO. TOPEKA, KANSAS	
CHANGES IN CONNECTIONS OF C. TRANSF. TO PROVIDE CURRENT DIFF. ON DELTA-WYE BANKS - VAN BUREN AND WESTBORO	
Dr. OKJ	Scale- None
Date: 5-22-39	C-6684



Front View of Panel ~~Line 4~~ 13.8 Kv.
Scale 1" = 1'-0"

Reference G.E. Co. Dwg. P-6120951
P-6121966

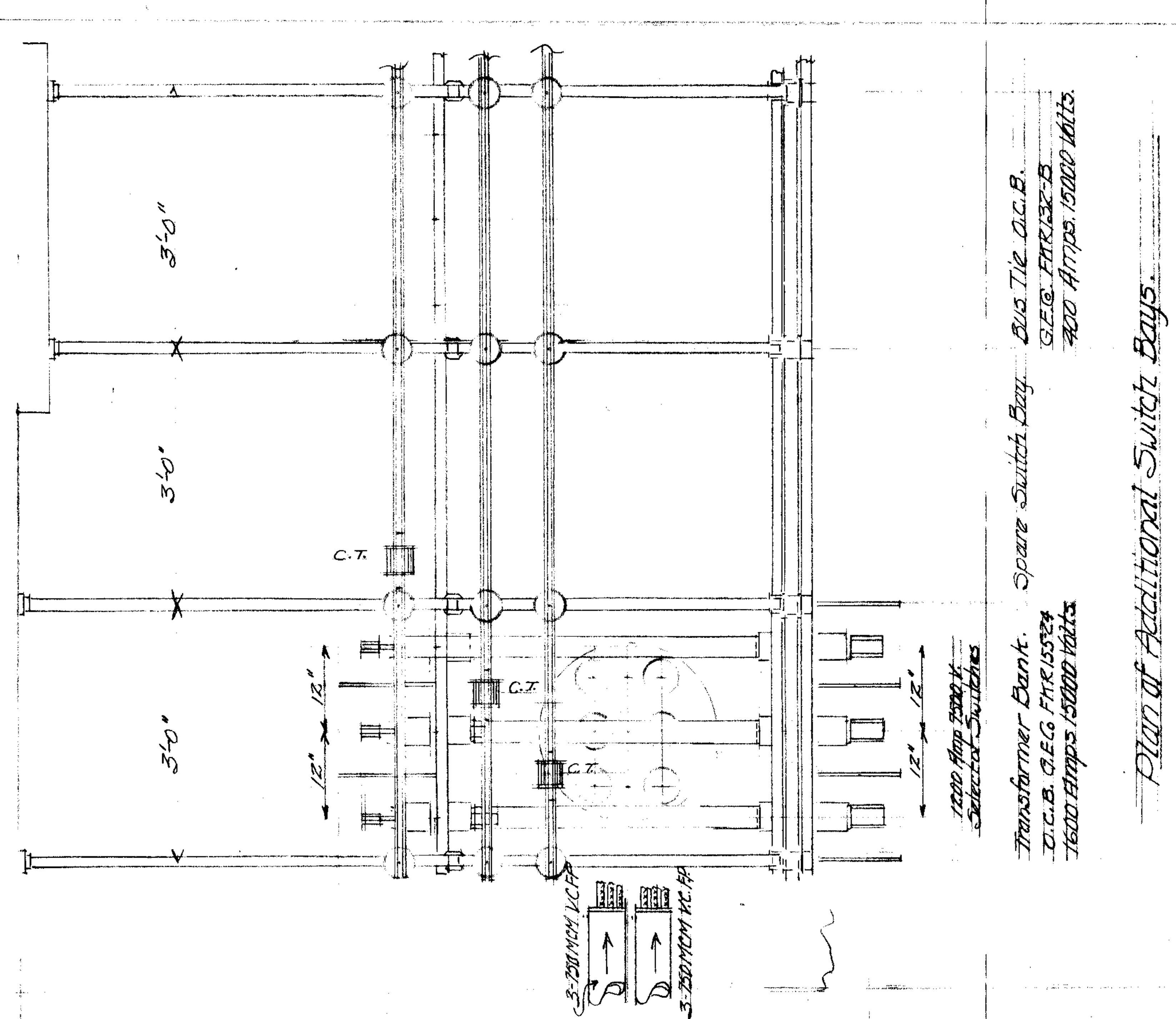
NO.	REVISION	BY	DATE

THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

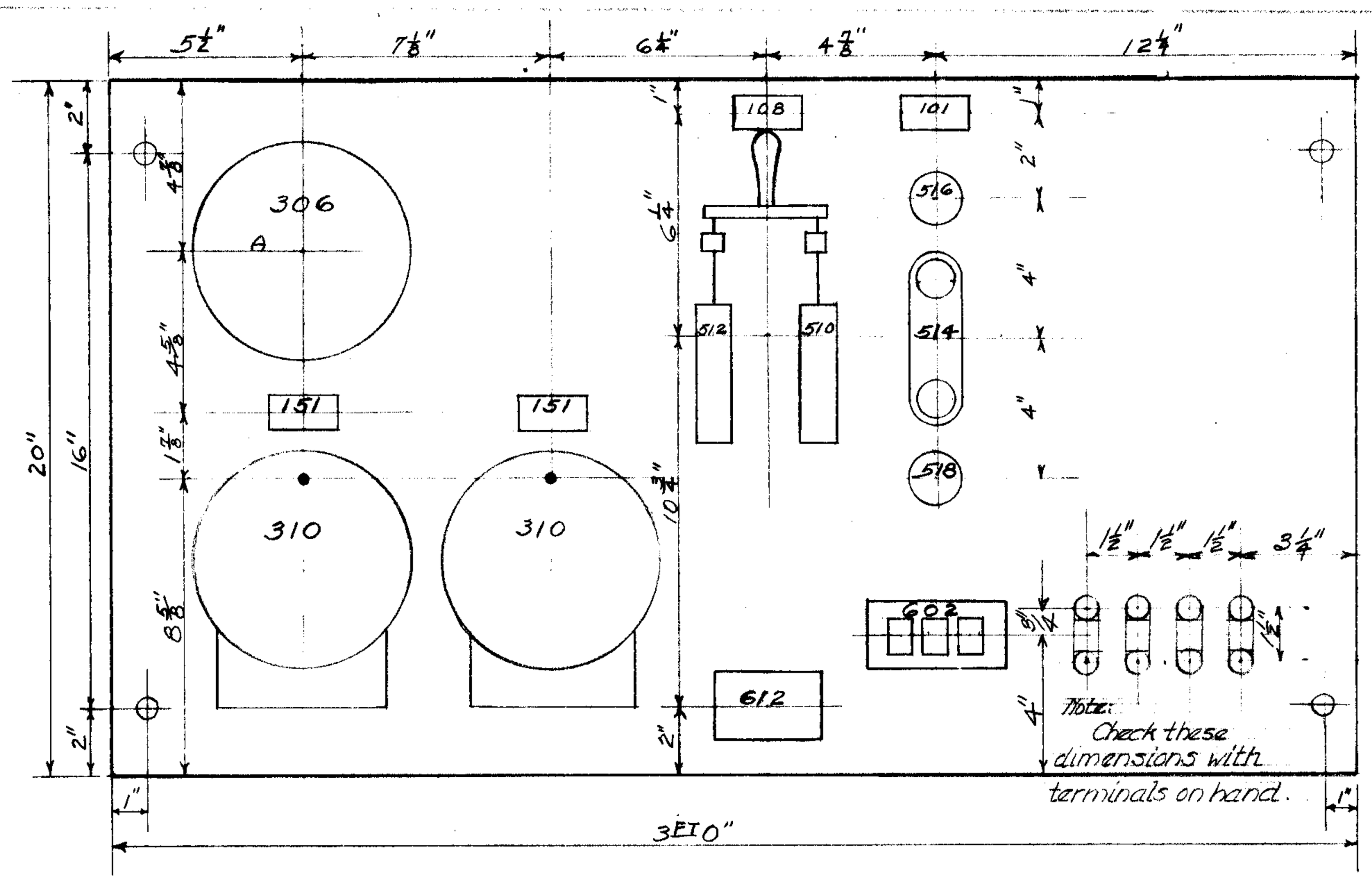
Line 4 - 13.8 kv. Panel. VanBuren.
Addition of directional phase relay.
Topeka, Kans. 1936 - AFE-48-328a.

DR. B.S.C.	CH.	SCALE As shown.
TR.	OK.	C-6339
APP.	APP.	
DATE 7-8-36.		

ALLUP—K C., MO.



Plan of Additional Switch Bays.



Terminal Board
Scale 3" = 1'-0"

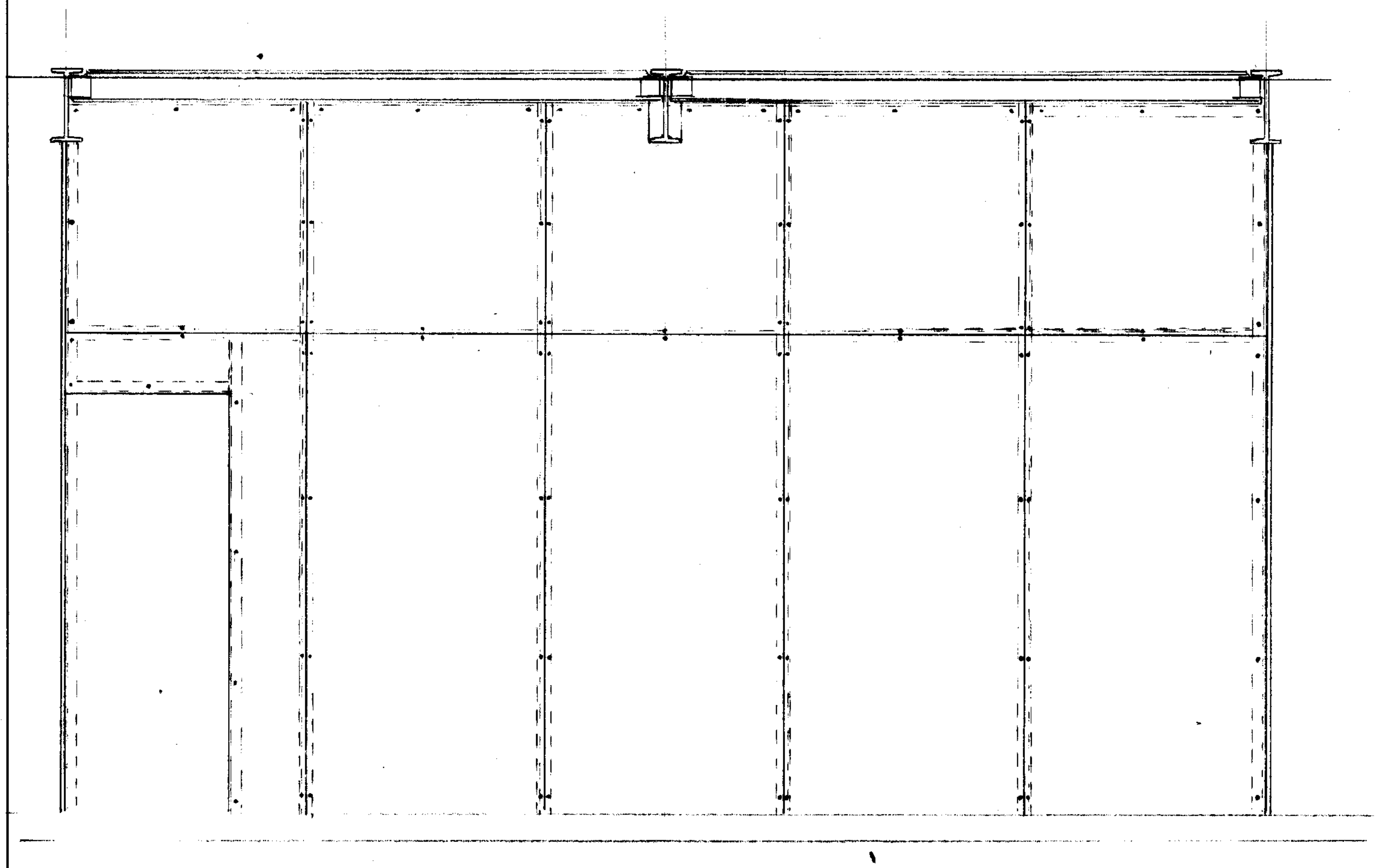
1600 Amp. Brkr. 5000 kva Trans. Bnk.

North Elevation of 2300 Volt Feeder and Regulator Racks.
Van Buren Plant.

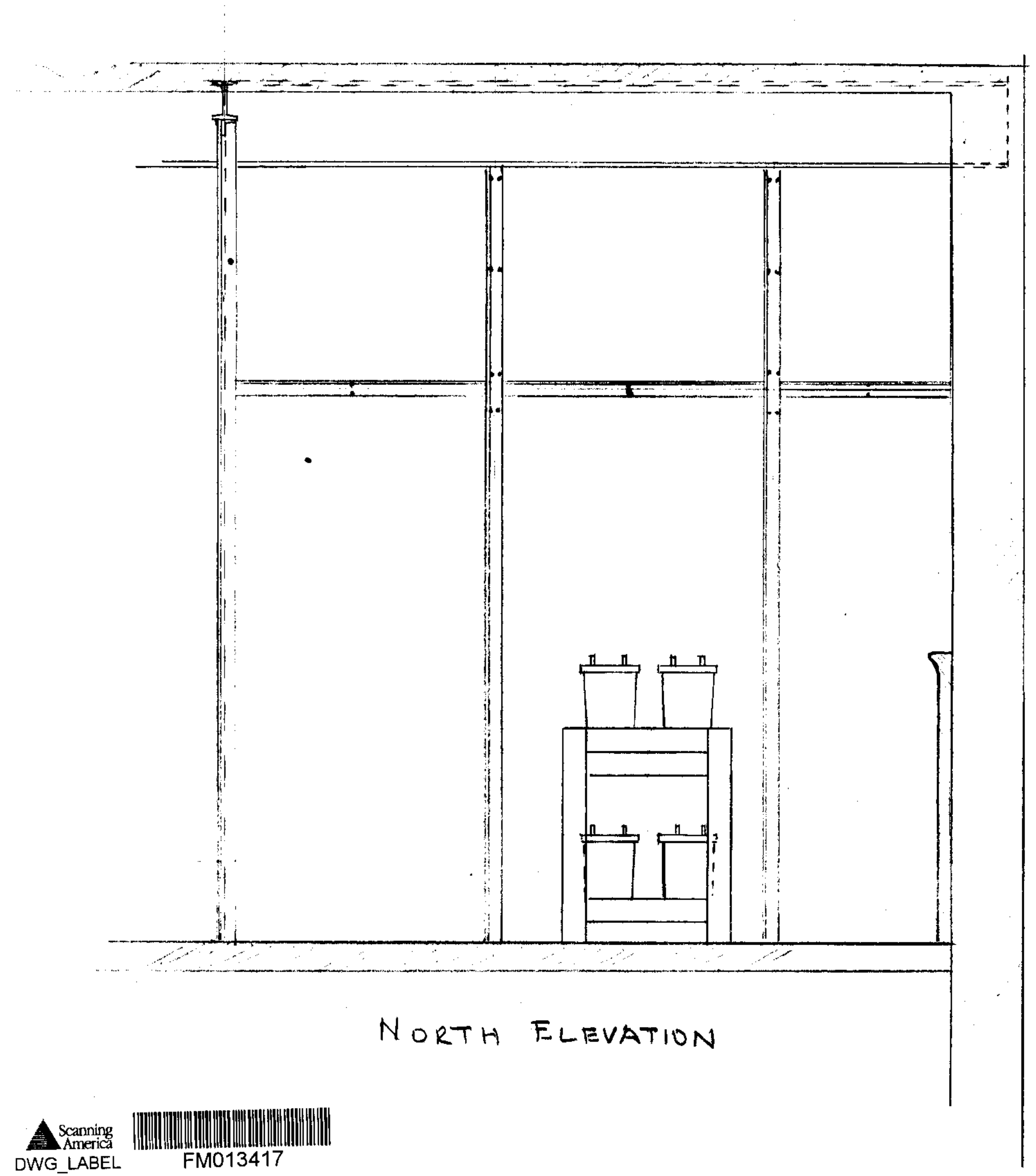
THE KANSAS POWER & LIGHT CO
TOPEKA KANSAS.

Additional Feeder Breakers
2300 V. Racks Van Buren Plant.

B.S.C.
Scale ¾" = 1'-0"
D6153
April 14 1931



EAST ELEVATION



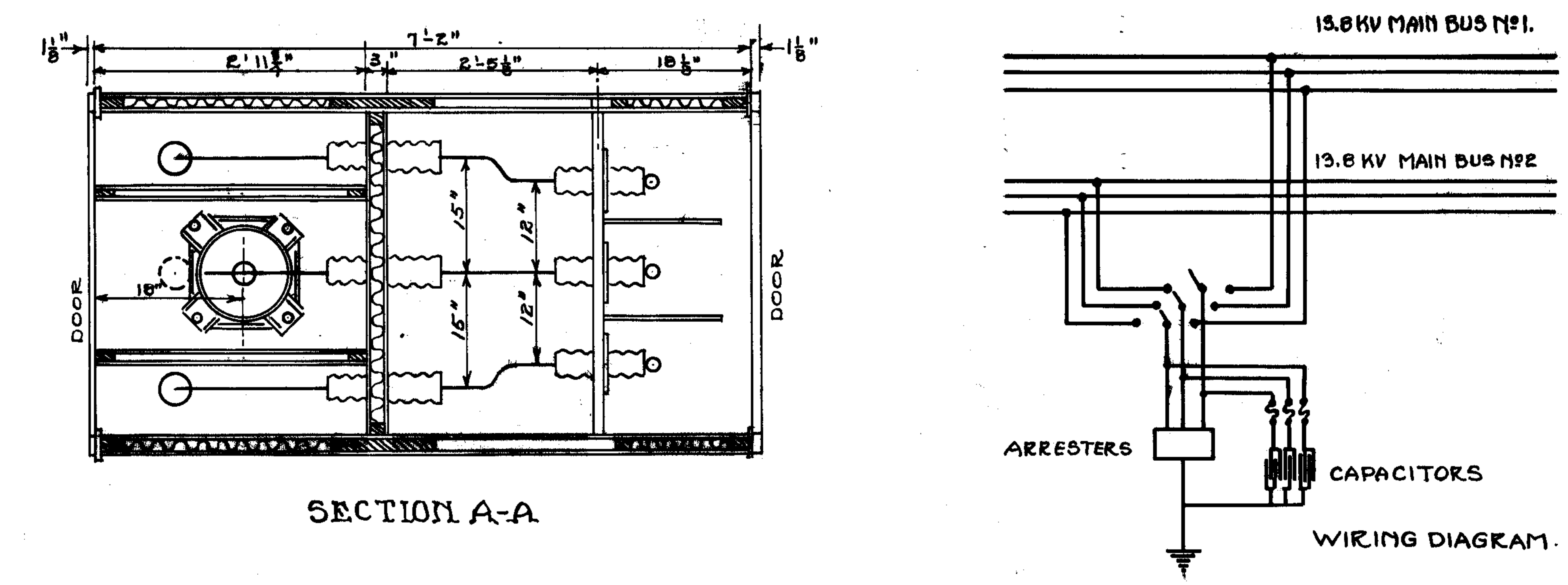
NORTH ELEVATION

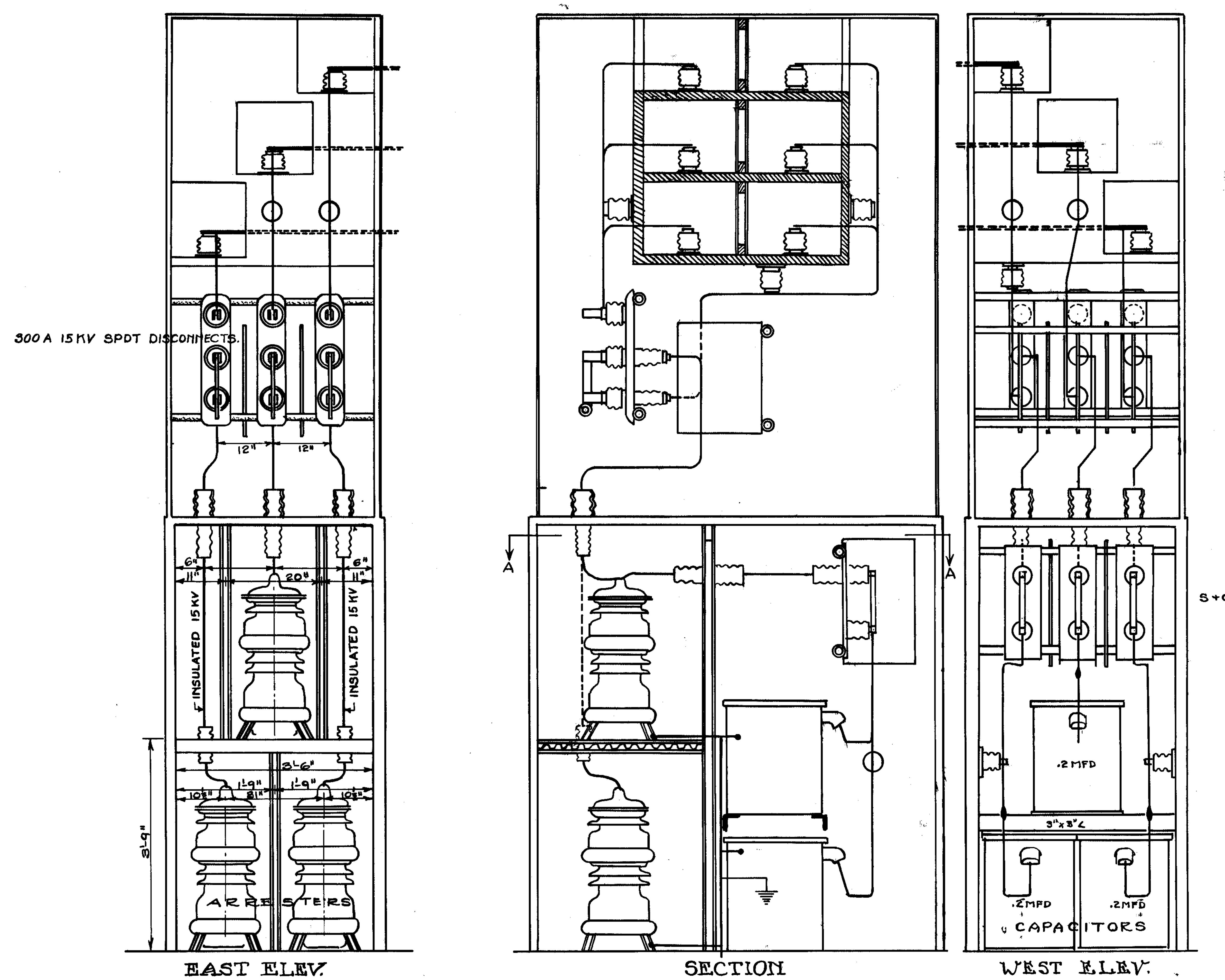
NO.	REVISION	BY	DATE

THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

ELEVATIONS OF TRANSITE WALL
FOR BATTERY ROOM
V.B. PLANT

DR. OW	CH.	SCALE ¼" = 1'-0"
TR.	OK.	C-6240
APP.	APP.	
DATE 5-17-37		





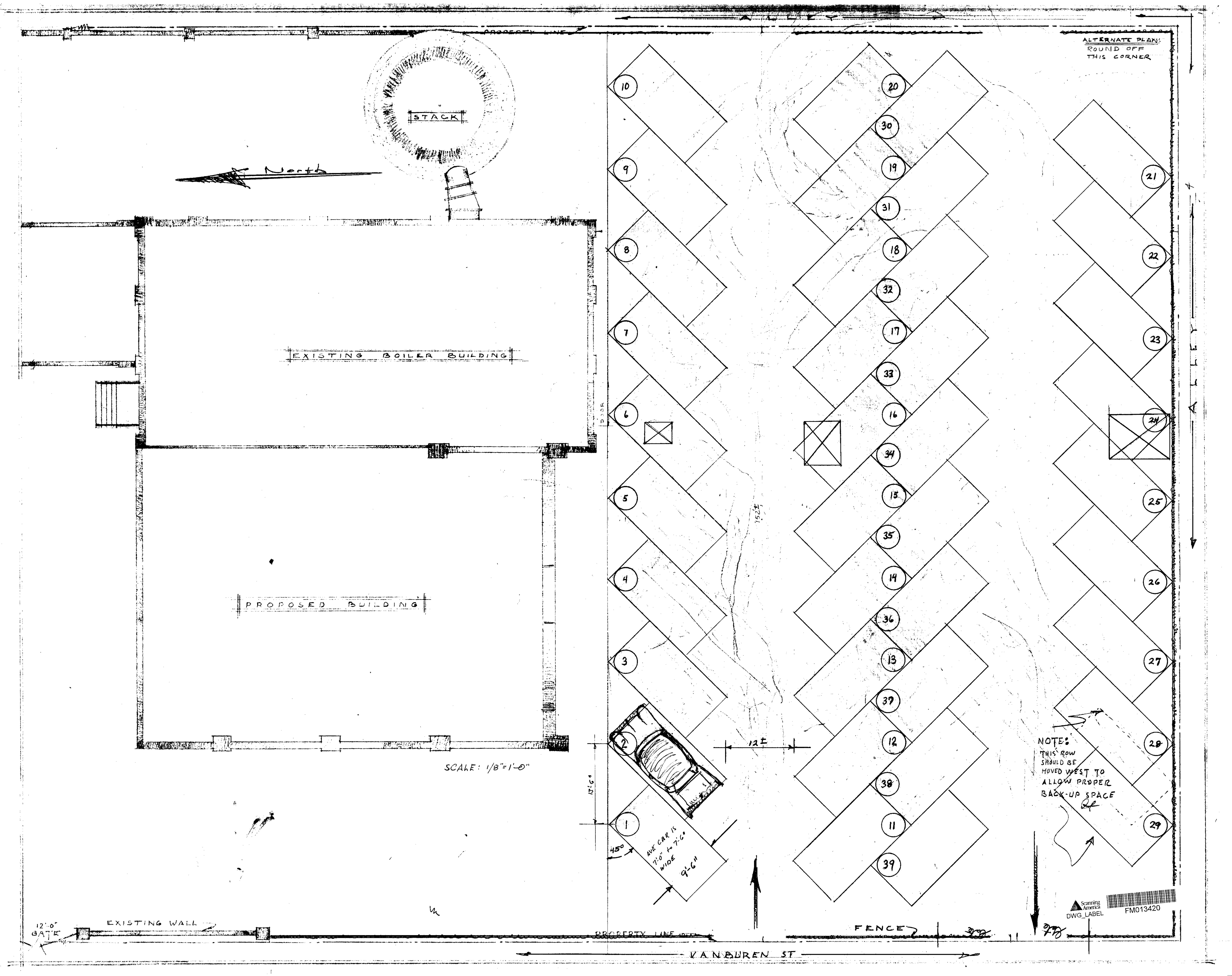
No	REVISION	BY	DATE

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

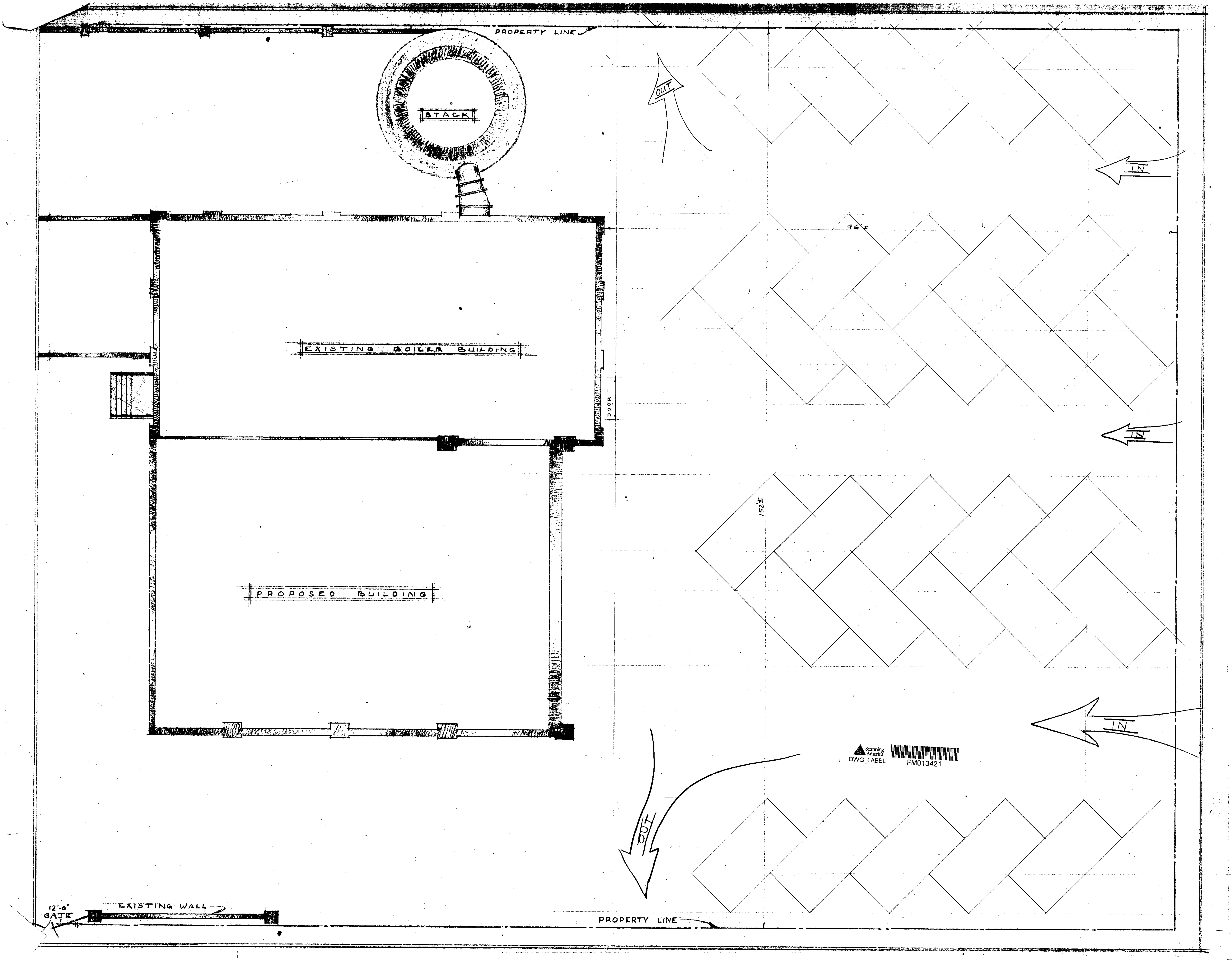
FLASH-OVER PROTECTION.
13.8 KV BUS VAN BUREN PLT.

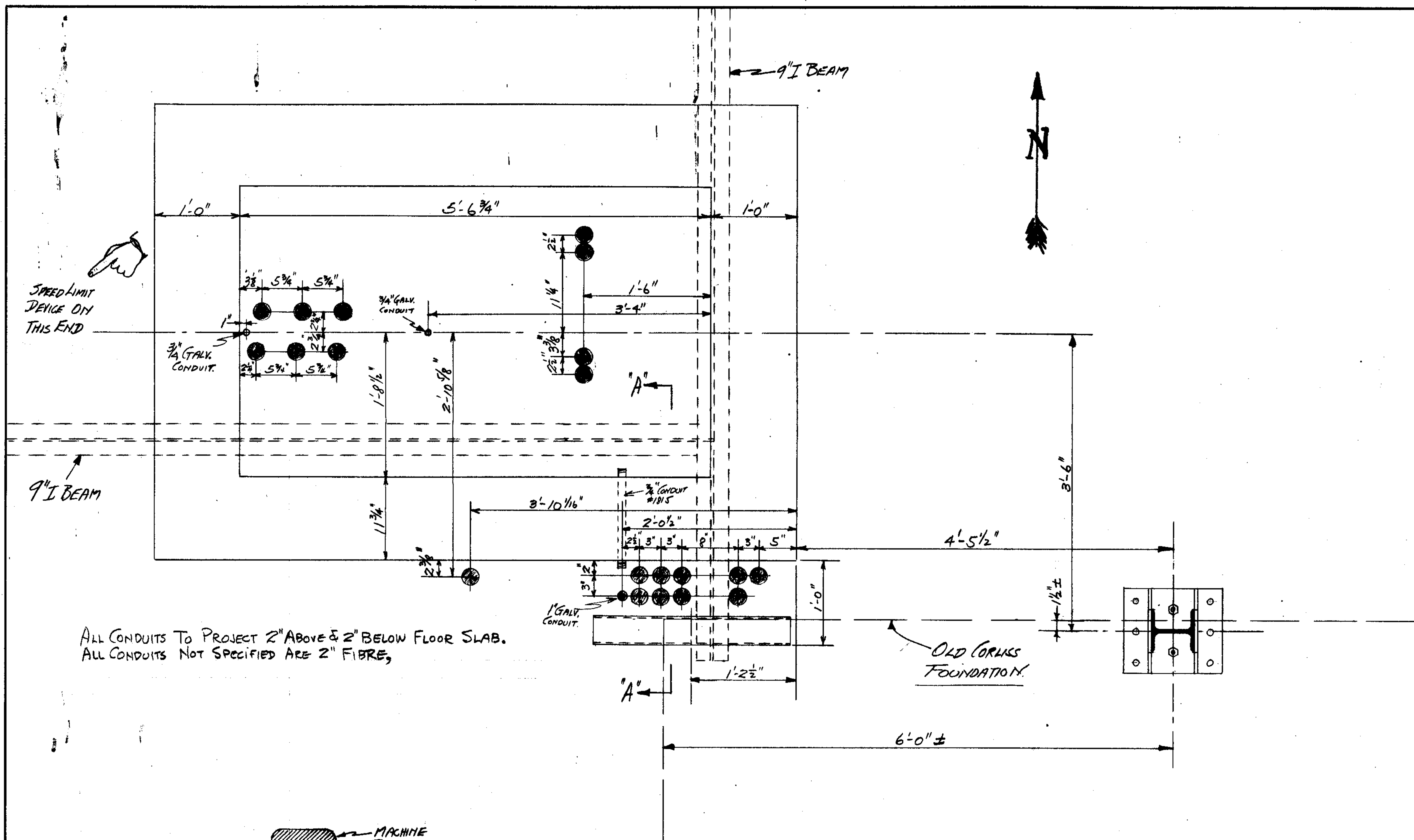
DR. B.S.C.	CH	SCALE 3/4"=1'-0"	D 6268
TR.	O.K		
APR	APP		
DATE NOV. 11, 1932			

KNOCKOUTS FOR 3" CONDUITS
NOTE 6 BOXES TO HAVE THESE 8 HOLES ONLY, AND THE OTHER 6 BOXES TO HAVE THE OTHER 8 HOLES ONLY. ALL HOLES TO BE 5/16
KNOCKOUTS FOR 3/4" CONDUITS
KNOCKOUT FOR 3/4" CONDUIT
KNOCKOUTS FOR 3" CONDUITS
EXPLODED VIEW
DOORS
PLAN TOP
2'-3 1/2" OUT SIDE
2'-4" O.S.
END
FRONT
END
BOTTOM VIEW
FRONT VIEW DOORS REMOVED
BOX-"B"-#12 G.S.I
12 REQD.
3/8" Transite board furnished by Customer
Furnish-1"X1"X1/8" Ls.-@1'-0" for mounting transite board
1" ANGLES.
3/8" TRANSITE BOARD
SECTION-AA
1" HOLES IN TRANSITE BOARD FOR FEDERAL BUSHINGS.
HOLES FOR 3" CONDUITS
EXPLODED VIEW
1'-6" OUT SIDE
1'-0" OUT SIDE
PLAN-TOP
END
FRONT
END
BOTTOM VIEW
BOX-"C"-#12 G.S.I
2-REQD
HOLES FOR 3" CONDUITS.
EXPLODED VIEW
1'-6" OUT SIDE
1'-0" OUT SIDE
PLAN TOP
END
FRONT
END
BOTTOM VIEW
BOX-"D"-#12 G.S.I
2. REQD
KNOCKOUTS FOR 3" CONDUITS
EXPLODED VIEW
1'-0" OUT SIDE
1'-0" OUT SIDE
PLAN TOP
END
FRONT
END
BOTTOM
BOX "E"-#12 G.S.I
8-REQD
BOXES ON THIS DRWG. ARE ORDERED ON P.O. #72733.
FOR LOCATION SEE DRWG. #C18585
DWG_LABEL FM013419
ILLINOIS POWER & LIGHT CORPORATION
CHICAGO
DETAILS OF JUNCTION BOXES TO BE USED IN STRUCTURE FOR IND. VOLTAGE REGULATORS. KANSAS POWER AND LIGHT CO. TOPEKA, KANSAS.
DR. W.H.B 7-17-25
TR.
CH. ERW 10-12-25
O.K. JJD 10/14/25
SCALE 1" = 1 FOOT
CONT. NO.
SHEET NO.
B-18586

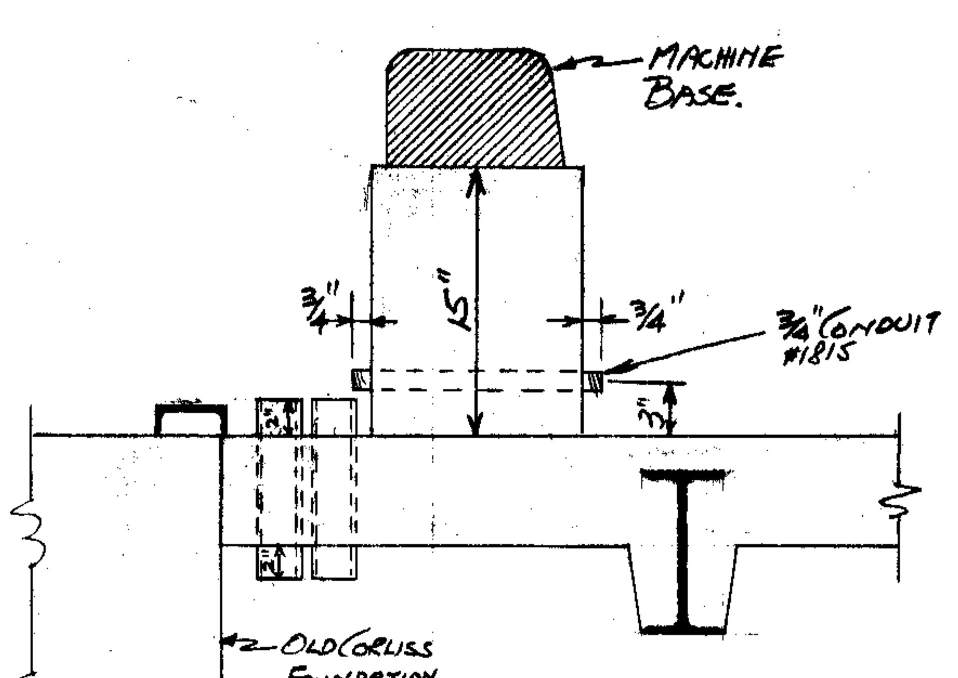


ALLEY
PROPERTY LINE
ALTERNATE PLAN: ROUND OFF THIS CORNER
STACK
North
EXISTING BOILER BUILDING
DOOR
PROPOSED BUILDING
SCALE: 1/8"=1'-0"
10
9
8
7
6
5
4
3
2
1
20
30
19
31
18
32
17
33
16
34
15
35
14
36
13
37
12
38
11
39
21
22
23
24
25
26
27
28
29
152±
12±
13'-6"
45°
AVE CAR IS 7'-0" to 7'-6" WIDE
9'-6"
NOTE: THIS ROW SHOULD BE MOVED WEST TO ALLOW PROPER BACK-UP SPACE
ALLEY
12'-0" GATE
EXISTING WALL
PROPERTY LINE
FENCE
VAN BUREN ST
DWG_LABEL
FM013420


PROPERTY LINE
STACK
OUT
IN
96'±
EXISTING BOILER BUILDING
DOOR
IN
152'±
PROPOSED BUILDING
IN
OUT
12'-0" GATE
EXISTING WALL
PROPERTY LINE



ALL CONDUITS TO PROJECT 2" ABOVE & 2" BELOW FLOOR SLAB.
ALL CONDUITS NOT SPECIFIED ARE 2" FIBRE,



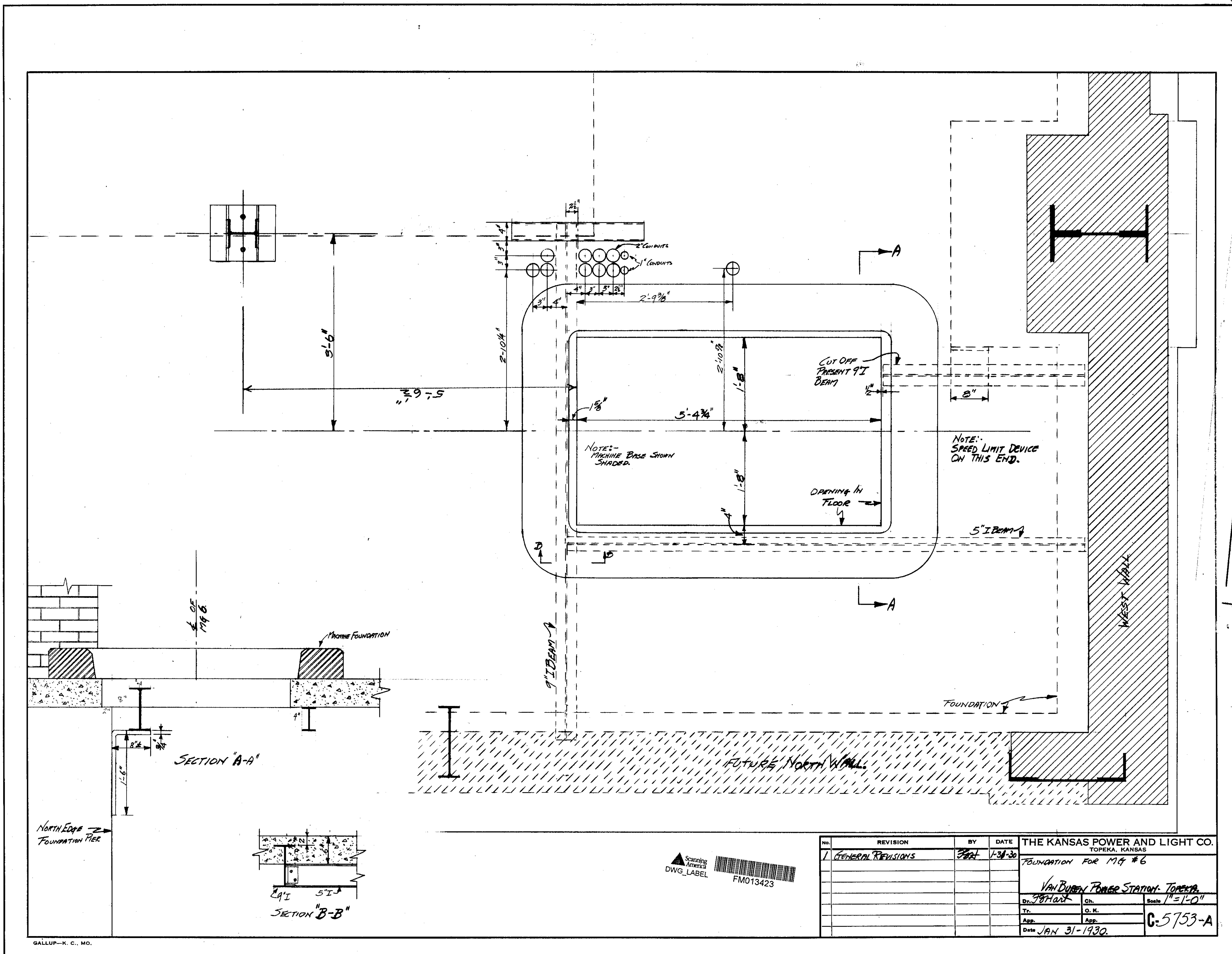
SECTION "A-A"

NO.	REVISION	BY	DATE
1	ADDED CONDUIT	[illegible]	10-[illegible]-29

THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

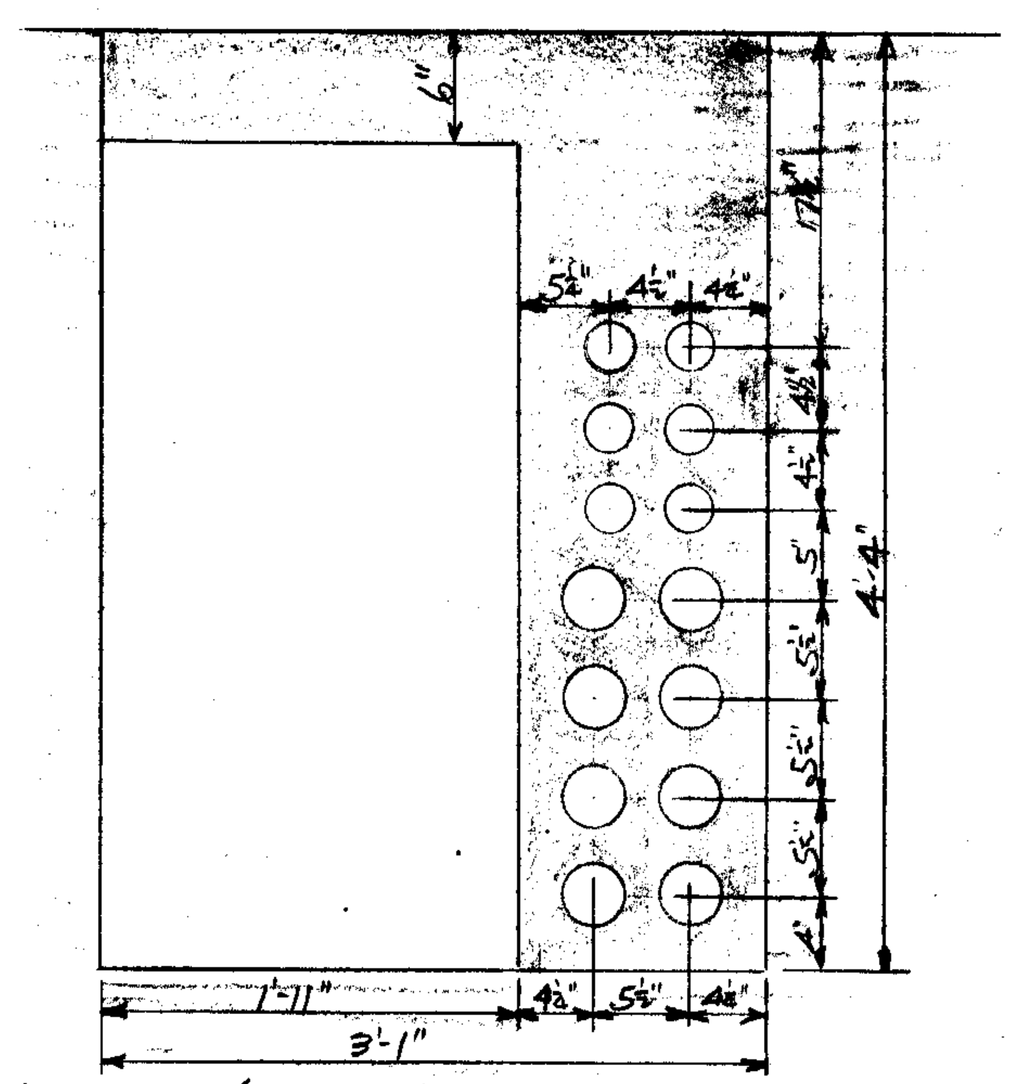
DETAILS OF CONDUITS IN BASE OF MG #6 - VAN BUREN

Dr. [illegible]	Ch.	Scale 1" = 1'-0"	
Tr.	O. K.	C-5753-B	
App.	App.		
Date 10-18-29			

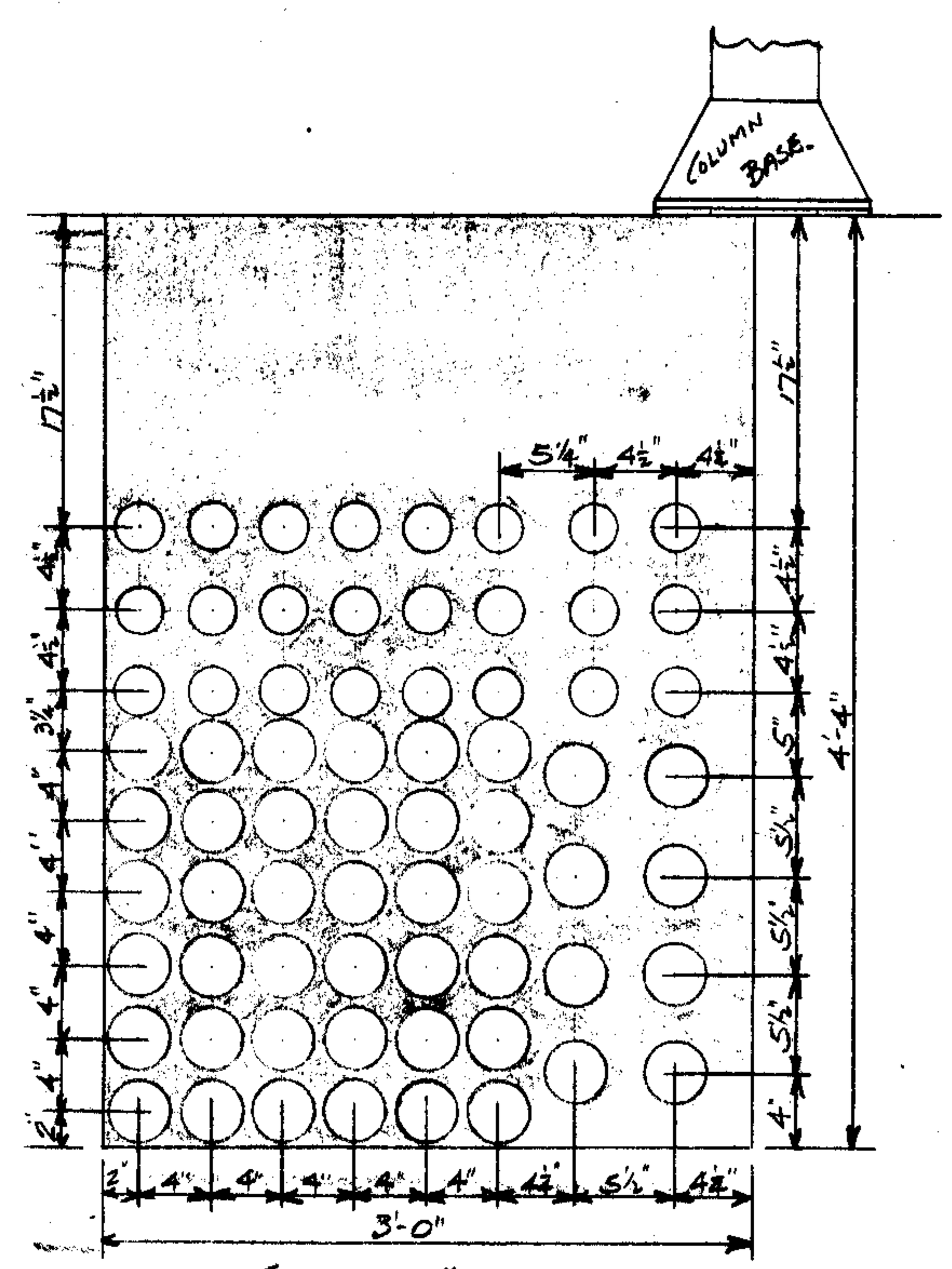

2" CONDUITS
1" CONDUITS
2½"
4"
3"
3"
3"
4"
3"
3"
2½"
2'-9⅜"
3'-6"
2'-10¼"
2'-10⅞"
5'-6"
1⅝"
5'-4¾"
1'-8"
1'-8"
4"
CUT OFF PRESENT 9" I BEAM
½"
8"
NOTE:- MACHINE BASE SHOWN SHADED.
NOTE:- SPEED LIMIT DEVICE ON THIS END.
OPENING IN FLOOR
5" I BEAM
A
A
B
B
9" I BEAM
FOUNDATION
WEST WALL
FUTURE NORTH WALL
℄ OF MG 6
MACHINE FOUNDATION
8"
2"
4"
8"
¾"
1'-6"
SECTION "A-A"
NORTH EDGE FOUNDATION PIER
9" I
5" I
SECTION "B-B"
DWG_LABEL
Scanning America
FM013423
GALLUP—K. C., MO.
No. | REVISION | BY | DATE
1 | GENERAL REVISIONS | | 1-31-30
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS
FOUNDATION FOR MG #6
VAN BUREN POWER STATION - TOPEKA.
Dr. FJHart
Ch.
Scale 1"=1'-0"
Tr.
O. K.
App.
App.
Date JAN 31-1930.
C-5753-A

RACK No.	OPEN WIRE RUNS							CONDUIT RUNS			CABLE SUPPORTS $\frac{3}{8}$-1$\frac{3}{8}$	CABLE SUPPORTS 1½-2½	CABLE SUPPORTS SINGLE	CABLE SUPPORTS DOUBLE	#1943361-G11 FITTING	1¼" PIPE	HANGERS No.-MARK	HANGERS TOTAL LENGTH	FIGURE	J-BOLTS FOR CONDUIT ¾"	1"	1½"
1	1601										0	1	1	0	2	1'-4"	2-1	3'-0"	A	–	–	–
2	1603	1604									0	4	0	2	2	1'-4"	2-1	3'-0"	A	–	–	–
3	1601	1602	1603	1604							1	5	2	2	2	2'-3"	2-1	3'-0"	B	–	–	–
4	1601	1602	1603	1604							1	5	2	2	2	2'-3"	2-1	3'-0"	B	–	–	–
5	1601	1602	1603	1604							1	5	2	2	2	2'-3"	2-1	3'-0"	B	–	–	–
6	1601	1602	1603	1604	2001						2	5	1	3	2	2'-3"	2-1	3'-0"	B	–	–	–
7	1601	1602	1603	1604	2001	2002		2003			3	5	0	4	2	2'-3"	2-1	3'-0"	B	1	–	–
8	1601	1602	1603	1604	2001	2002		2003			3	5	0	4	2	2'-3"	2-1	3'-0"	B	1	–	–
9	1601	1602	1603	1604	2001	2002		2003			3	5	0	4	2	2'-3"	2-1	3'-0"	B	1	–	–
10	1601	1602	1603	1604	2001	2002		2003			3	5	0	4	2	2'-3"	2-1	3'-0"	B	1	–	–
11	1601	1602	1603	1604	1912	2001	2002	2003			3	6	3	3	4	3'-7"	2-2	6'-0"	H	1	–	–
12	2004	2005	2007	2008				2006	2009	2010	4	0	0	2	2	1'-4"	2-1	3'-0"	A	3	–	–
13	1708 2008	1710	1711	1712	2004	2005	2007	1706 2009	1707 2010	2006	5	13	6	6	8	7'-2"	3-2	9'-0"	E	5	–	–
14	1908	~~1909~~	1910	1911				1906	1907		1	12	3	5	4	4'-6"	2-2	6'-0"	D	2	–	–
15	1908	~~1909~~	1910	1911				1906	1907		1	12	3	5	4	4'-6"	2-2	6'-0"	D	2	–	–
16	1908	~~1909~~	1910	1911				1906	1907		1	12	3	5	4	4'-6"	2-2	6'-0"	D	2	–	–
17	1809	1810	1811					1813	1814		0	5	3	1	2	2'-3"	2-1	3'-0"	B	1	1	–
18	1809	1810	1811					1812	1813	1814	0	5	3	1	2	2'-3"	2-1	3'-0"	B	2	1	–
19	1809	1810	1811	2011	2013			1812	1813	1814	2	5	1	3	2	2'-3"	2-1	3'-0"	B	2	1	–
20	1809	1810	1811	2011	2012	2013	2014	1812	1813	1814	4	5	1	4	2	2'-8½"	2-1	3'-0"	C	2	1	–
21	1809	1810	1811	2011	2012	2013	2014	1812	1813	1814	4	5	1	4	2	2'-8½"	2-1	3'-0"	C	2	1	–
22	1809	1810	1811	2011	2012	2013	2014	1812	1813	1814	4	5	1	4	2	2'-8½"	2-1	3'-0"	C	2	1	–
23	1809	1810	1811	2011	2012	2013	2014	1812	1813	1814	4	5	1	4	2	2'-8½"	2-1	3'-0"	C	2	1	–
24	1809	1810	1811	2011	2012	2013	2014	1714 1814	1812	1813	4	5	1	4	2	2'-8½"	2-1	3'-0"	C	3	1	–
25	1601 1712 2004 2014	1602 1809 2005	1603 1810 2007	1604 1811 2008	1708 1912 2011	1710 2001 2012	1711 2002 2013	1706 1812 1914 2009	1707 1813 2003 2010	1714 1814 2006	12	24	12	12	12	13'-6"	3-3	13'-6"	F	10	1	–
26	1601 1712 2004 2014	1602 1809 2005	1603 1810 2007	1604 1811 2008	1708 1912 2011	1710 2001 2012	1711 2002 2013	1706 1812 1914 2009	1707 1813 2003 2010	1714 1814 2006	12	24	12	12	12	13'-6"	3-3	13'-6"	F	10	1	–
27	1601 1712 1911 2008	1602 1809 1912 2011	1603 1810 2001 2012	1604 1811 2002 2013	1708 1908 2004 2014	1710 1909 2005	1711 1910 2007	1706 1812 1906 1907 2006	1707 1813 1914 2009	1714 1814 2003 2010 2008	13	36	11	19	18	17'-7½"	4-3	18'-0"	G	12	1	1
28	1601 1712 1911 2008	1602 1809 1912 2011	1603 1810 2001 2012	1604 1811 2002 2013	1708 1908 2004 2014	1710 1909 2005	1711 1910 2007	1706 1812 1906 1907 2006	1707 1813 1914 2009	1714 1814 2003 2010 2008	13	36	11	19	18	17'-7½"	4-3	18'-0"	G	12	1	1
29	1601 1712 1911 2008	1602 1809 1912 2011	1603 1810 2001 2012	1604 1811 2002 2013	1708 1908 2004 2014	1710 1909 2005	1711 1910 2007	1706 1812 1906 1907 2006	1707 1813 1914 2009	1714 1814 2003 2010 2008	13	36	11	19	18	17'-7½"	4-3	18'-0"	G	12	1	1
30	1601 1810 2001 2012	1602 1811 2002 2013	1603 1908 2004 2014	1604 1909 2005	1708 1910 2007	1712 1911 2008	1809 1912 2011	1706 1813 1914 2009	1714 1814 2003 2010	1812 1906 2006 1907	13	24	11	13	12	13'-6"	3-3	13'-6"	F	11	1	–
31	1601 1908 2008	1602 1912 2011	1603 2001 2012	1604 2002 2013	1809 2004 2014	1810 2005	1811 2007	1713 1813 1914 2009	1715 1814 2003 2010	1812 1906 2006	12	11	1	11	8	7'-2"	3-2	9'-0"	E	8	2	1
32	1601 2001 2012	1602 2002 2013	1603 2004 2014	1604 2005	1809 2007	1810 2008	1811 2011	1713 1813 1915 2009	1715 1814 2003 2010	1812 1913 2006	11	10	3	9	8	7'-2"	3-2	9'-0"	E	6	3	2
33	1601 2001 2012	1602 2002 2013	1603 2004 2014	1604 2005	1809 2007	1810 2008	1811 2011	1713 1813 1915 2009	1715 1814 2003 2010	1812 1913 2006	11	10	3	9	8	7'-2"	3-2	9'-0"	E	6	3	2
34	1601 2001 2012	1602 2002 2013	1603 2004 2014	1604 2005	1809 2007	1810 2008	1811 2011	1713 1813 1915 2009	1715 1814 2003 2010	1812 1913 2006	11	10	3	9	8	7'-2"	3-2	9'-0"	E	6	3	2
35	1601 2001 2012	1602 2002 2013	1603 2004 2014	1604 2005	1809 2007	1810 2008	1811 2011	1713 1813 1915 2009	1715 1814 2003 2010	1812 1913 2006	11	10	3	9	8	7'-2"	3-2	9'-0"	E	6	3	2
36	1601 2001 2012	1602 2002 2013	1603 2004 2014	1604 2005	1809 2007	1810 2008	1811 2011	1713 1813 1915 2009	1715 1814 2003 2010	1812 1913 2006	11	10	3	9	8	7'-2"	3-2	9'-0"	E	6	3	2
	SUB TOTAL										197	381	122	228	200	202'-11"	–	238'-6"	–	140	31	14
	SPARES										43	9	8	22	—	57'-1"	–	21'-6"	–	10	X	X
	TOTAL										240	390	130	250	200	260'-0"	–	260'-0"	–	150	20	10

GALLUP—K. C., MO.



SECTION "A-A"



SECTION "B-B"

DETAILS OF RACKS — C-5702

No.	REVISION	BY	DATE
1	REVISED & REDRAWN FROM D-7[illegible]	[illegible]	10-26-[illegible]

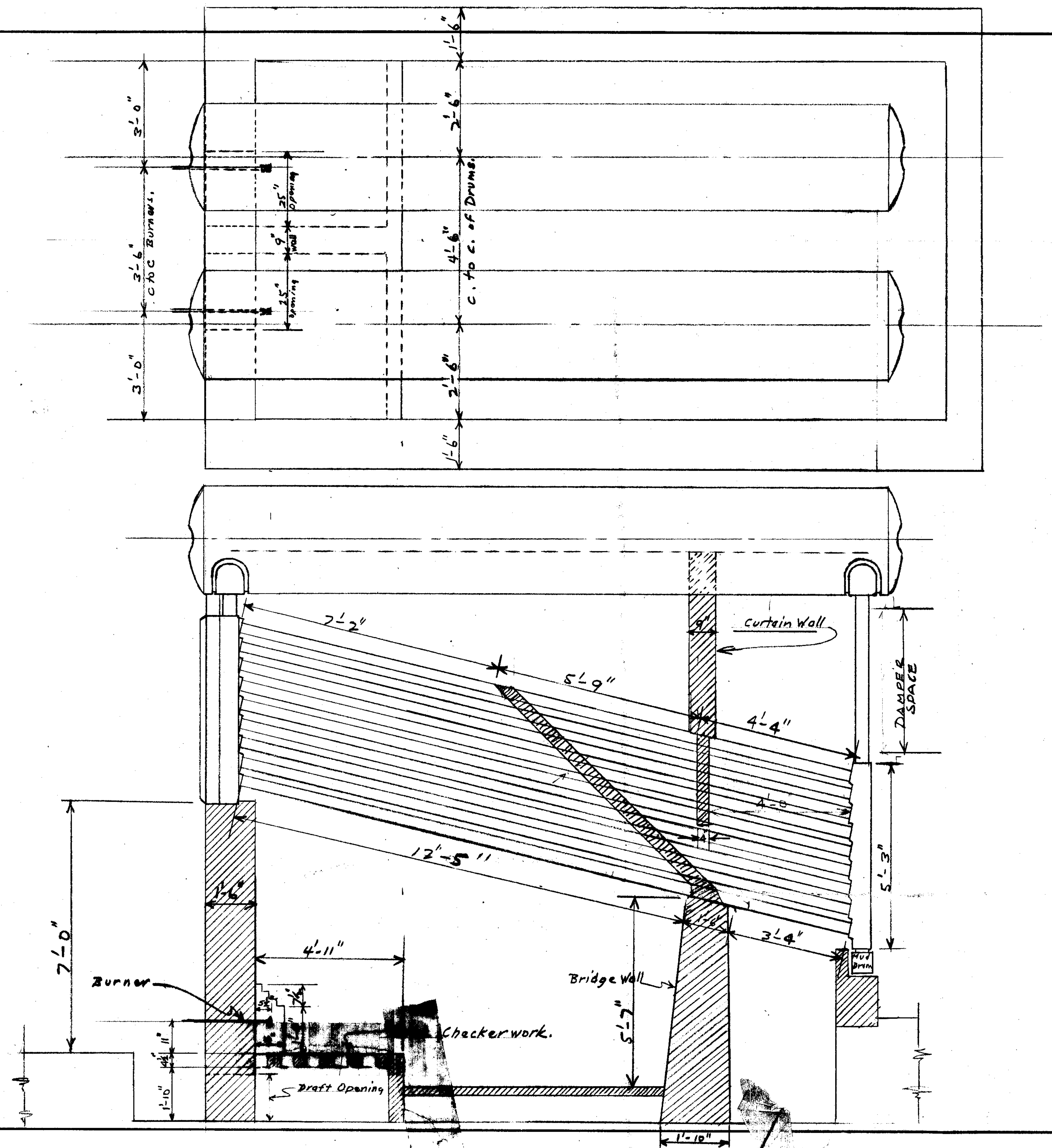
THE KANSAS POWER AND LIGHT CO.
TOPEKA, KANSAS

CABLE RACK SCHEDULE & SECTIONS "A-A" & "B-B"
VAN BUREN STATION.

Dr. [illegible] | Ch. | Scale 1"=1'-0"
Tr. | O. K.
App. | App.
Date OCT. 24-1929

C-5764

N



THE KANSAS POWER AND LIGHT CO. TOPEKA, KANSAS	
PLAN AND LONGITUDINAL SECTION OF 300HP B+W BOILERS - VAN BUREN STREET POWER STATION.	
Dr. OKJ	Ch.
Tr.	O. K.
App.	App.
Date 1-5-28	
Scale ¼"=1'-0"	C-5498

NO.	REVISION	BY	DATE

ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

DETAILS OF CONDUITS AND BUS TIE,
FOR 13,200 V. TRUCK BREAKERS
KANSAS POWER AND LIGHT Co. TOPEKA, KAN.

DR. W.H.B. 10-1-25
TR.
CH. ERW 10-12-25
O.K. J.D. 12/3/25
APP. [illegible]

SCALE 1/2" = 1 FOOT
CONT. NO. | SHEET NO.
C-18597

DWG_LABEL FM013426

DWG_LABEL FM013427

NO	REVISION	BY	DATE
1	ADDED CHOKE COILS	W.H.B.	12-2-25

ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

STEEL LINE RACK FOR 2300 VOLT FEEDERS
KANSAS POWER AND LIGHT CO.
TOPEKA, KAN.

DR. W.H.B. 10-5-25
CH. E.R.W. 10-12-25
O.K. J.J.D. 10/17/25

SCALE 1/2" = 1 FOOT
CONT. NO.
SHEET

C-185

CONDUIT AND WIRE LIST
TOPEKA INSTALLATION

Cond. No.	For	From	To	Wire Size	Wire Length	Wire Purch. Order	Conduit Size	Conduit Length	Conduit Purch. Order
		Engine Room Panels							
	Panel #1- Swinging Bracket								
	Panel #2- 1000 K.W. Generator								
	Panel #3- M.G. Set	- A.C. Motor							
	Panel #4- 1000 K.W. Generator								
	Panel #5- 6000 K.V.A. Double Circuit Transf.								
5-A	2.3 K.V. Secondary	1667 KVA Tran.	Oil Switch	1-0- VC					
				(750,000 CM	166	69125	3"Fib.	140	66065
5-B	" " "	" " "	" "	" "	166	69125	3" "	140	66065
5-C	" " "	" " "	" "	" "	166	69125	3" "	140	66065
5-D	" " "	" " "	" "	" "	166	69125	3" "	140	66065
5-E	" " "	" " "	" "	" "	166	69125	3" "	140	66065
5-F	" " "	" " "	" "	" "	166	69125	3" "	140	66065
5-G	Future Neutral	" " "	" "		–		3" "	140	66065
5-H	2.3 K.V. Secondary	Oil Switch	614 Station Bus	1-0- VC					
				(1,000,000 CM	50	R-1398	3" "	20	66065
5-I	" " "	" "	" "	" "	50)		3" "	20	66065
5-J	" " "	" "	" "	" "	50)		3" "	20	66065
5-K	(O.S. Control-	Panel #5	Junction Box	4) 19/22	375	69126	1½"Ir.	20	
	(Current Transfs.	" "	" "	3)					
	(Potent Transfs.	" "	" "	3)					
5-K1	O.S. Control-	Junction Box	Oil Switch	4)					
	Current Transfs.	" "	" "	4) 19/22	240	69126	1½"Ir.	10	
	Potent. Transfs.	" "	" "	3)					
5-L									
5-M	2.3 K.V. Secondary	Future Transf.	Fut. Oil Sw.	Ducts only			3"Fib.	60	66065
5-N	" " "	" "	" " "	" "			3" "	60	66065
5-P	" " "	" "	" " "	" "			3" "	60	66065
5-Q	" " "	" "	" " "	" "			3" "	60	66065
5-R	" " "	" "	" " "	" "			3" "	60	66065
5-S	" " "	" "	" " "	" "			3" "	60	66065
5-T	Neutral						3" "	60	66065
5-U									
5-V									
	Panel #9 - 1500 K.W. M.G. & 600	K.W. M.G. -		125/250 V. D.C.					
9-A	M.G. Mains Pos.	Panel #112	3 Wire Bus	4-1"x4"	420'		–		
9-B	" " Neg.	" 113	" "	6-1"x4"	480		–		
9-C	" " Neut.	" 114	" "	1-1"x4"	70				
9-D	Ammeter	SHUNTS	Panel #9	6-19/22		G.E.Co.	1¼"	60	68316
9-E	O.B. Control			4-19/22					
	Field Control			3-19/22	500		1½"	60	
	Panel #23 - 750	K.W. Rotary -	600 V.						
23-A	D.C. Mains Pos.	750 KW Rotary	Pos.Bx. APL.#3	1-1,000,000	65	69125	3"Fib.	60	
23-B	" " "	" " "	" " " "	"	65	69125	3" "	60	
23-C	" " Neg.	" " "	" " " "	"	65	69125	3" "	60	
23-D	" "	" " "	" " " "	"	65	69125	3" "	60	
23-E	" " Equ.	" " "	"Alt.Bus"	"	65	69125	3" "	60	
23-F	" Field		"Ex.APnl. #2	1- #6 -	70		2" I.	60	68316
23-G	P.F.M.-Current	Panel - 111	" " " " #2	2-19/22	340	69126	1" Ir.	75	
	P.F.M.- Pot.	" - 111	" " " "	2-)					
23-H	Speed Limit	Rotary	" " " " 23	2- 12	140	69126	¾" I.	65	68316
		Battery Room Panels							
	Panel #101 - Swinging Bracket								
	Panel #102 - Rotary Converter								
102-A	13.2 K.V. Mains	Panel #102	Transf. [illegible]	3- 1/0- VC	105'	69124	3½" I.	30	68316
				#4-					
	Panel #103 13.2	K.V. Outgoing Line							
103-A	13.2 K.V. Mains	Panel #103	Line Rack	3- 1/0- VC	75'	69124	4" I.	20	68316
				350,000 CM					
	Panel #104 13.2	K.V. Incoming Line							
104-A	13.2 K.V. Mains	Panel #104	Line Rack	3- 1/0- VC					

Cond. No.	For	From	To	Wire Size	Length	Purch. Order	Conduit Size	Purch. Order	Cond. No.
	Panel #104 13.2 K.V. Incoming	Line (Cont.)							
				350,000 CM	75	69124	4½" I	20	68316
	Panel #105 13.2 K.V. Transformer								
105-A	13.2 Mains	Panel #105	Junction Box	3-1/0- VC)	60		4" I	15	68316
				#2/0)		69124			
105-A1	13.2 Mains	Panel #105	" "	3-1/0- VC)	60		4" I	15	68316
				#2/0		69124			
105-A2	6.6 K.V. Mains	Junction Box	Panel #109	3- 1/0 VC)	200	69124	4" I	60	68316
				#1/0		69124			
105-A3	Transf. Prim.	Junction Box	Transf. #1	3- 1/0 VC)	35		4" I	8	68316
				2- #2/0		69124			
				1- #1/0	20	69124			
105-A4	" "		" "	" #2	2- #2/0)	60'	69124	4" I	15	68316
				1- #1/0)	20	69124			
105-A5	" "		" "	" #3	2- #2/0)	90'	69124	4" I	25	68316
				1- #1/0)	45	69124			
105-B	Diff. Relays	Panel 105	Junction Box	7-)19/22)	850		1½" Ir	180	
				1-))					
105-C	Diff. Relays	"	Panel 109	4- 19/22	200		1" I	30	68316
	Aux. Switches								
	Panel #106 Future Line								
	Panel #107 Future Transformer								
	Panel #108 Incoming Line								
108-A	13.2 K.V. Mains	Panel 108	Line Rack	3-1/0- VC	75		4½" I	20	68316
				350,000 CM		69124			
	Panel 109 - M.G.	Set 13.2 K.V.	Motor Starting						
109-A									
	Panel 110 - M.G.	Set 13.2 K.V.	Motor Running						
110-A	13.2 K.V. Mains	Panel 110	Syn. Motor	3-1/0- VC)	[illegible]		4" I	45'	68316
				#1/0)		69124			
110-B	Field Control	Panel 110	Panel 114	3-)19/22)	[illegible]		1½" I	45	
	Rheostat Control	" "	" "	3-)19/22)					
110-C	Ammeter	Panel 110	" "	2- 19/22		G.E.Co.	3/4"	45	68316
	Panel #111 - Rotary A.C. Starting								
111-A	A.C. Running	Rty. Transf.	Panel #111	3-1/0- VC	[illegible]		Open		
				1,000,000		69125			
111-B	A.C. Starting	" "	" #111	3- 1/0 VC	25				
				400,000		69125			
111C-1	A.C. Running	" "	Rotary	1- 1/0- VC)	25		2" F	15	
				1,000,000)		69125			
111C-2	A.C. Running	" "	"	")	25	69125	2" F	15	
111C-3	" "	" "	"	"	25	69125	2" F	15	
111D-1	" "	Panel #111	"	"	20	69125	2" F	15	
111D-2	" "	" "	"	"	20	69125	2" F	15	
111D-3	" "	" "	"	"	20	69125	2" F	15	
111 F	Voltmeter	" "	"	2- #12	50		3/4" I	20	68316
	Panel #112 -	Positive Circuit Breaker							
112 A	D.C. Generator	Machine Pos.	Panel #112	1-1/0 VC	25		3" F	15	
				2,000,000 CM		69126			
112-B	" "	" "	" "	"	25	69126	3" F	15	
112-C	" "	" "	" "	"	25	69126	3" F	15	
112-D	" "	" "	" "	"	25	69126	3" F	15	
112-E	" "	" "	" "	"	25	69126	3" F	15	
112-F	" "	" "	" "	"	25	69126	3" F	15	
112-G	Speed Limit	Sp. L. Device	" "	2- #12	25	69126	3/4" I	15	
	Panel #113 -	Negative Circuit Breaker							
113-A	D.C. Generator	Machine Neg.	Panel #113	1-1/0 V.C.					
				2,000,000 CM	25	69126	3" F	15	
113-B	" "	" "	" "	"	25	69126	3" F	15	
113-C	" "	" "	" "	"	25	69126	3" F	15	
113-D	" "	" "	" "	"	25	69126	3" F	15	
113-E	" "	" "	" "	"	25	69126	3" F	15	
113-F	" "	" "	" "	"	25	69126	3" F	15	
	Panel #114	M.G. Set Neutral & Field							
114-A	Comp. Field	Shunt Field	Panel #114	1- #6	20'	69126	3/4" I	10	
114-B	" Neutral	Machine	" "	1-1,000,000	20	69126	3" F	12	
114-C	" "		Compensator	1-1,000,000	35	69126	3" F	30	
114-D	" "	"	"	"	35	69126	3" F		
114-E	" "	"	"	"	35	69126	3" F		
114-F	Motor Field	"	Panel #114	2- #2	70	69126	1¼	30	
	2.3 K.V. Distribution Panels								
	Panel #201 -	Automatic Reclosing Feeder #1 (Future)							
201-A	Circuit #1 Mains	Gallery O. Sw.	New Bus Struct.	3-1/0 250,000	50	69125	3" I	10'	70943
201-B	" " "	New Bus Struct.	Regulators	"	125'	69125	3" I	35'	70943
201-C	" " "	Regulators	Line Rack	"	45'	69125	3" I	10'	70943
201-D	Regulator Comp.	C.T. & P.T.	Compensator	3- #12	50	69126	3/4" I	10'	
	Panel #202 -	Automatic Reclosing Feeder #2 (Future)							
202-A	Circuit #2 Mains	Gallery O. Sw.	New Bus Struct.	3-1/0 250,000	50	69125	3" I	10'	70943
202-B	" " "	New Bus Struct.	Regulators	"	80	69125	3" I	20'	70943
202-C	" " "	Regulators	Line Rack	"	45	69125	3" I	10'	70943
202-D	Regulator Comp.	C.T. & P.T.	Compensator	3- #12	50	69124	3/4"	10'	
	Panel #203 -	Automatic Reclosing Feeder #3 (Future)							
203-A	Circuit #3 Mains	Gallery O.Sw.	New Bus Struct.	3-1/0 250,000	50	69125	3" I	10'	70943
203-B	" " "	New Bus Struct.	Regulators	"	125	69125	3" I	35'	70943
203-C	" " "	Regulators	Line Rack	"	45'	69125	3" I	10'	70943
203-D	Regulator Comp.	C.T. & P.T.	Compensator	3- #12	50	69126	3/4" I	10'	
	Panel #204 -	Automatic Reclosing Feeder #4 (Future)							
204-A	Cir. #4 Mains	Gallery O.Sw.	New Bus Struct.	3-1/0 250,000	50	69125	3" I	10'	70943
204-B	" " "	New Bus Struct.	Regulators	"	80'	69125	3" I	20'	70943
204-C	" " "	Regulators	Line Rack	"	45'	69125	3" I	10'	70943
204-D	Regulator Comp.	C.T. & P.T.	Compensator	3- #12	50	69126	3/4"	10'	
	Panel #205 -	Automatic Reclosing Feeder #5 (New)							
205-A	Cir. #5 Mains	Bus	O. Switch	3-¼"x1½"	75				
205-B	" " "	Oil Switch	Future Reg.	3-1/0 250,000	125'	69125	3" I	35'	70943
205-C	" " "	Future Reg.	Line Rack	"	45'		3" I	10'	70943
		Miscellaneous							
300-	Main Bus Tie	13.2 KV Group A	13.2 KV Group B	1/4" x 2"	75		Open		
300-A	" " "	"	"	3- 350,000	30		"		
301-	Aux. Bus Tie	"	"	1/4" x 2"	75		"		
301-A		"	"	3- 350,000	30		"		
302	Control Bus Tie	"	"	7- 19/22	175		2"	20'	
				2- #4 -	75				
303	D.C. Control	3 W. Bus-125V	North Sw.Panel	3- #6	100		1¼"	5	
303-A	Air C.B.Control	N. Sw. Panel	Panel #114	2- #4	40		1¼"	15	
303-B	13.2KV O.S.Cont.	" " "	" #110	2- #4	100		1¼"	45	
304	D.C. Control	3 W.Bus-125 V	South Sw.Panel	3- #4	80		1¼"	20	
304-A	2.3KV O.S.Cont.	S. Sw. Panel	Panel #201	2- #4	85		1¼"	35	
305	R.C. Reg. Motor	220 V.3Ph.Transf.	S.Sw.Panel	3- #8	65		1"	25	
305-A	" E.Reg.Motors	S.Sw. Panel	E.Reg.Struct.	3- #8	130		1"	40	
305-B	" W. "	" "	W. " "	3- #8	100		1"	30	
310	Main Ground Bus	Along W.Wall		1- ¼"x1½"	130'				
310-A	Reg. & 2.3 Gd. Bus	Main Gd. #310	Reg.&2.3KV Struct.	1-¼"x1½"	25'				
310-B	M.G. Gd. Bus	" " "	1500KW Gen.&Comp.	"	45'				
310-C	Rotary " "	" " "	Rotary&Transf.	"	20				
310-D	Truck " "	" " "	Groups A & B	"	50				
310-E	O.D.Transf. Gd.	" " "	7667 KVA Transf.	"	30				
311	2.3 KV Str.Gd.	Gd. 310 A	Along Struct.	1/4"x 1"	30				
312	E.Reg. Gd.	" "	Along "	"	30				
313	W. " "	" "	" "	"	30				
314	E. 13.2 Truck Gd.	" 310 D	" "	"	30				
315	W. " " "	" "	" "	"	30				

Notes:

For Conduit Plan See Dwg. #C-18572.

For Wiring Diagram See G.E. #T-1617235.

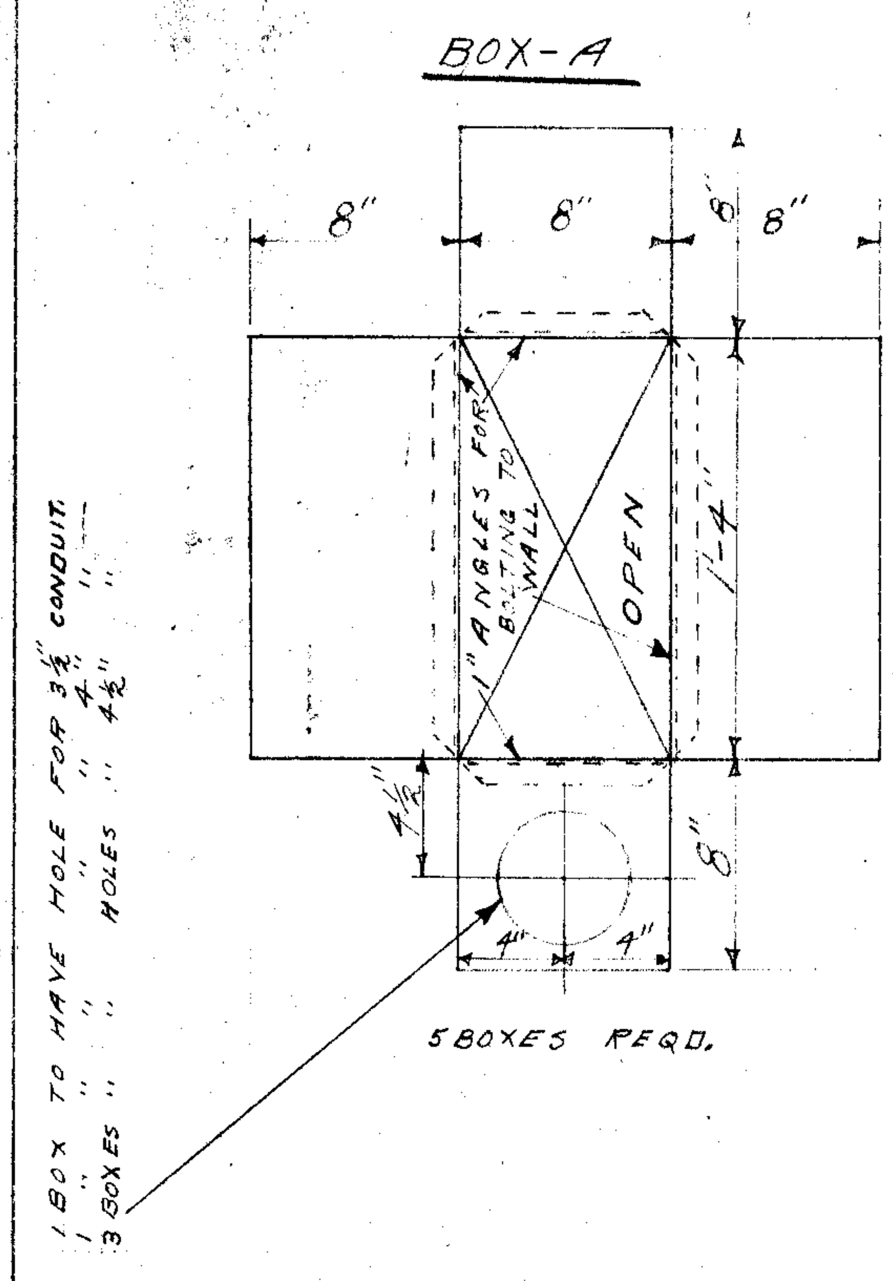
REVISION
1 CHANGED CONDUIT 9-D WHB 10-18-25
2 ADDED TWO WIRES WHB 10-28-25

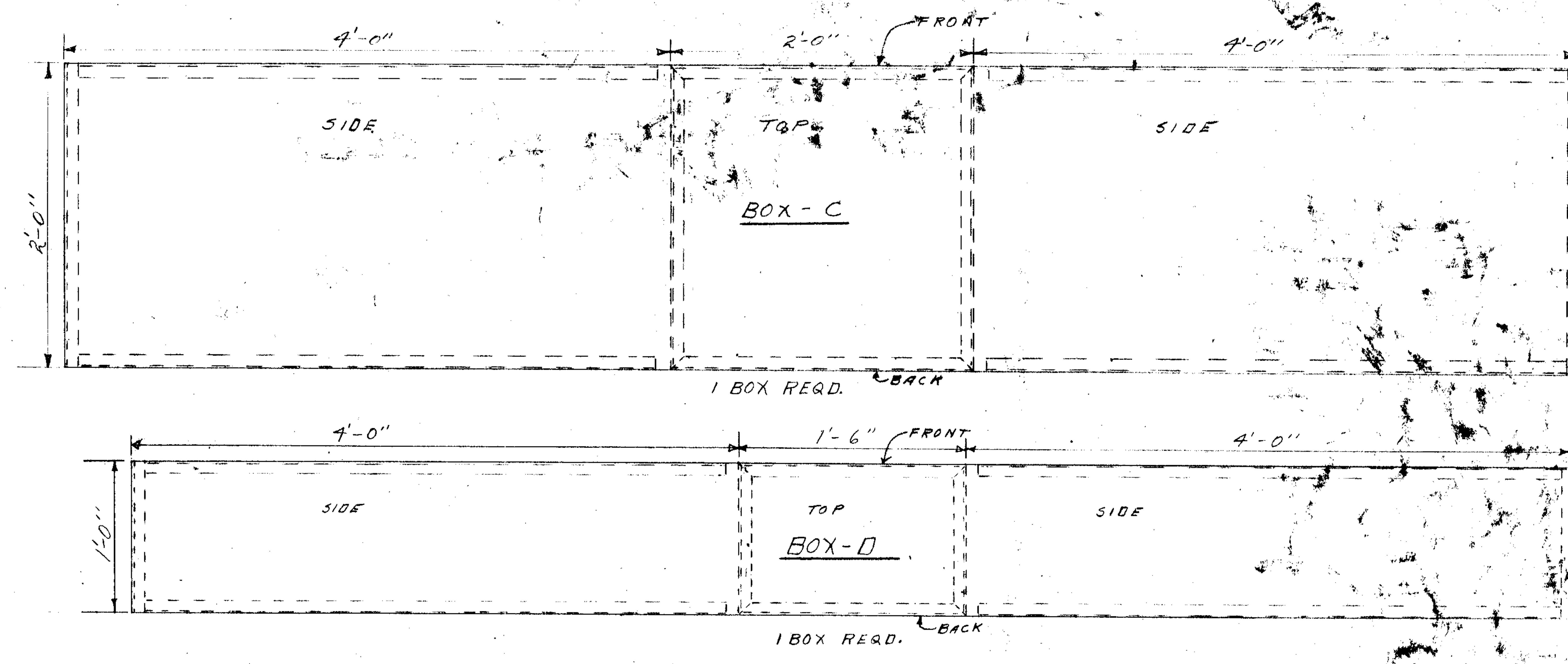
ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

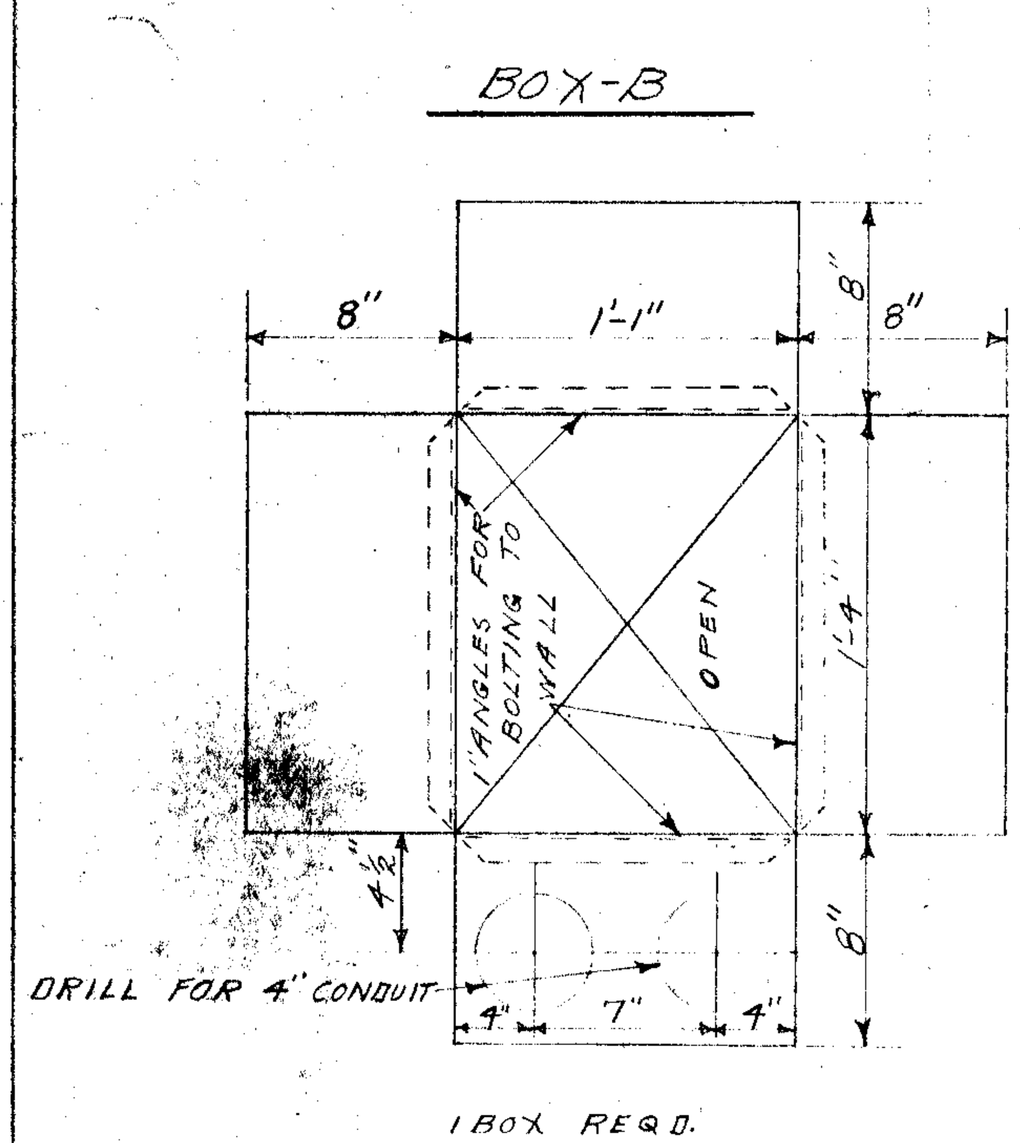
WIRE AND CONDUIT TABLE
KANSAS POWER AND LIGHT CO.
TOPEKA, KAN.

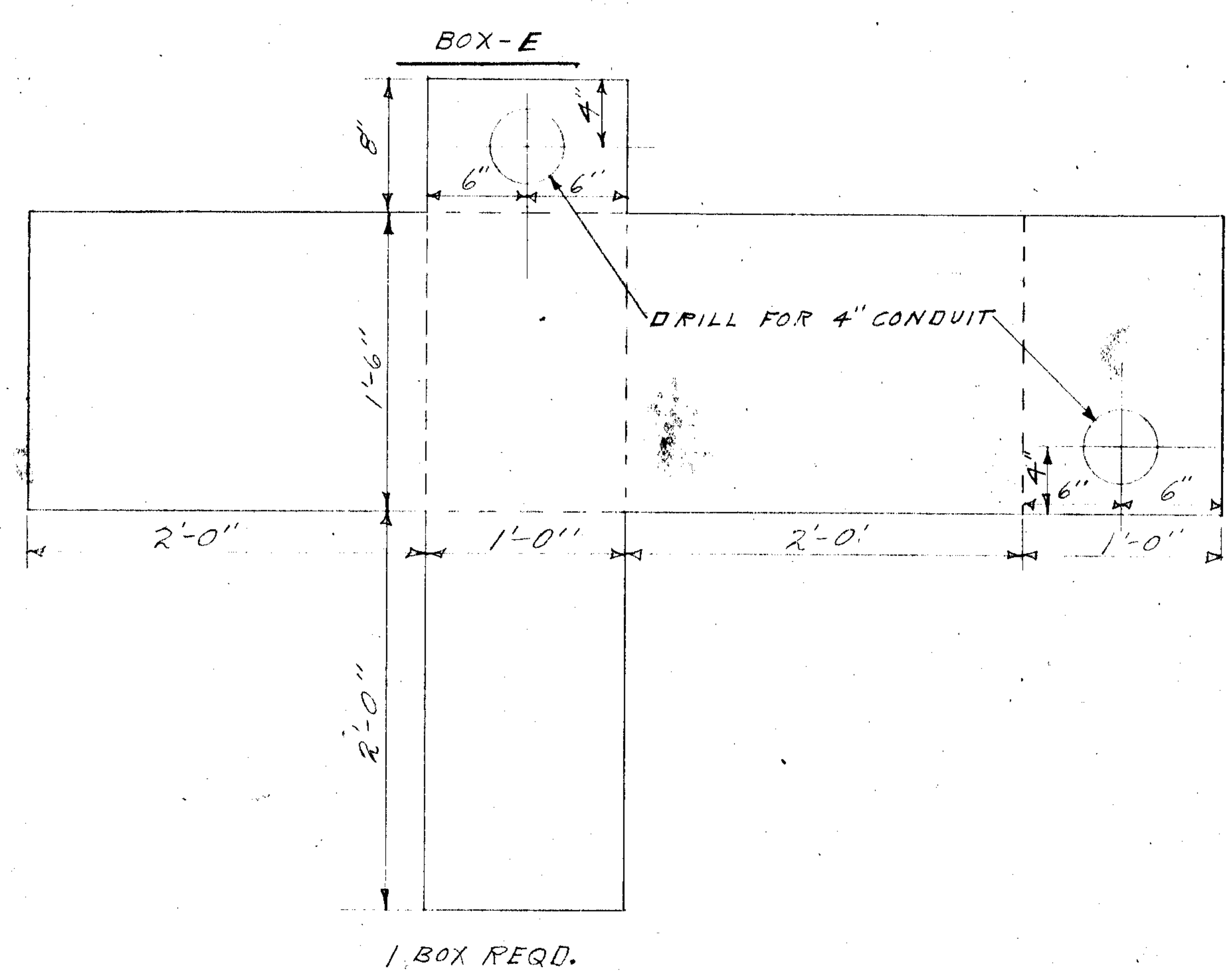
DR. 10-1-25
CH.
APP.

B-18596









NOTE!—
ALL ANGLES WILL BE ON INSIDE OF BOXES.
BOXES -A-B-AND-E WILL BE MADE OF # 12 GAUGE SHEET IRON.
BOXES A- AND- B WILL HAVE NO BACKS.
BOXES C- AND- D WILL BE MADE OF #10 GAUGE SHEET IRON.
ALL EDGES OF BOXES C-AND-D WILL BE REINFORCED WITH 1" ANGLES, THE ANGLES ON THE BACK AND BOTTOM WILL BE DRILLED FOR BOLTING TO FLOOR AND WALL.
ALL BOXES WILL HAVE SCREWED COVERS.
COVERS FOR BOXES C-AND-D SHOULD BE REINFORCED WITH STRIPS OF SOFT STEEL.
BOXES C-AND-D WILL HAVE NO BACK OR BOTTOM
FOR LOCATION OF BOXES A-B-AND-E SEE DRWG.# C18597
" " " " C-AND-D SEE DRWG.# C18582
P.O.# 77384 AND # 77385

ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

DETAILS OF JUNCTION BOXES.
KANSAS POWER AND LIGHT CO.
TOPEKA, KAN.

DR. W.H.B.	10-6-25	SCALE 1½"=1 FOOT
TR.		CONT. NO. / SHEET NO.
CH. E.R.W.	10-12-25	B-18594
O.K. J.D.	10/27/25	
APP.		APP.


ENGINE ROOM
UP TO MAIN BUS
TO NEUTRAL BUS
TO 2300V. BUS
3-3" FIBER CONDUITS, AND 1-1,000,000 C.M. CABLE PER. PHASE.
WASH ROOM
¢ ANGLE IRON
I BEAM
2-¼"X3" COPPER BARS
TO: 2300 VOLT BUS IN ENGINE ROOM. FOR DETAILS SEE DRAWING #18594
PLAN
3-WIRE D.C. BUS
FUTURE AUX BUS
TYPE-FKR 132 B O.C.B. 1200 AMP. 7500V. P.O.#64949
END ELEVATION
ENGINE ROOM WALL
ROOF
DELTA STAR BUS BAR CLAMPS CAT.#102873 P.O.#69544
¼"X1½" COPPER BARS
DELTA STAR CO. CAT.#11064 BUS BAR SUPPORTS P.O.#70902 AND #69544
2-3" COPPER BARS.
DELTA STAR BUS BAR CLAMPS CAT.#102876 P.O.#69544
E.E.E. CO. CAT.#9260 CLAMP TEE P.O.#71248
E.E.E. CO. CAT.#5186 4-U-BOLT CLAMP CROSSES P.O.#71248
E.E.E. CO. CAT.#11945 DISC. S.W. P.O.71689
G.E. CO. PANEL FOR AUTOMATIC SWITCHING EQUIPMENT.
G.E. CO. TYPE FKR-132-B O.C.B. 1200 AMP. 7500V. P.O.#64949 ITEM S11
1¼ BLACK PIPE P.O.#70945
E.E.E. CO. CAT.#1651 FLOOR FLANGES P.O.#61248
CONC. FLOOR
E.E.E. CO. CLAMP TYPE INSULATORS CAT.#1459 P.O.#71248
EXTEND TO FLOOR
750,000 C.M. 5000V. CABLE P.O.#69125 2-CABLES IN PARALLEL PER. PHASE
FRONT ELEVATION KK
5000 K.V.A. TRANSF. OIL SWITCH
OLD 2300V. BUS
NEW 2300V. BUS
DISC. S.W.
O.C.B.
TRANSIT BOARD COVER
TO 13,200/2300V. 5000 K.V.A. TRANS. BANK
IND. VOLTAGE REG.
2300V. FEEDERS
ONE LINE DIAGRAM 2300 VOLT CONNECTIONS
TYPE-FKR 132 B 400 AMP. 15000V. O.C.B. P.O. 72016
ROOF BEAM
SECTION
FM013430
NO. REVISION BY DATE
① CHANGED CROSSES W.H.B. 11-16-25
ILLINOIS POWER & LIGHT CORPORATION
CHICAGO
TOPEKA POWER STATION
2.3 K.V. BUS STRUCTURE.
1925 INSTALLATION.
SCALE ¾"=1 FOOT
C-18593

NOTE
FOR LOCATION OF GROUND BUS AND CONNECTIONS SEE DWG. # 18587.
DRAIN ALL CONDUITS TO PITS.

REFERENCE DRAWINGS
C-18582-GENERAL ARRANGEMENT PLAN
B-18596 CONDUIT & CABLE LIST.

NO	REVISION	BY	DATE
1	REMOVED CONDUIT # 90	W.H.B.	10-19-25
2	ADDED 2 PANELS	W.H.B.	10-20-25
3	ADDED CONDUIT # 90	W.H.B.	10-28-25

ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

PLAN OF CONDUITS
KANSAS POWER AND LIGHT CO.
TOPEKA, KAN.

DR. W.H.B. 9-24-25
TR.
CH.
O.K. E.R.W. 9-25-25 J.D. 10-1-25

SCALE 1/4", 1" = 1 FOOT.
CONT. NO. | SHEET NO.
C-185?2

NOTE. ALL STEEL TO BE GALVANIZED.

NO.	REVISION	BY	DATE

ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

PLAN AND SECTIONS SHOWING 13,200V. INCOMING AND OUTGOING LINES.
KANSAS POWER AND LIGHT CO. TOPEKA, KANSAS.

DR. W.H.B. 7-29-25
TR.
CH. E.R.W. 9-23-25
O.K. J.T.D. 9-20-25

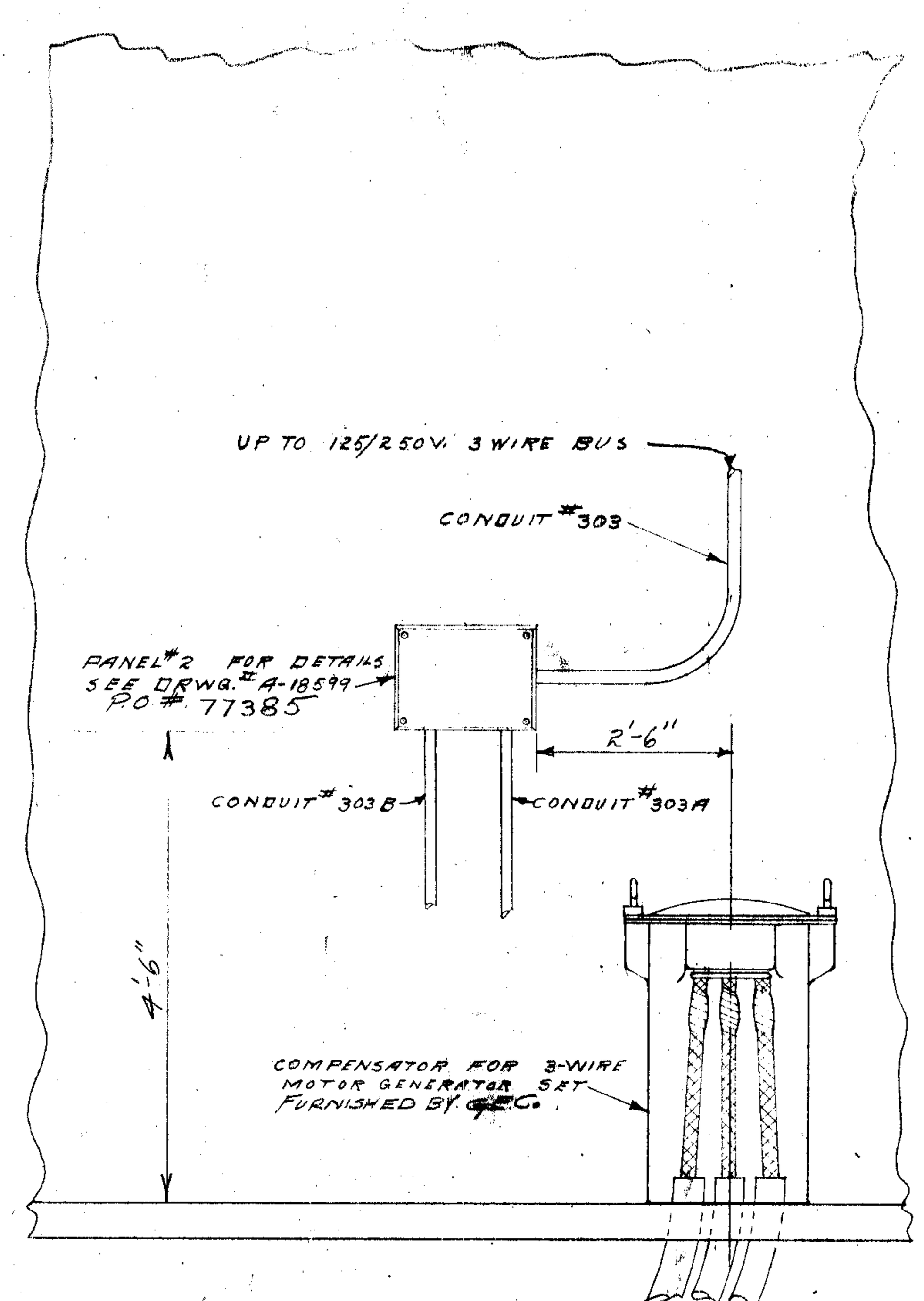
SCALE 1/2" - 1 1/2" = 1 FOOT
CONT. NO.
SHEET NO.

C-18589

C-18589

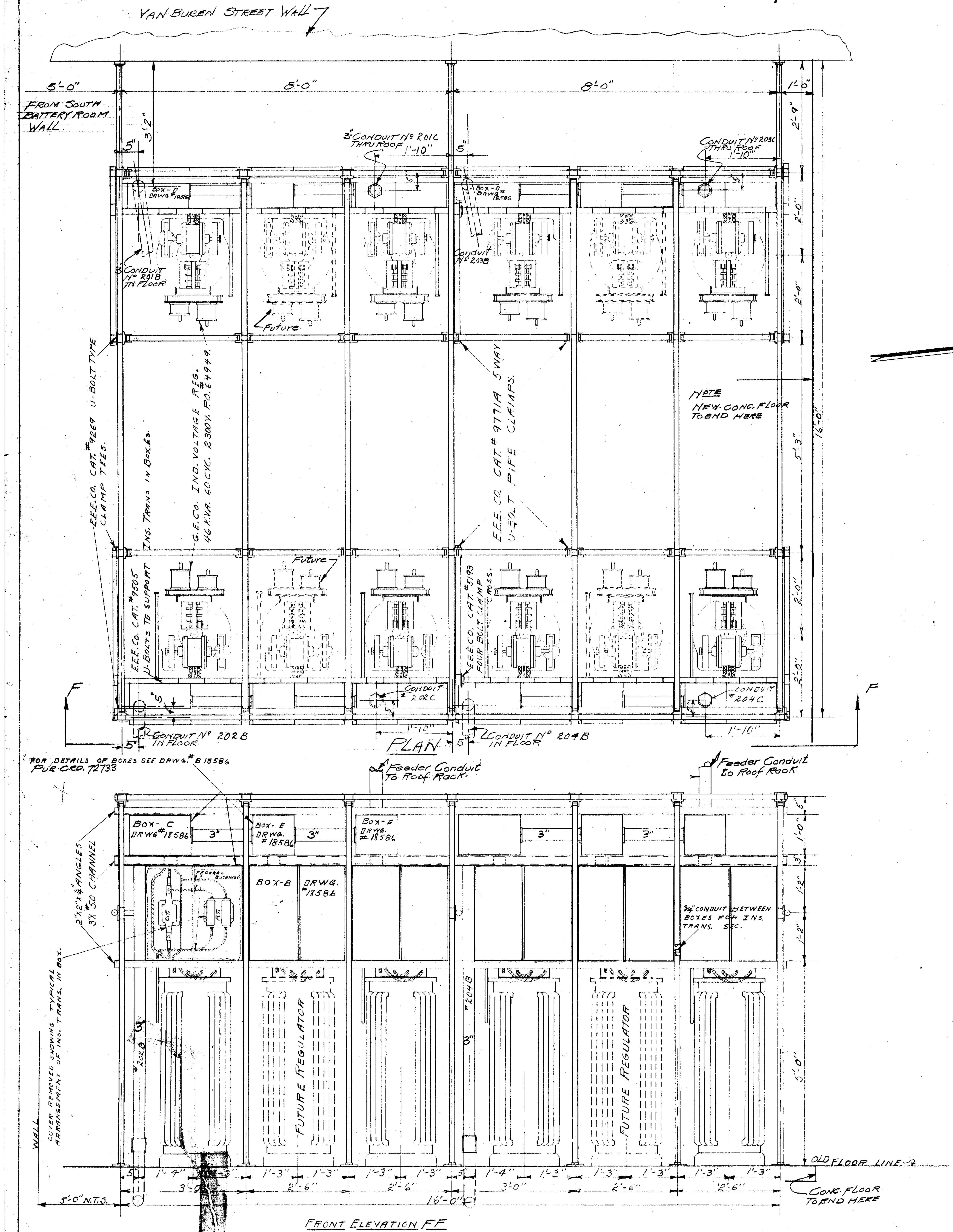
Balcony Outline
No. 1 Engine
No. 2 Engine
E-W Axis Line
"C"
"A"
"B"
#302
#303
#304
#305
#306
#307
#308
#309
4'-7"
7'-5"
5'-1"
6'-2¾"
#102
#103
#104
#105
#106
#107
#26
#25
#24
#23
#22
#21
Extend Present D.C. Bus As Shown
Section "A-A"
Section "B-B"
Section "C-C"
Panels
1½" Pipe
#314066 Deltastar
#318026 Deltastar
1½" Ebony Asbestos Barrier
5'-7"
Notes:- This Barrier Ordered With Slots As Shown By Dotted Lines. Change Slots In Field As Shown.
Ebony Asbestos Barrier For D.C. Bus.
Location Of Conduits Behind Panels.
FM013433
No.
REVISION
BY
DATE
THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS
LOCATION OF SWITCHBOARDS.
VAN BUREN. PLANT.
DR.
CH.
SCALE ½"=1'-0"
TR.
O. K.
APP.
APP.
D-
DATE Oct. 24-1929

PLAN
SCALE ¼"=1 FOOT.

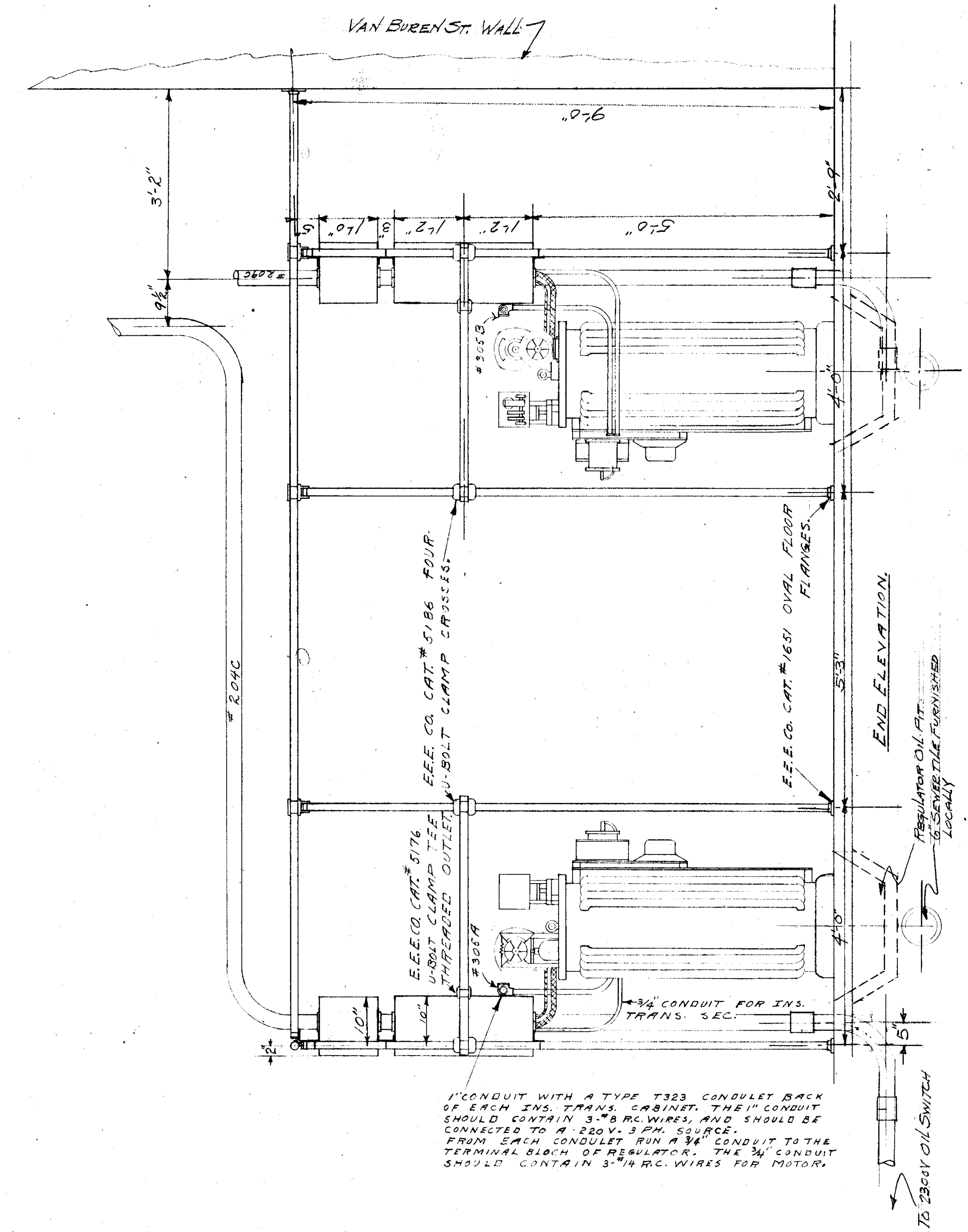


SECTION-BB
SCALE ¾"=1 FOOT.

ILLINOIS POWER & LIGHT CORPORATION CHICAGO	
PLAN SHOWING GENERAL ARRANGEMENT KANSAS POWER AND LIGHT CO. TOPEKA, POWER PLANT	
DR. W.H.B. 10-21-25	SCALE ¼"=1 FOOT
TR.	
CH. ERW 12-2-25	
O.K. J.D. 12-3-25	C-1858



N



REFERENCE DRAWINGS

C-18582. GENERAL ARRANGEMENT PLAN.
C-18587. FOUNDATION PLAN & DETAILS.
C-18592. CONDUIT PLAN.

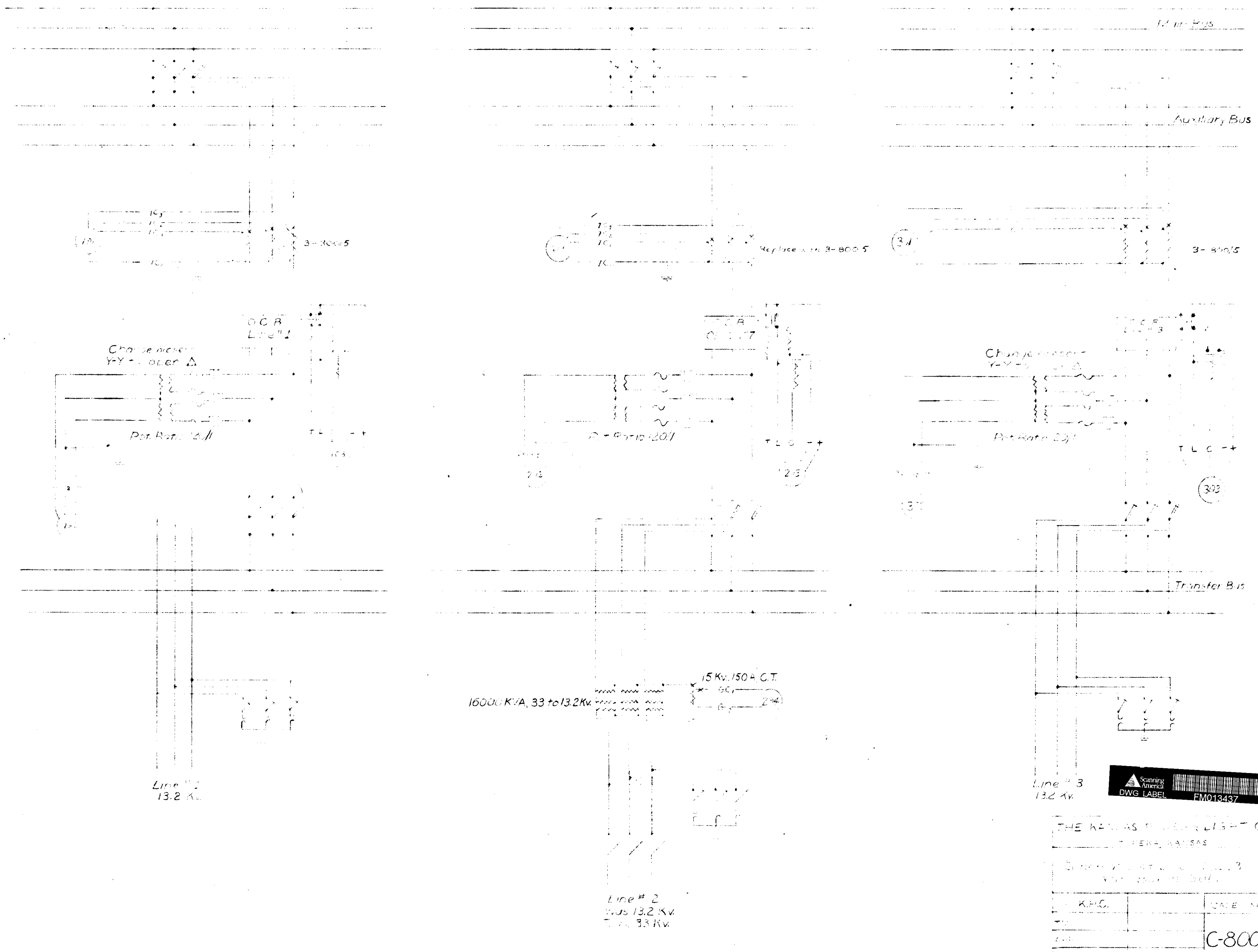
NO	REVISION	BY	DATE

ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

PLAN AND ELEVATION OF STRUCTURE FOR INDUCTION VOLTAGE REGULATORS.
KANSAS POWER AND LIGHT CO. TOPEKA, KANSAS.

DR. W.H.B. 7-16-25
TR.
CH. ERW 9-20-25
O.K. T.J.D. 9/20/25
APP'D
SCALE 3/4" = 1 FOOT
CONT. NO.
SHEET NO.
C-18585


VAN BUREN STREET
AIR INTAKE
TO BE DETERMINED IN FIELD
GROUND PLATE
LOUVER
GROUND BUS # 310
GROUND BUS # 310 B
GROUND BUS # 310A
GROUND BUS # 310C
TAP GROUND BUS ON STRUCT.
TAP GROUND BUS ON STRUCTURE
REGULATOR FOUNDATIONS
4-6" TILES TO CONNECT TO SEWER
NEW CONC. FLOOR AT PRESENT FLOOR ELEV.
PRESENT FLOOR
NEW CONC. FLOOR
2300 VOLT BUS STRUCTURE
℄ FUTURE 2300V. BUS
TAR. ROT. TRANS.
ROTARY TRANSFORMER FOUNDATION FOR DETAILS SEE GE
TAP ROTARY FRAME
1500 KW. 3W. M.G. SET FOUNDATION FOR DETAILS SEE GE # T-2851134
750 KW. ROTARY FOUNDATION FOR DETAILS SEE GE T-285117
TRUCK SWITCHBOARD FOUNDATIONS FOR DETAILS SEE GE T-1617235
TAP TRUCKS
PLAN
SCALE 1/8" = 1 FOOT.
1/2" MACH. BOLTS
4"x4"x3/8" ANGLES
3/8" STEEL PLATE
#22 GAUGE LOUVERS
1"x1"x1/8" ANGLE
#18 GAUGE SLIDE
SECTION - KK
SCALE 1" = 1 FOOT.
SECTION - EE
SCALE 1/4" = 1 FOOT.
3/8" bars @ 6" c-c's PUR. ORD. 69473
△ MESH PO # 69472 STYLE 245
6" I BEAMS PUR. ORD. 70627
SECTION - DD
SCALE 1/4" = 1 FOOT
SECTION - CC
SCALE 1/4" = 1 FOOT
SECTION - BB
SCALE 1/4" = 1 FOOT
SECTION - AA
SCALE 1/4" = 1 FOOT
DRILL FOR 1/2" ROUND RODS. PUT 1/2" PIPES, 1" LONG OVER RODS FOR SPACERS.
1/4" x 1 3/4" SOFT STEEL BARS ON EDGE.
GRATING FOR AIR INTAKE
SCALE 1/2" = 1 FOOT
PUR. ORDER Nº 70627.
1/2" x 8" MACH. BOLTS.
SECTION - LL
SCALE 1" = 1 FOOT.
TYPICAL PLAN
SCALE 1" = 1 FOOT.
TYPICAL SECTION - GG
SCALE 1" = 1 FOOT.
4" I BEAMS PUR. ORD. 70627
TYPICAL SECTION
SCALE 1" = 1 FOOT.
6" SEWER PIPE, CONNECTING ALL REGULATOR PITS TOGETHER, THEN DRAIN TO MAIN SEWER.
2"x2"x1/4" ANGLES
6" ABOVE GROUND LINE.
DRAIN TO 6" SEWER TILE AND RUN TILE TO MAIN SEWER.
SECTION - HH
SCALE 1/2" = 1 FOOT
△ MESH STYLE 245
SECTION - JJ
SCALE 1/2" = 1 FOOT.
REFERENCE DRAWINGS.
C-18582. GENERAL ARRANGEMENT PLAN.
C-18592. CONDUIT PLAN.
C-18585 PLAN & ELEVATION OF REGULATOR STRUCTURE
C-18593 2.3 KV BUS STRUCTURE
DWG_LABEL
FM013436
NO. REVISION BY DATE
ILLINOIS POWER & LIGHT CORPORATION
CHICAGO
PLAN AND DETAILS OF FOUNDATIONS FOR M.G. SET, SYN. CONVERTER AND VOLTAGE REGULATORS KANSAS POWER AND LIGHT CO. TOPEKA, KANSAS.
DR. W.H.B. 7-23-25
CH. EKW 9-21-25
O.K. J.J.D. 9/21/25
SCALE 1/8"-1/2"-1" = 1 FOOT.
C-18587



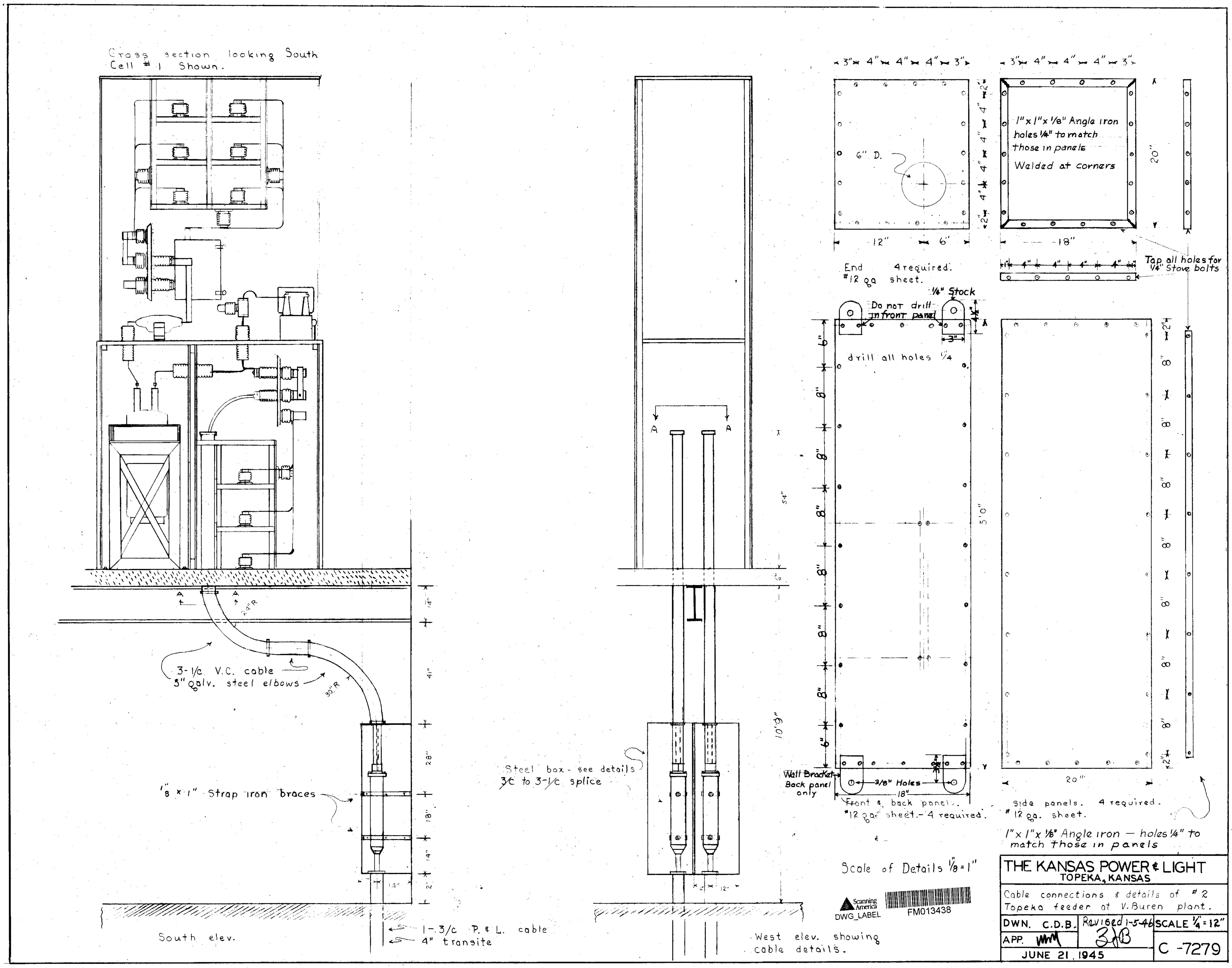
THE KANSAS POWER & LIGHT CO.

TOPEKA, KANSAS

K.P.C.

SCALE NONE

C-8001



THE KANSAS POWER & LIGHT
TOPEKA, KANSAS

Cable connections & details of #2
Topeka feeder at V. Buren plant.

DWN. C.D.B.	Revised 1-5-46	SCALE 1/4 = 12"
APP. WM	3-B	C-7279
JUNE 21, 1945		

DWG_LABEL FM013438

THE KANSAS POWER & LIGHT CO.
TOPEKA, KAN.

Wiring Diagram of Panels 1, 2 and 3
Van Buren Sub.

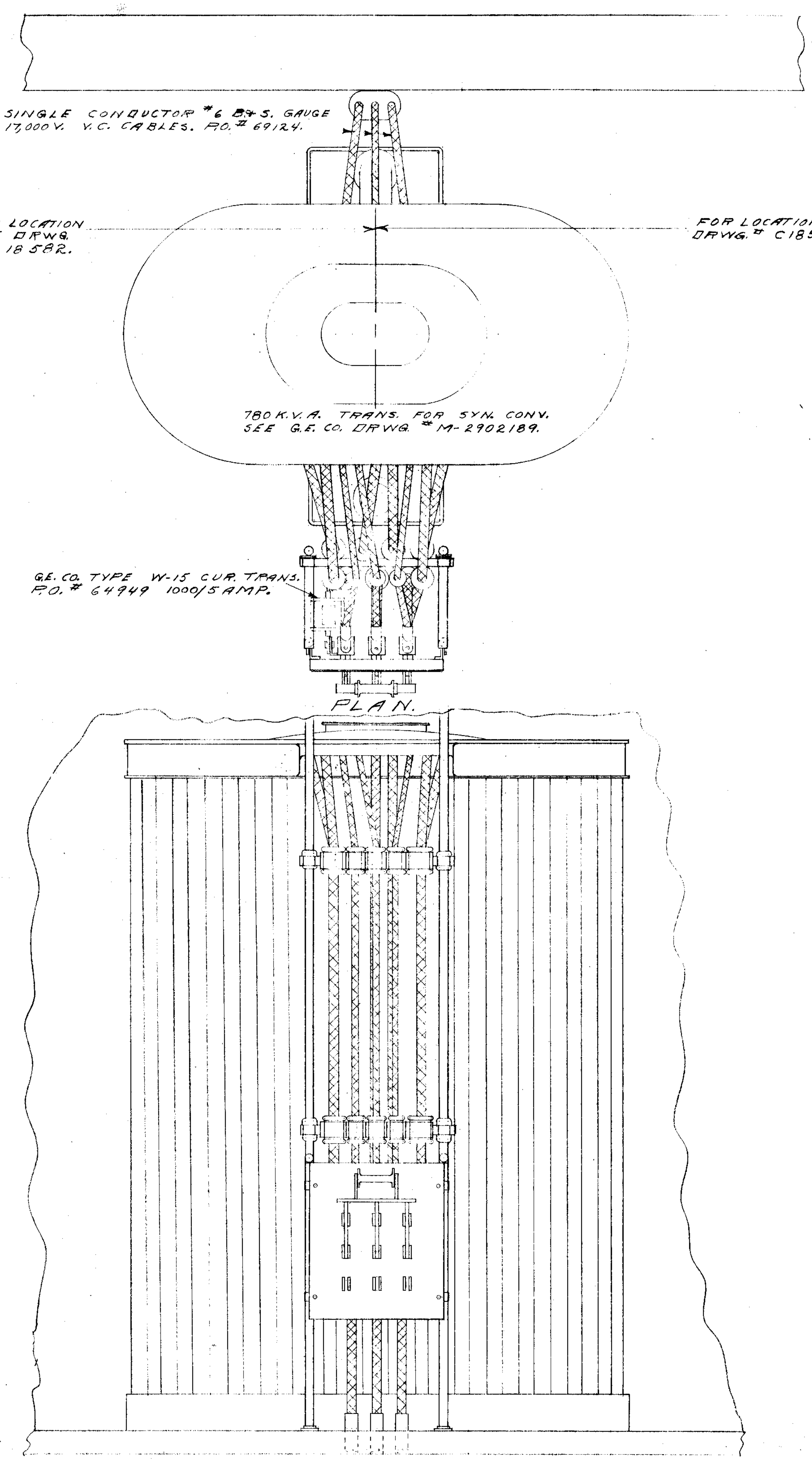
Dr. – K.H.C.

Scale – None

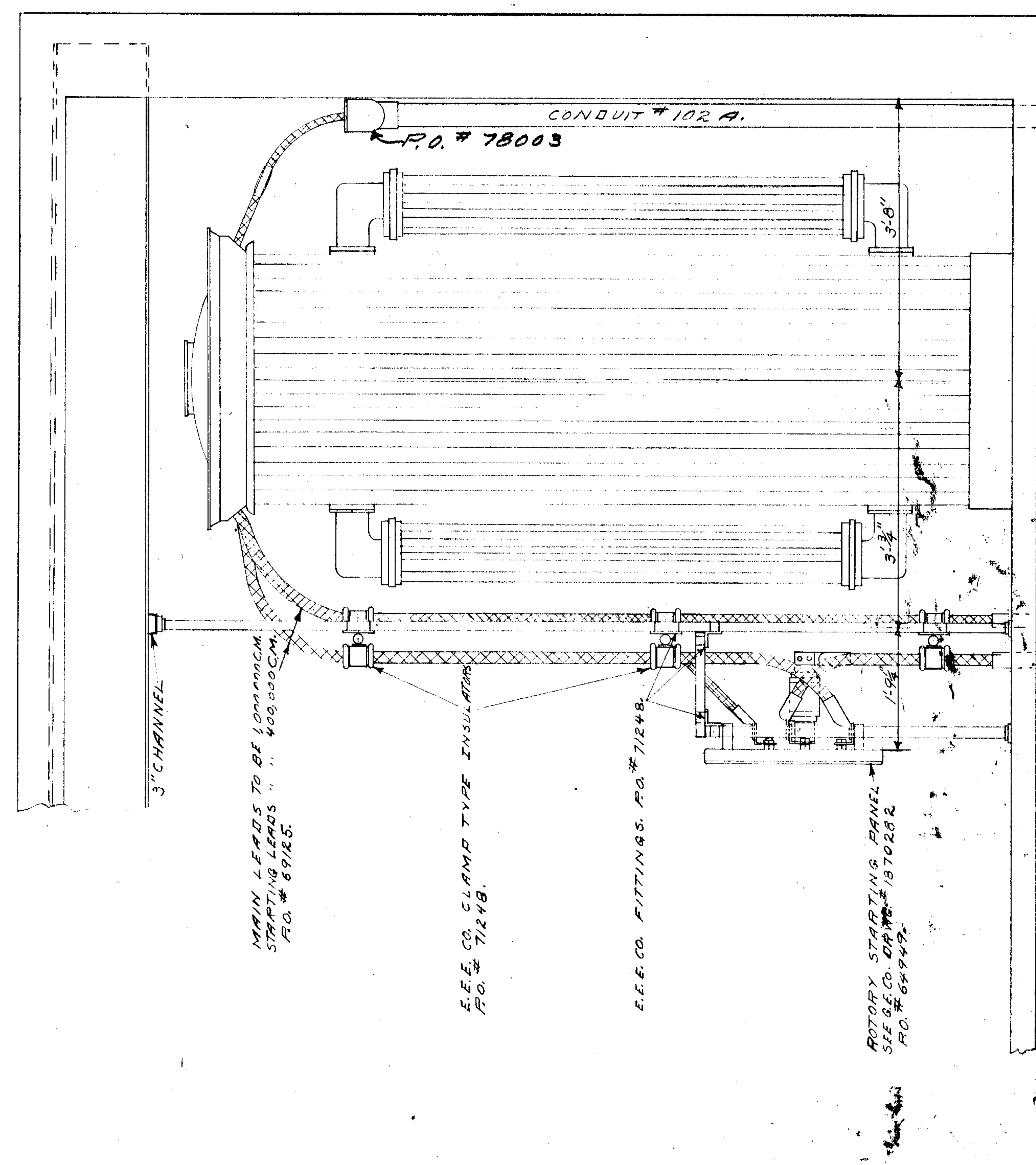
Date – Oct. 17, 1946

D-8002

ENGINE ROOM
N
2½"X3" ANGLE
3" CHANNELS
1-¼"X4" COPPER BAR
6-¼"X4" COPPER BARS
6-¼"X4" COPPER BARS
SEE DETAIL AA
THESE VERTICAL RISERS SHOULD BE LOCATED SO THE POSITIVE BUS WILL GO TO POSITIVE BUS WITH OUT CROSSING.
9'-0"
1'-4"
2'-0"
1'-0"
40'-1" N.T.S.
SOUTH WALL
PLAN
2" ALBERENE STONE FOR DETAILS SEE DRWG.# A 18520. P.O.#
ENG. ROOM FLOOR
10"
1'-0"
1'-0"
8"
6-¼"X4" COPPER BARS P.O.# 76290
SECTION-BB
B
2½"X3" ANGLES P.O.#
5'-0"
5'-0"
DELTA STAR CO. BUS BAR CLAMPS CAT.# 103348 P.O.#
DELTA STAR CO. INS. CAT.# 314066 P.O.#
2'-10"
2'-0"
2'-½"
1'-0"
1'-4"
FIELD RHEO. FOR MOTOR 1500K.W. M.G. SET. FOR DETAILS SEE G.E. DRAWG. # 14733-B
FIELD RHEO. FOR GEN. 1500 K.W. M.G. SET. FOR DETAILS SEE GE. DRAWG. # 14733-B
FIELD PANEL FOR MOTOR 1500 K.W. M.G. SET. FOR DETAILS SEE G.E. DRAWG. # M-2866428
C.B. PANELS FOR 1500 K.W. M.G. SET. FOR DETAILS SEE G.E. DRAWG. # M-2866428
PANEL # 114
PANEL # 113
PANEL # 112
ELEVATION
3" CHANNEL
2" ALBERENE STONE
2"
4"
2"
¼"X2" STEEL BAR
DETAIL-AA
DWG LABEL
FM013440
NO
REVISION
BY
DATE
ILLINOIS POWER & LIGHT CORPORATION
CHICAGO
C.B. PANELS, FIELD RHEO. AND 3-WIRE BUS.
KANSAS POWER AND LIGHT CO.
TOPEKA, KAN.
DR. W.H.B. 11-14-25
TR.
CH. ERW 12-2-25
O.K. J.T.P. 12/3/25
APP.
APP.
SCALE ¼"=1 FOOT
CONT. NO.
SHEET NO.
C-18518



FRONT ELEVATION.



DWG_LABEL FM013441

ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

DETAILS OF ROTARY TRANSFORMER
AND STARTING PANEL
KANSAS POWER AND LIGHT CO. TOPEKA, KA[illegible]

DR. W.H.B.	11-19-25		SCALE ¾" = 1 FOO[illegible]
TR.			CONT. NO. / SHEET NO.
CH. ERW	12-1-25		B-185[illegible]
O.K. J.D.	12-1-25		
APP. [illegible]		APP.	

NOTE:-
NUMBERS IN OR ADJACENT TO LIGHT SYMBOLS, IN[…]
CIRCUIT TO WHICH LIGHT SHOULD BE CONNECTED.
USE #12 R.C. WIRE FOR MAINS AND #14 FOR BRAN[…]
MATERIAL ORDERED ON R.O.#

DWG_LABEL FM013442

ILLINOIS POWER & LIGHT CORPORAT[…]
CHICAGO

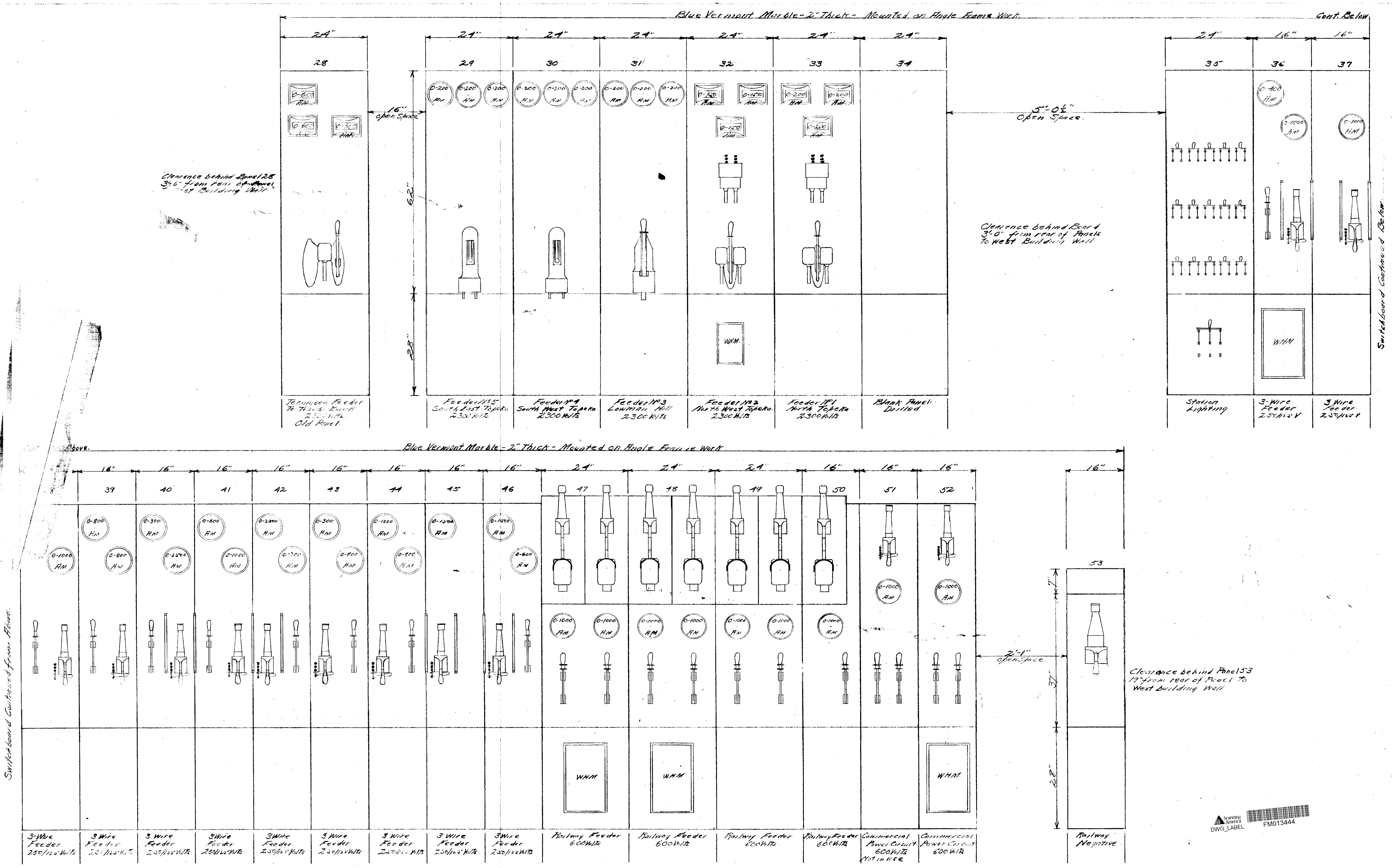
KANSAS POWER AND LIGHT CO. TOPEKA, K[…]
PLAN AND GENERAL ARRANGEM[…]
OF LIGHTING.

DR. W.H.B. 12-14-25
TR.
CH. ERW 12-17-25
O.K. J.J.D. 12-18-25
APP. [illegible]
SCALE 1/4"=1'
C-18[…]

C-18521

JCSBC
2-2-2016
Att.9G.--1281

ILLINOIS POWER AND LIGHT CORPORATION CHICAGO	
KANSAS POWER & LIGHT CO. TOPEKA, KAN. TOPEKA POWER STATION	SWITCHBOARD - ENGINE ROOM FLOOR. FRONT VIEW INC. 1925 INST.
4-16-25 E.B.L.	CONTRACT NO.
JJD 1/16/46	SHEET NO.
APP. UGC	SCALE 1" = 1 Ft. C-18578



ILLINOIS POWER AND LIGHT CORPORATION
CHICAGO

No C-18578

KANSAS POWER & LIGHT CO. TOPEKA, KAN. TOPEKA POWER STATION.	SWITCHBOARD-BALCONY FLOOR. FRONT VIEW. MAY 1925

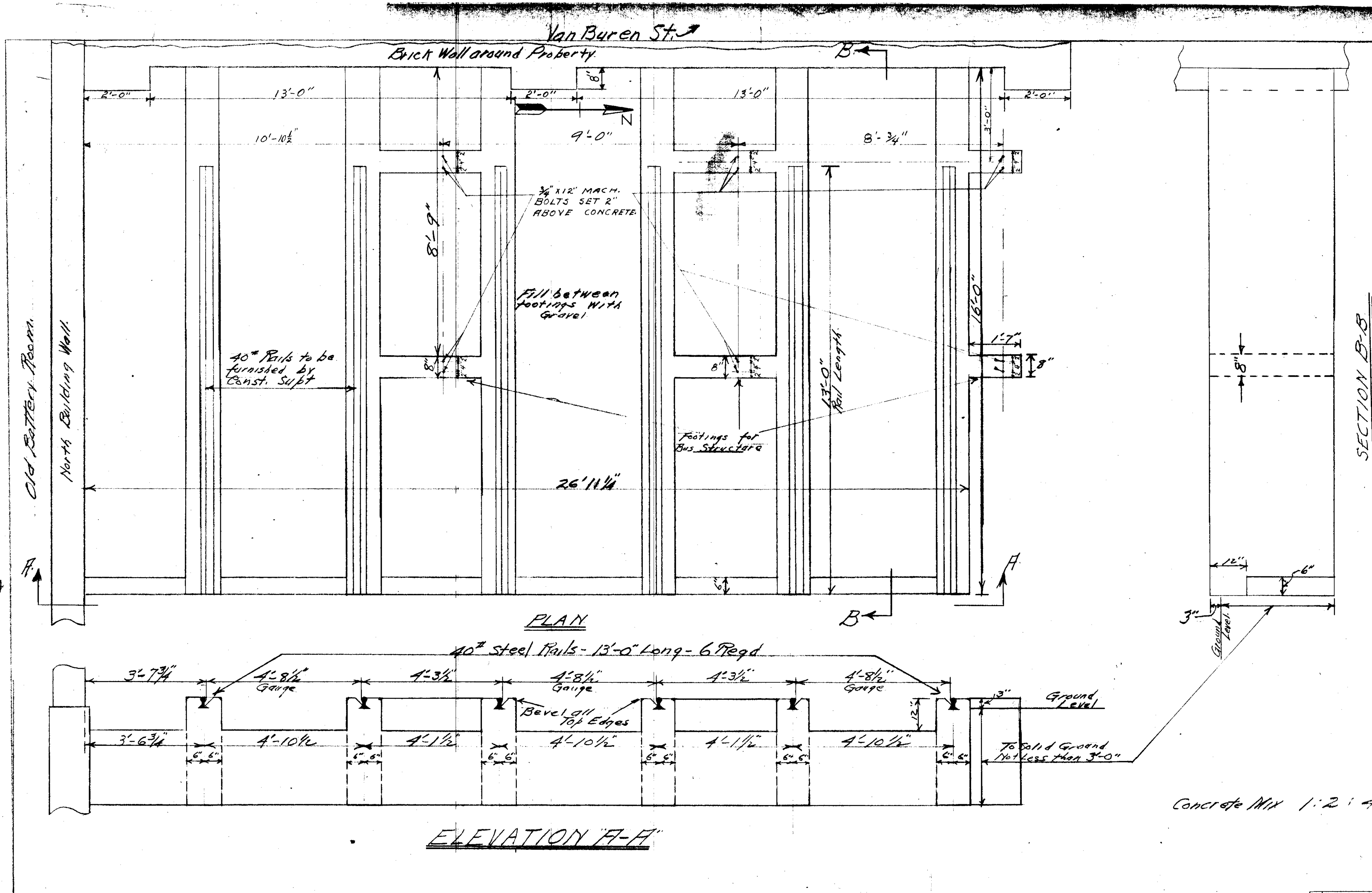
E.B. L 5-21-25

10/19/25

CONTRACT NO.
SHEET NO.

1" = 1 Ft

C-18579



No	REVISION	BY	DATE
1	CHANGED PROPERTY WALL	W.H.B.	6-18-25

ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

FOUNDATION
3-1667 KVA-13200/2300V TRANSFORMERS
KANSAS POWER & LIGHT CO.
TOPEKA POWER STATION

DR. 6-2-25 Z.B.J.
TR.
CH. 6-7-25 J.D.
O.K.
APP.

SCALE ½" = 1'-0"
CONT. NO.
SHEET NO.
B-18580

DWG_LABEL
FM013445

REFERENCE DRAWINGS

C-18582 GENERAL ARRANGEMENT PLAN.
B-18580 TRANSFORMER FOUNDATIONS

NO	REVISION	BY	DATE

ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

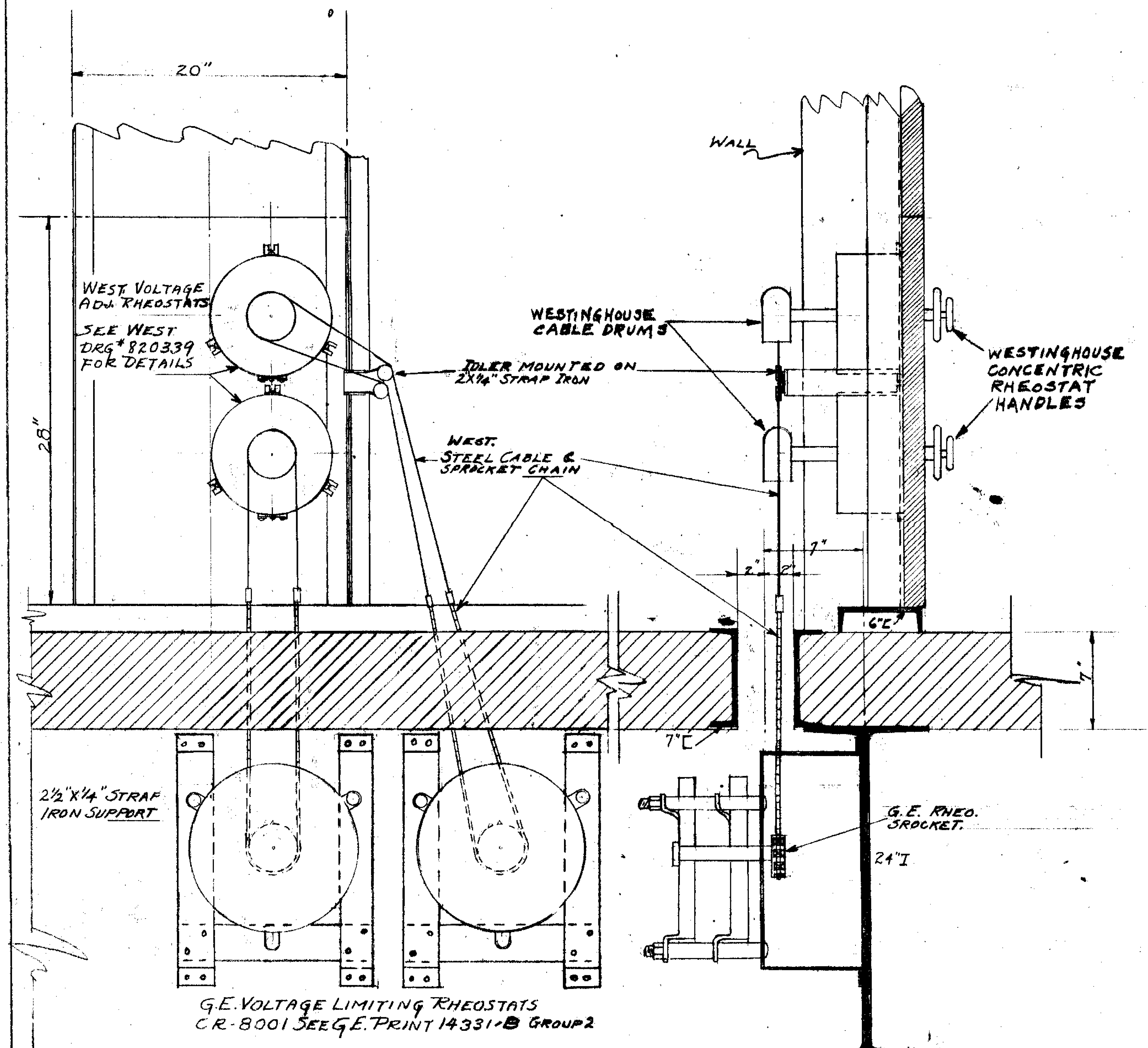
PLAN AND ELEVATION TRANSF. & STRUCTURE
KANSAS POWER AND LIGHT · CO.
TOPEKA POWER STATION.

DR. W.H.S. 6-2-25
TR.
CH. ERW 9-20-25
O.K. J.J.D. 9/20/25
APP.
APP.

SCALE ½"-1½" = 1 FOOT
CONT. NO. | SHEET NO.

C-18581

6



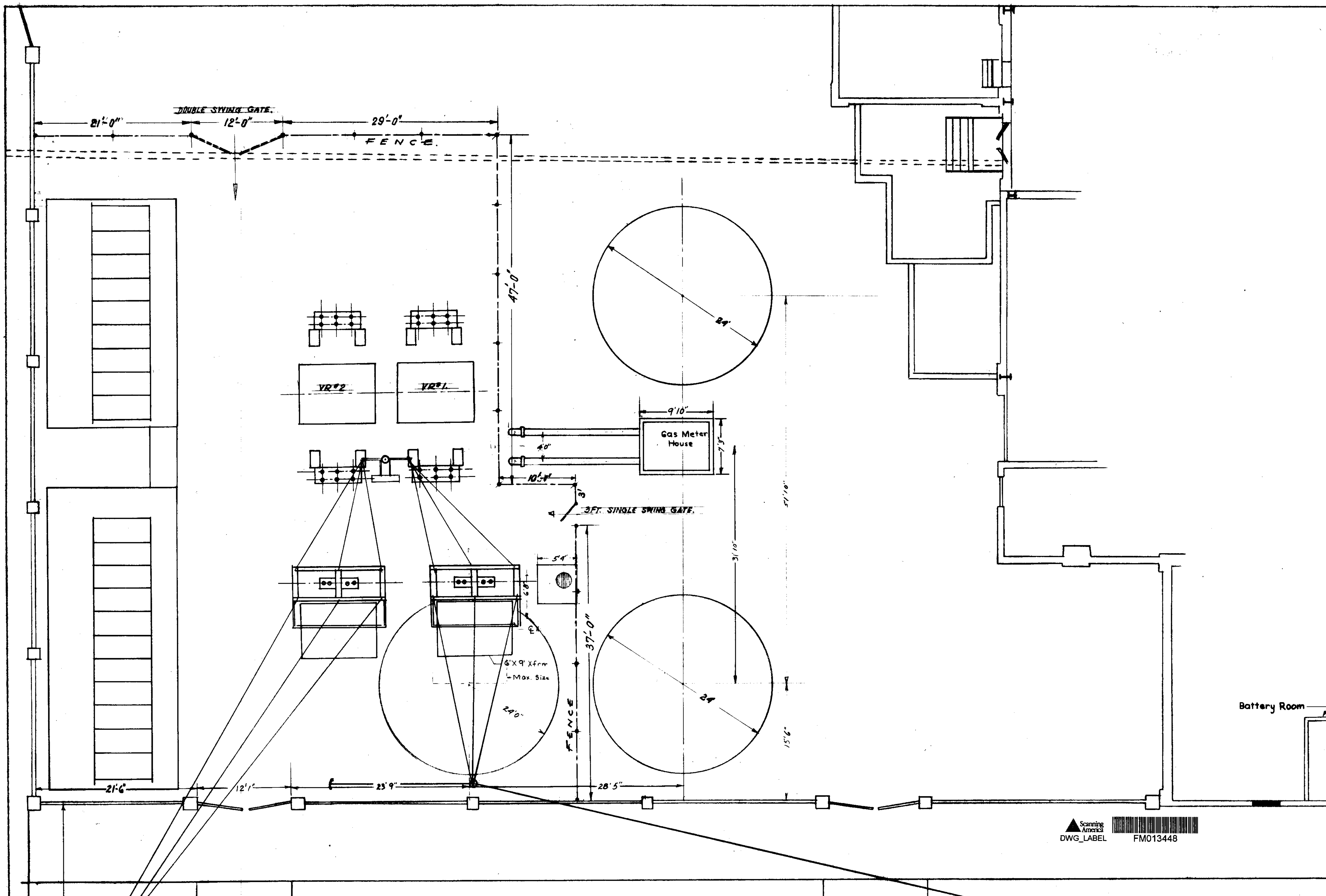
REAR VIEW VOLTAGE REGULATOR PANEL

SIDE VIEW

ILLINOIS POWER & LIGHT CORPORATION
CHICAGO

KANSAS POWER AND LIGHT COMPANY
TECUMSEH POWER STATION TOPEKA, KANSAS.
METHOD OF MOUNTING RHEOSTATS ON BACK OF VOLTAGE REGULATOR PANEL

DR. MWE	8-6-25	$1\frac{1}{2}"=1'0"$
TR.		
CH. W.A.A.	8-6-25	
O.K. HWS	8-11-25	A 18364
APP.		APP.



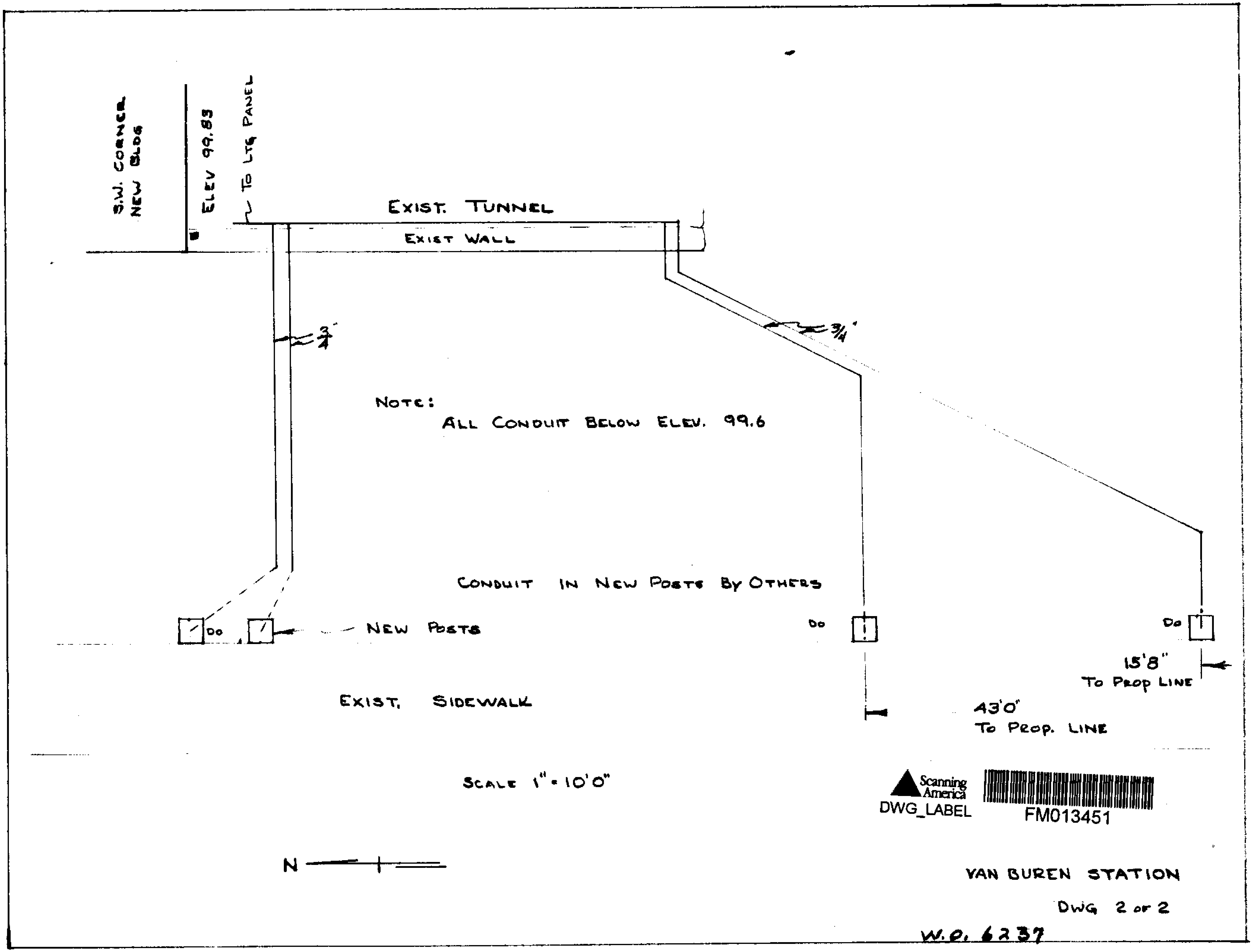
THE KANSAS POWER & LIGHT CO.

VAN BUREN SUBSTATION
FENCE & GATES.

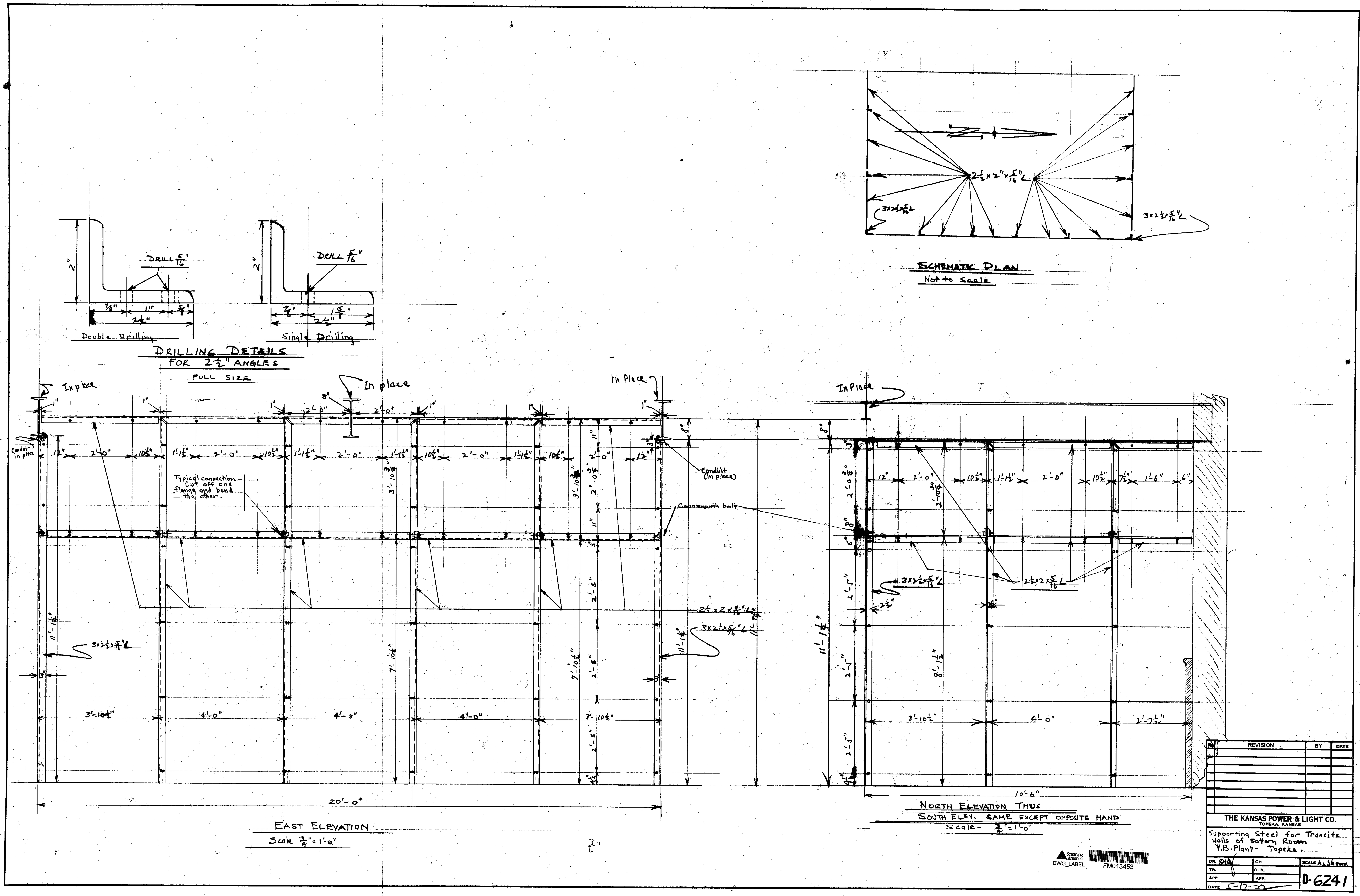
DATE: 5-14-57	CHECK.	DRWN: A.B. CRANE
SCALE: 1/8" = 1'	APPR.	NO. C-1031

Fuel Bunkers
8" Water Line
Sewer
TANK
Gas Meter House
Building
18'
Existing Manhole
6'4"
15'
TANK
Battery Room
21' 9½"
14'1"
59' 9"
14' 0"
31' 0"
124'0" to Corner of building
7'6"
SIDEWALK
25'
8'6"
Concrete Drive
PARKING
Concrete Drive
22'
77'
43'
Existing Manhole
8'6"
Pole
Northwest Corner
Van Buren Yard
7th Street
Van Buren Street
DWG_LABEL
FM013449

8" WATER LINE
SEWER
TANK
TANK
GAS METER HOUSE
SEVENTH STREET
VAN BUREN STREET.
STREET.
STEAM PIPES
STEAM PIPE.
Water Pipe.
ELV. 100
30 FT.
FM013450
DWG_LABEL
Both Ducts 64" deep.
Both Ducts 74" deep.
Both Ducts 54" deep.
BY PASS SW. VR. # 101 E.
2 Pots. & ST. POWER.
TIE BREAKER # 100 E.
VR # 2 # 1321.
XFRM # 1. # 1210.
XFRM # 2. # 1110.
VR # 1 # 1324.
13.8 KV LINE. CKT. # 3 # 1310
13.8 KV LINE. CKT. # 4 # 1410.
2 POTS
STATE BLDG # 2
STATE BLDG # 1
V.R. # 2 # 1323.
V.R. TRANSF # 1825.
V.R. # 1 # 1325.
UNDERGR F. # 5
UNDERGR F. # 6
UNDERGR F. # 7
2 POTS
FUTURE UNDERGR. # 8.
12-3-56. Revised - VR & XFRM. Pads. & & Lic.
THE KANSAS POWER & LIGHT CO.
DUCT RUNS
VAN BUREN SUBSTATION
DATE: 8-14-56
SCALE: 1/8" = 1'-0"
DWN: A.S. CRANE
CHK.
APPR.
No. D-1041


S.W. CORNER
NEW BLDG
ELEV 99.83
TO LTG PANEL
EXIST. TUNNEL
EXIST WALL
3/4"
3/4"
NOTE:
ALL CONDUIT BELOW ELEV. 99.6
CONDUIT IN NEW POSTS BY OTHERS
DO
NEW POSTS
DO
DO
15'8"
TO PROP LINE
EXIST. SIDEWALK
43'0"
TO PROP. LINE
SCALE 1" = 10'0"
N
VAN BUREN STATION
DWG 2 of 2
W.O. 6237

Alley
Alley
7th Street
150.395
150.45
99'9"
69'-7"
Substation
Office
Van Buren St
DWG_LABEL
FM013452



REVISION	BY	DATE

THE KANSAS POWER & LIGHT CO.
TOPEKA, KANSAS

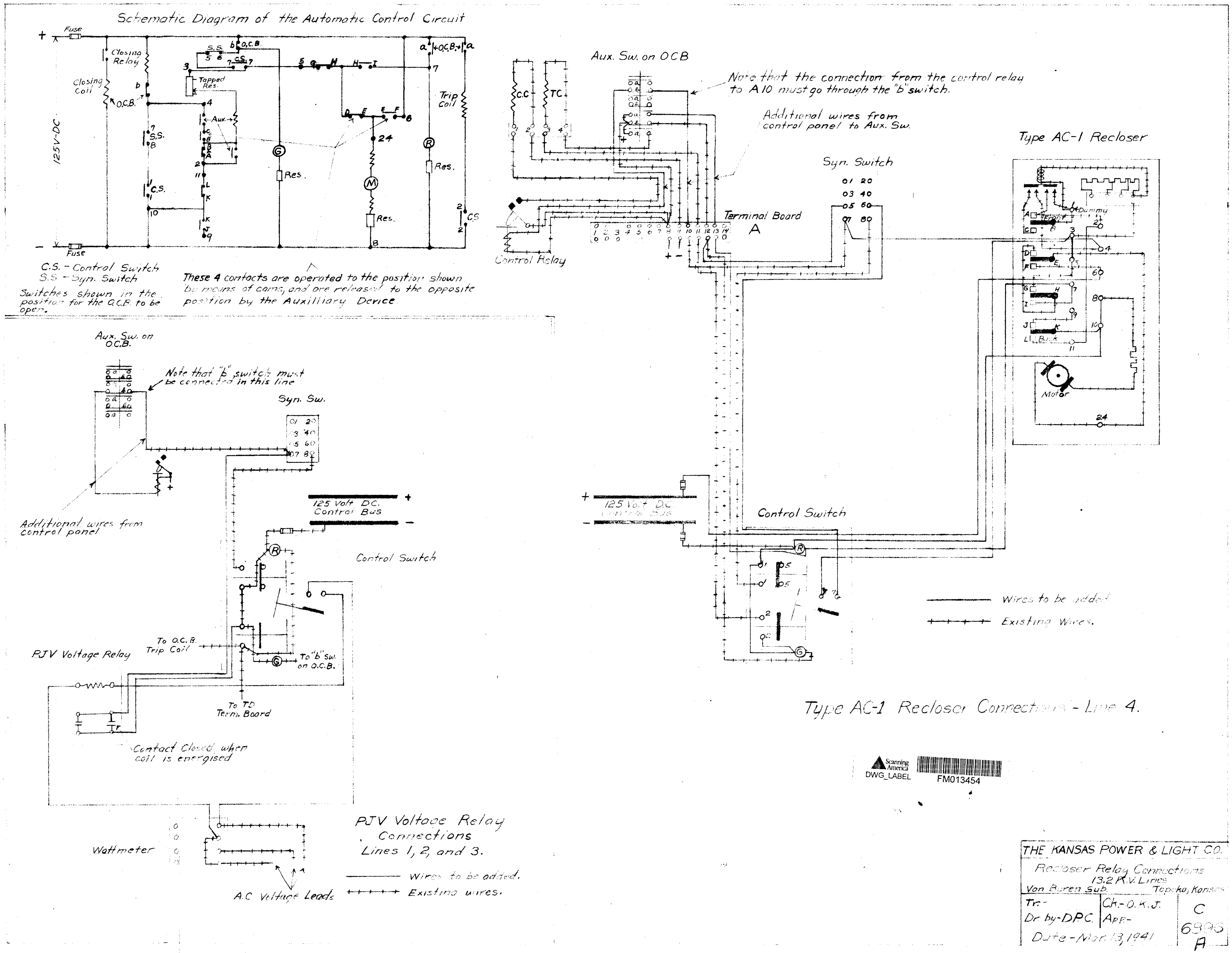
Supporting Steel for Transite Walls of Battery Room
Y.B. Plant - Topeka.

SCALE As Shown

DATE 5-17-

D-6241

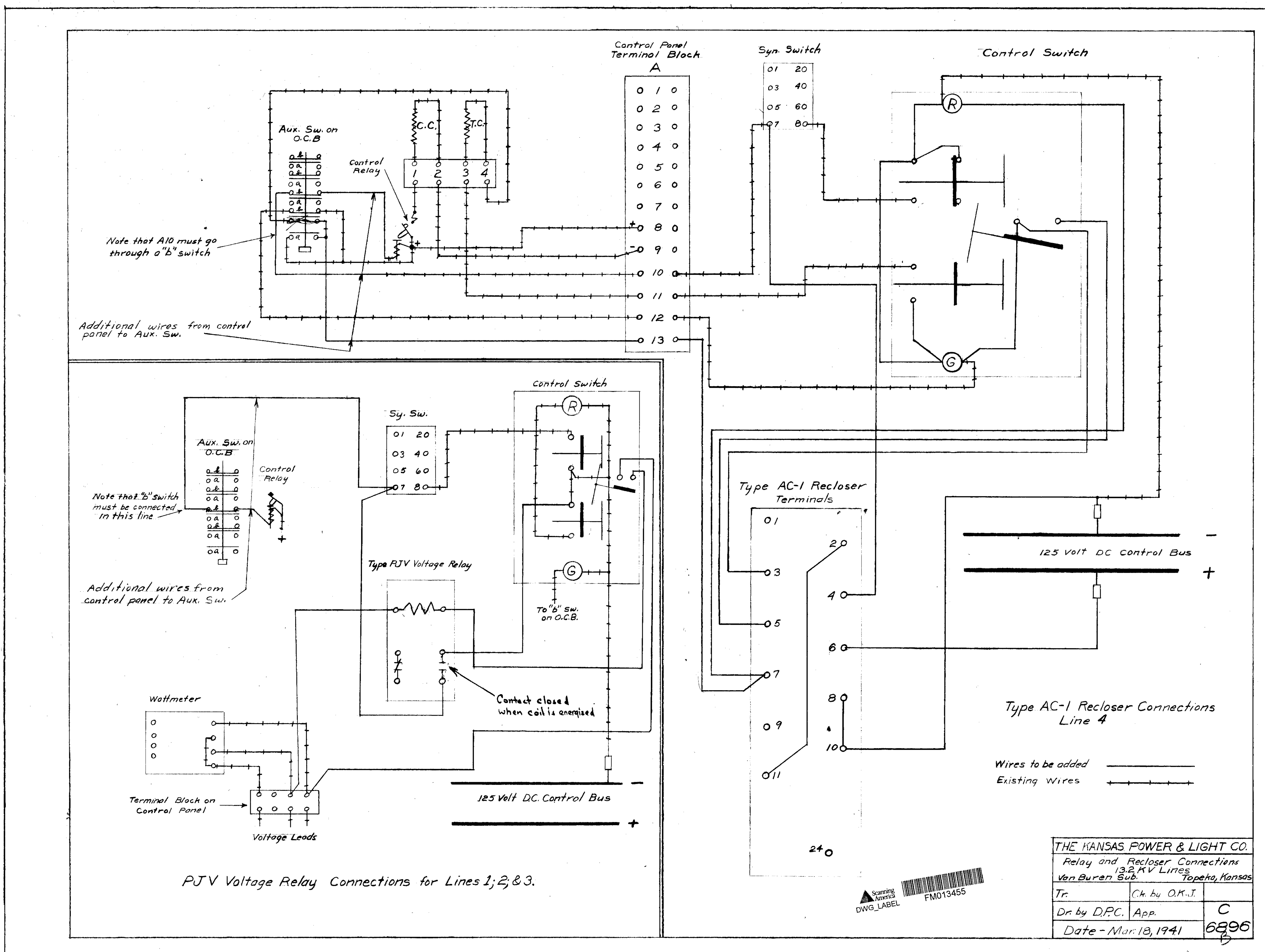
FM013453

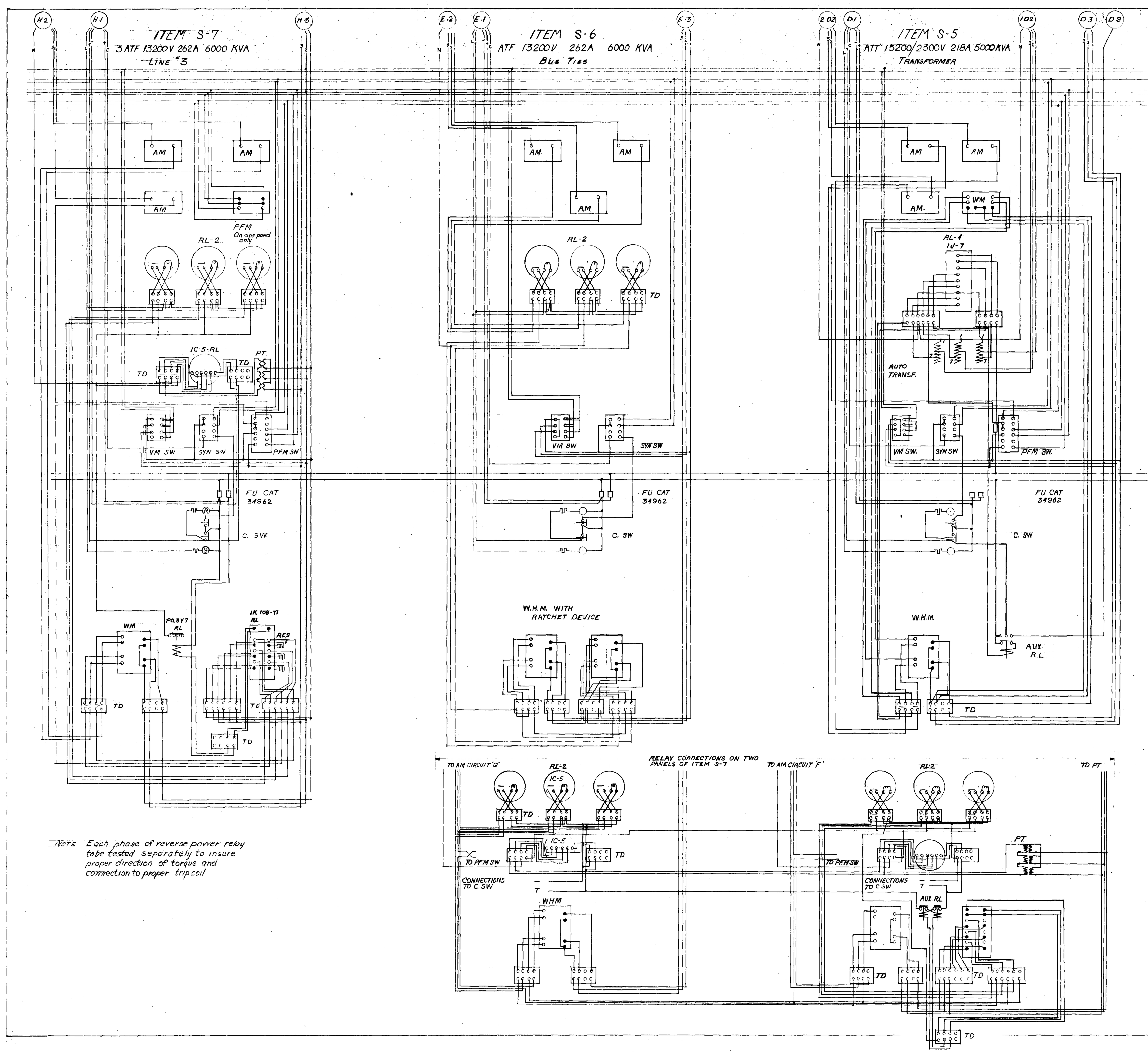


THE KANSAS POWER & LIGHT CO.

Recloser Relay Connections
13.2 K.V. Lines
Von Buren Sub. Topeko, Kansas

Tr.-	Ch.- O. K. J.	C
Dr. by-DPC.	App.-	6896
Date - Mar. 13, 1941		A


Control Panel Terminal Block
A
Syn. Switch
Control Switch
Aux. Sw. on O.C.B.
C.C.
T.C.
Control Relay
Note that A10 must go through a "b" switch
Additional wires from control panel to Aux. Sw.
Control Switch
Sy. Sw.
Aux. Sw. on O.C.B
Control Relay
Note that "b" switch must be connected in this line
Additional wires from control panel to Aux. Sw.
Type PJV Voltage Relay
To "b" Sw. on O.C.B.
Contact closed when coil is energised
Wattmeter
Terminal Block on Control Panel
Voltage Leads
125 Volt D.C. Control Bus
PJV Voltage Relay Connections for Lines 1; 2; & 3.
Type AC-1 Recloser Terminals
125 Volt DC Control Bus
Type AC-1 Recloser Connections Line 4
Wires to be added
Existing wires
THE KANSAS POWER & LIGHT CO.
Relay and Recloser Connections 13.2 KV Lines
Van Buren Sub. Topeka, Kansas
Tr.
Ch. by O.K.J.
Dr. by D.P.C.
App.
C 6896 B
Date - Mar. 18, 1941
Scanning America
DWG_LABEL
FM013455

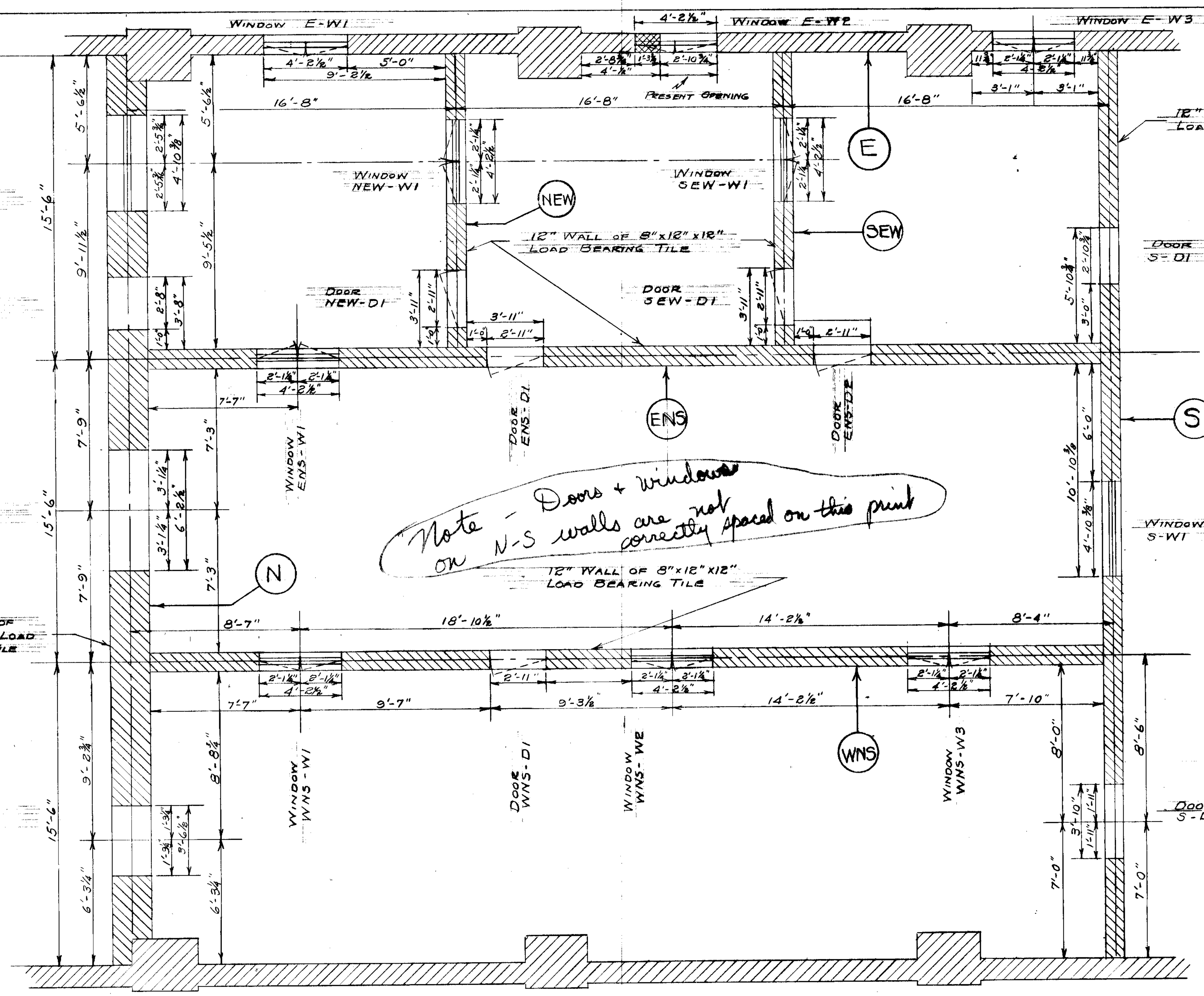


FOR RELAY CONNECTIONS ON THESE PANELS, ALSO SEE DETAIL DIAGRAM SHOWN BELOW.

THE KANSAS POWER AND LIGHT COMPANY
TOPEKA KANSAS

WIRING DIAGRAM 13.2 KV. LINES 1, 2, 3 & 4
& TRANSFORMER PANEL VAN BUREN SUBSTATION

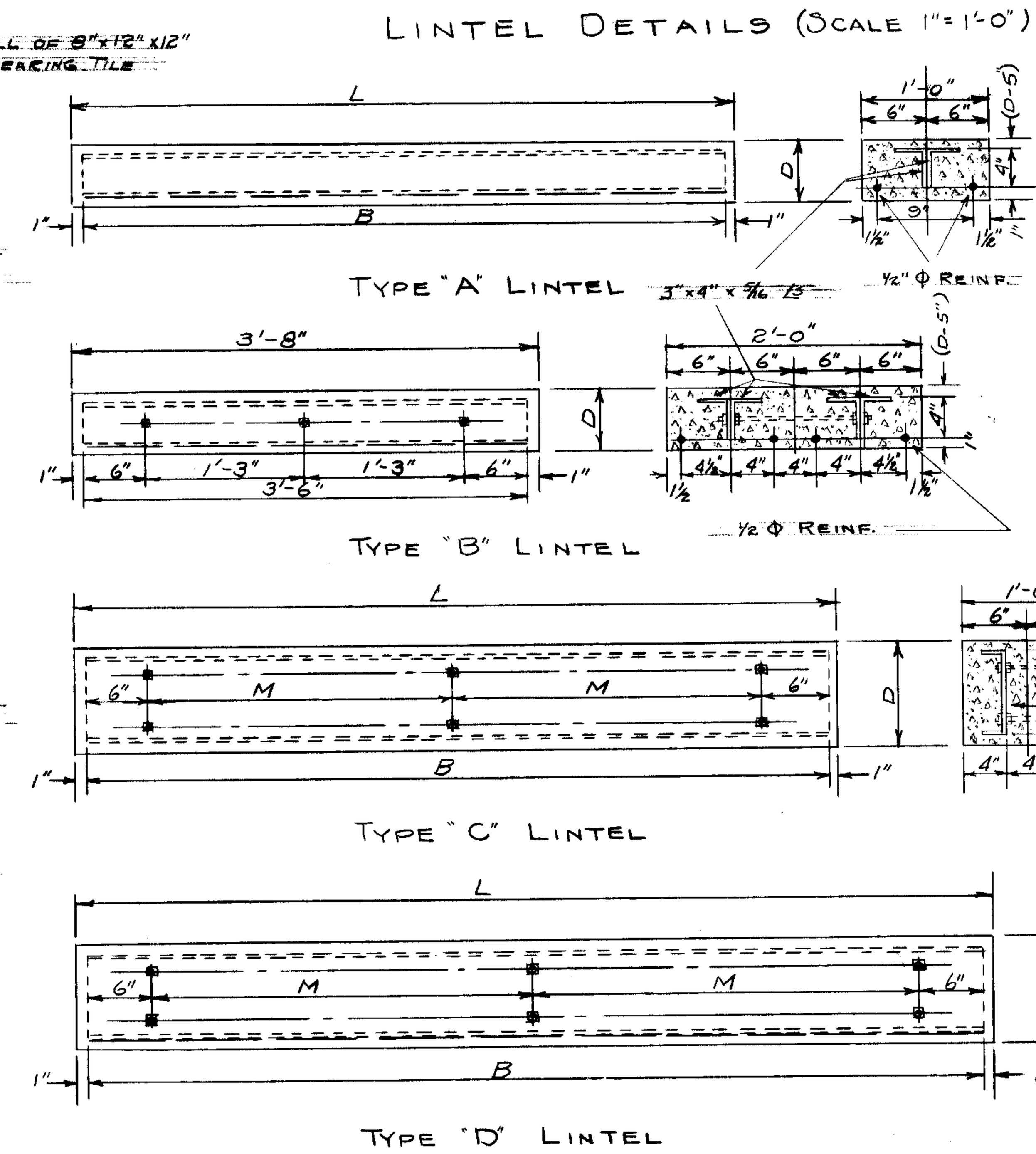
DR. C.B.M.	No Scale
CK.	D-7280
APP	
DATE: 6-21-45	



Note - Doors + windows on N-S walls are not correctly spaced on this print

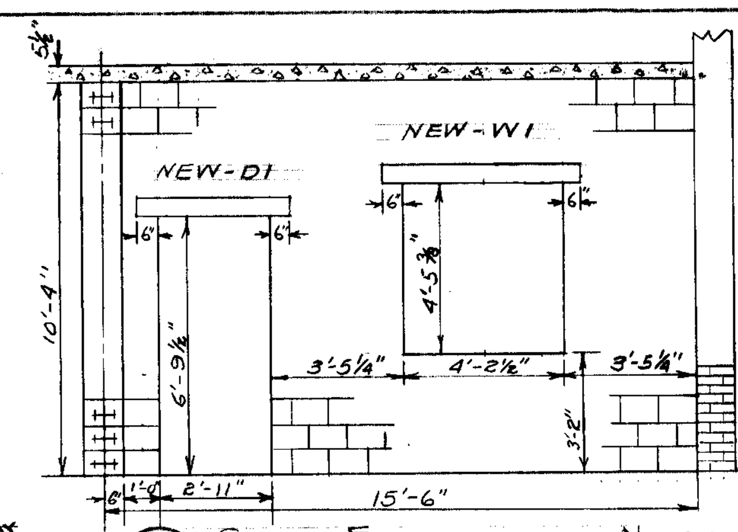
First Foor Plan Van Buren Service Headquarters Showing Location of Partitions, Doors, and Windows

Lintel Details (Scale 1"=1'-0")

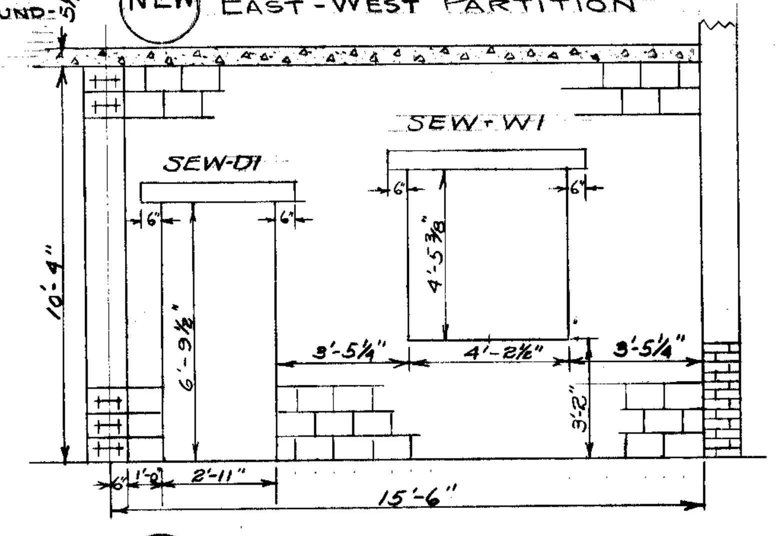


Lintel Type	No. Req	Dimension L	Dimension B	Dimension M
A-1	1	3'-10¾	3'-8¾	—
A-2	5	3'-11"	3'-9"	—
A-3	1	4'-10"	4'-8"	—
A-4	6	5'-2½"	5'-½"	—
B-1	1	3'-8"	3'-6"	1'-3"
C-1	3	5'-2½	5'-½	2'-¼"
C-2	1	5'-10⅜	5'-8⅜	2'-4⅜
D-1	1	5'-10⅜	5'-8⅜	2'-4⅜
D-2	1	7'-2½	7'-½"	3'-¼
D-3	1	4'-6½"	4-4½	1-8¼"

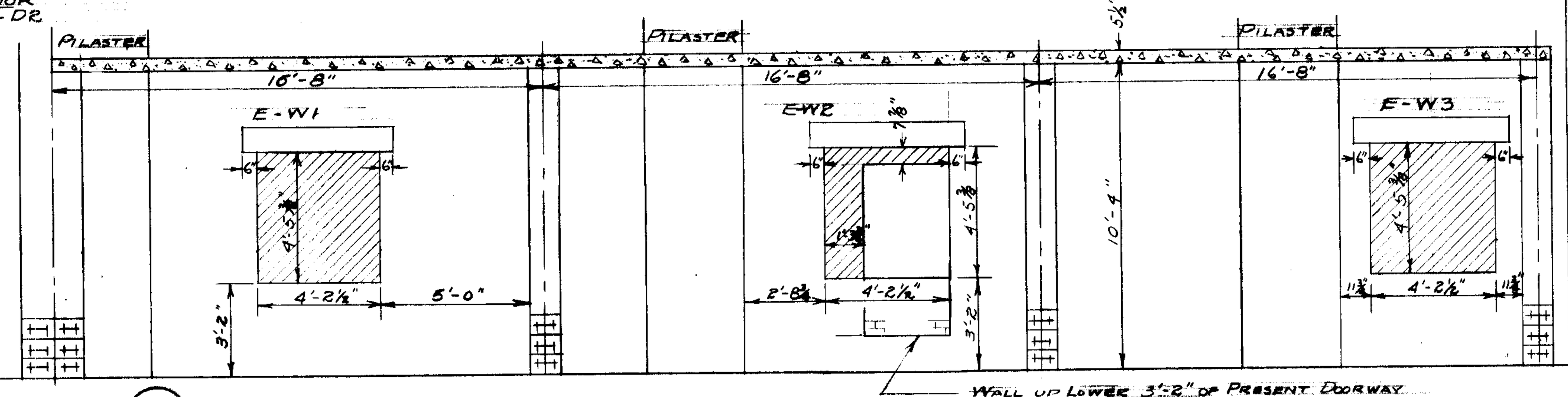
Note: Dimension "D" May Be Adjusted To Conform With Level of Surrounding Tile Wall.



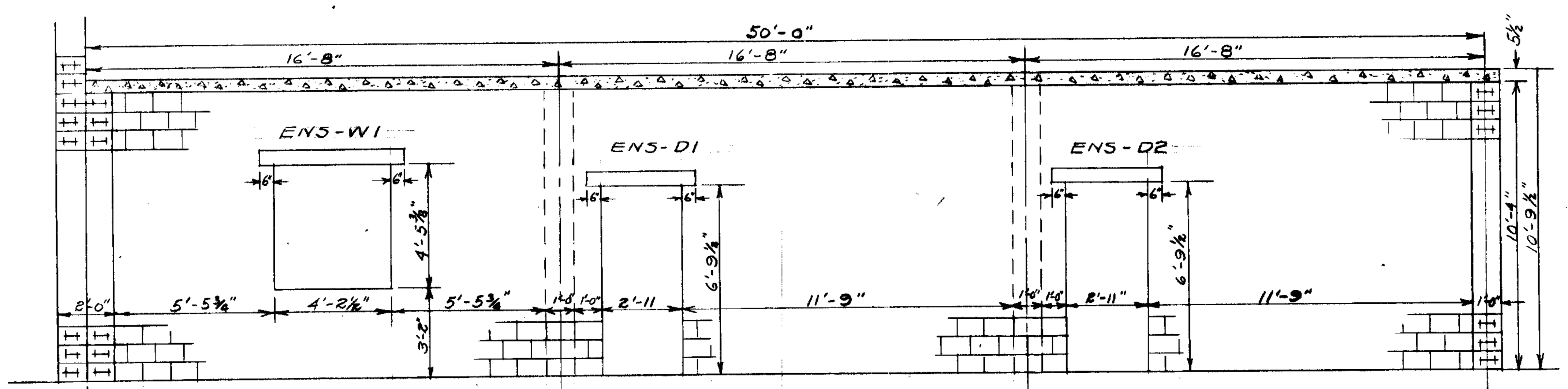
(NEW) South Elevation of North East-West Partition



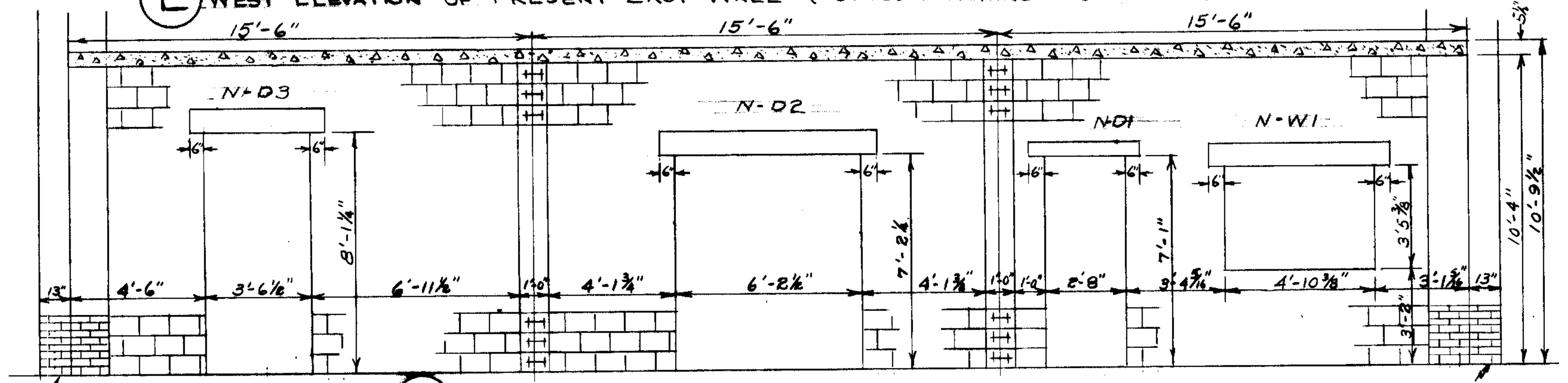
(SEW) South Elevation of South East-West Partition



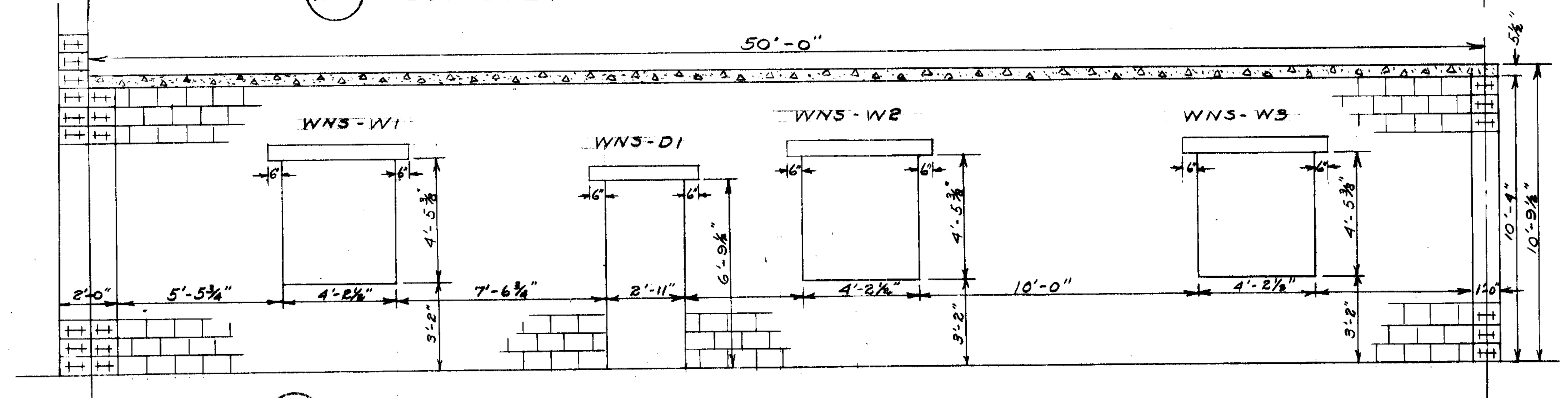
(E) West Elevation of Present East Wall (Cross Hatching Shows Areas To Be Removed For Windows)



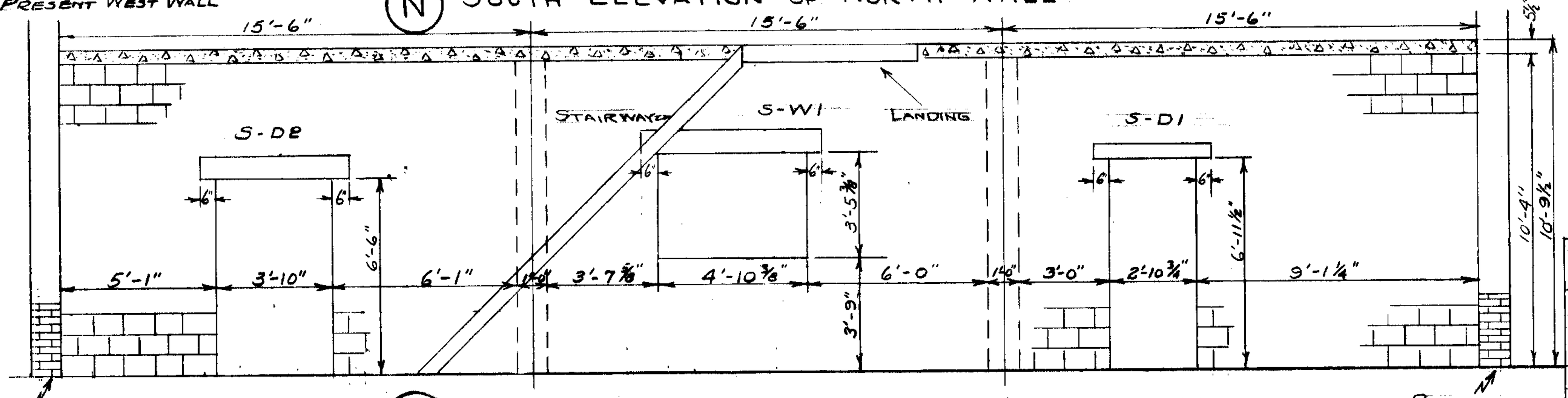
(ENS) West Elevation of East North-South Wall



(N) South Elevation of North Wall



(WNS) West Elevation of West North-South Wall



(S) South Elevation of South Wall

Window Schedule

Designation	Opening Width	Opening Height	Lintel	Type of Window	Present Location
N-W1	4'-10⅜"	3'-5⅜"	D-1	Metal	To Be Purchased
S-W1	4'-10⅜	3'-5⅜	C-2	"	"
E-W1	4'-2½"	4'-5⅜"	C-1	Wood Casement	"
E-W2	4'-2½	4'-5⅜	C-1	"	"
E-W3	4'-2½"	4'-5⅜"	C-1	"	"
NEW-W1	4'-2½"	4'-5⅜"	A-4	"	"
SEW-W1	4'-2½"	4'-5⅜	A-4	"	"
ENS-W1	4'-2½"	4'-5⅜	A-4	"	"
WNS-W1	4'-2½	4'-5⅜	A-4	"	"
WNS-W2	4'-2½"	4'-5⅜	A-4	"	"
WNS-W3	4'-2½"	4'-5⅜	A-4	"	"

Door Schedule

Designation	Opening Width	Opening Height	Lintel	Type of Door	Present Location
N-D1	2'-8"	7'-1"	B-1	Steel, Swinging	To Be Purchased
N-D2	6'-2½"	7'-2¼"	D-2	Fire Door	Van Buren Plt.
N-D3	3'-6½"	8'-1¼"	D-3	"	"
S-D1	2'-10¾	6'-11½"	A-1	"	"
S-D2	3'-10"	6'-6"	A-3	"	"
ENS-D1	2'-11"	6'-9½"	A-2	Wood, Swinging	To Be Purchased
ENS-D2	2'-11"	6'-9½"	A-2	"	"
WNS-D1	2'-11"	6-9½"	A-2	"	"
NEW-D1	2'-11"	6-9½"	A-2	"	"
SEW-D1	2'-11"	6-9½"	A-2	"	"

The Kansas Power and Light Company
Topeka, Kansas

Van Buren Plant Remodeling For Service Department Headquarters

DR JDW	CK	Scale ¼"=1'-0"
TR	APP D.P.A.	
CK	APP	D-7057
DATE March 11, 1943		

Dwg. No. 5973-3