EXHIBIT "I"

Job. No.	SE0044	SE0045	SE0130
Scope			
Preliminary Survey			x
Survey Pickup Work			x
Prel. Geotech Report			
Foundation Investigation	x	x	x
Staking of Sounding Locations	x	x	x
Bridge Survey Report/Sheets/Checklist			
Preliminary Bridge Design	x	x	x
Final Bridge PSE	x	x	x
Preliminary Roadway Design	x	x	x
ROW Plans	x	x	x
Final Roadway PSE	x	x	x
RR Coordination			
Utility Coordination	x	x	x
Environmental Services			

SCOPE OF SERVICES

The consultant shall perform the following services, all in accordance with the standard practice of the Commission and the following:

AASHTO "A Policy on Geometric Design of Highways and Streets" (latest version)

AASHTO "Roadside Design Guide" (latest version)

AASHTO "LRFD Design methods" (latest version)

AASHTO "Highway Drainage Guidelines" (latest version)

"Manual on Uniform Traffic Control Devices" (latest version)

"Highway Capacity Manual" (latest version)

I Administration

CONSULTANT shall participate in the following as part of the Administration tasks:

1. Attend and document milestone project meetings with MoDOT (CORE Team meetings). Meetings will be held virtually except for the project kick off and final design field check meetings.
2. Correspondence (emails, letters, meeting minutes, phone calls)

3. Set up the project and conduct Kick-Off Meeting.
4. Coordination with subconsultants.
5. Participate in one Public Meeting. Develop handouts and exhibits for meeting.
6. Provide monthly progress reports and invoices and review subconsultants invoices and reports.
7. Provide exhibits, sketches, and back-up data to MoDOT on an as-needed basis.
8. Provide information to support the SW District MoDOT staff in maintaining a public website for the project staff to inform the public and update impacts related to the project including timelines, changes to the project, meetings, comments. The website to be maintained through the construction phase.

II Surveys (SE0130 only)

The scope of work included in the section is to be performed on each bridge project.

1. Records Research. The Consultant shall be responsible for all research of:
    a. Title records and abstracts (may include deeds of record, title certification, etc.).
    b. Evidence from recorded surveys.
    c. Deeds and plats for affected properties.
2. Property Owner Notification. The Consultant shall be responsible for notifying property owners of the survey activity by the consultant. The consultant will attempt to make direct contact with residents in the field before entering properties.
3. Linear measures. Linear measurements will be made in the English System. The base unit will be the U.S. Survey Foot (and decimal parts thereof).
4. Control Survey. The Consultant shall be responsible for establishing project control and benchmarks throughout the project limits.
    a. Project Control points shall be established along the project route and have reference ties for control recovery.

        i. Control points shall be constrained to the Missouri Department of Transportation Real-Time Network.
        ii. Orthometric heights shall be referenced to the North American Vertical Datum of 1988 (NAVD88) using the current GEOID18 model.
        iii. Control shall be referenced to the Missouri Coordinate System of 1983 East Zone, North American Datum of 1983 (2011), Epoch 2010.
        iv. A project projection factor shall be derived as described in MoDOT EPG Category 238.1.4.4 Aerial Mapping and LiDAR Surveys.
        v. Project control points shall consist of 5/8” x 24” rebar with a 2” aluminum or plastic cap with a clearly center punched datum point.
        vi. Project control points shall be placed sufficiently below the ground’s surface to protect from disturbance. If set in a cultivated field the point shall be place a minimum of 6” below ground surface.
        vii. Control shall be placed at the following locations and interval spacing: 1) 2 control points shall be placed at the structure location, each being placed near opposite corners of the structure, 2) remaining control shall be placed

at intervals not to be greater than 1500ft and are to be visible to adjacent control points.

viii. Project control points shall have X, Y, positional values determined by methods sufficient to meet a network accuracy of horizontal (H) ≤ 0.05ft and vertical (V) ≤ 0.10ft at a 95% confidence level.

ix. A minimum of three (3) reference ties to recoverable accessories will be made for each control point. The control point is to be described in such manner as to facilitate navigation to, and recovery of, its location.

b. Benchmarks shall be established along the project route and have reference ties for recovery.

i. Vertical control shall be referenced to the North American Vertical Datum of 1988 (NAVD88).

ii. Benchmark location shall be referenced to existing centerline by station and offset

iii. Orthometric Heights (elevations 'Z') on benchmarks and control points shall be established using differential leveling technique. Differential leveling shall meet a Third (3^{rd}) Order accuracy, 0.05 ft. x Sq. Root Distance (miles).

iv. Benchmarks shall be conveniently located and easily accessible.

v. Benchmarks should be of a stable, permanent nature, e.g., aluminum, or brass disk epoxied into a drilled hole in rock or concrete, cut or chiseled "square" in a concrete object, a 2-inch (minimum) MAG nail epoxied into a drilled hole in a concrete object, e.g., concrete headwalls, retaining walls, signal base, or concrete pads. If these conditions cannot be met, a cotton picker spindle, railroad spike or 8-inch-long spike nail driven in the root or base of a tree within public right-of-way are acceptable.

vi. No benchmark shall be placed in the top of curbing or sidewalks along streets or highways or in utility poles.

5. Boundary Survey. The Consultant shall be responsible for the following boundary surveying services.

a. Establishment of existing horizontal alignments owned or maintained by state, county, and local municipalities within project limits.

b. Establishment of existing boundaries (right of way and permanent easements) owned or maintained by state, county, local municipalities or utility providers within project limits.

c. If property acquisition is required, establish a tie station from the existing centerline station at the beginning of the project to an established, recovered, or restored Section or Quarter Section corner, and label Section, Quarter Section and Quarter Quarter Sections within and adjoining the existing Missouri Highway and Transportation Commission (MHTC) Boundary. If work is performed in an urban

environment, ties to existing monuments marking subdivision lots and blocks are acceptable.

d. Obtain survey records, corner documents, deeds and title work as needed to complete the project.
e. Identify all adjoining property owners adjacent to the project route within the project limits.
f. Boundary Surveying services shall comply with the most recent Missouri Standards for Property Boundary Surveys in the Missouri Revised Statues Chapter 327, and any applicable portions of the Missouri Department of Transportation's Engineering Policy Guide (EPG) Category 238 Surveying Activities. Property descriptions and title work shall be in accordance with MoDOT EPG Category 236.4 Property Descriptions and Titles.

6. Topographic Survey. The Consultant shall be responsible for collecting the necessary field data to accurately provide topographic and planimetric information within the project limits.

    a. Topographic and planimetric survey data shall be collected to create a terrain model and planimetric map sufficient to complete roadway, drainage, structural and other design needed for the repair of the structure being surveyed.
    b. All visible utilities and utilities as marked through Missouri One Call or the utility company by shall be located within the project limits.
    c. MoDOT Feature Codes shall be used in the description of the survey points.

7. Bridge Replacement and Hydraulic (Bathymetric) Survey. The Consultant shall be responsible for collecting the applicable bridge and hydraulic surveying information as outlined in the MoDOT EPG.

8. Property Acquisition and Location Survey. The Consultant shall be responsible for services in preparing the final Commission location survey plan, and monumentation of the Commission's final boundaries within the project limits.

    a. Prepare Commission boundary (right of way and easement) descriptions for acquisitions at each project location as needed.
    b. Provide temporary staking of Commission boundaries (right of way and easements) as needed for negotiation purposes.
    c. Consultant shall monument the Commission's final boundaries (right of way and permanent easement) no more than 60 calendar days after all utilities have been

adjusted and the grading contractor has completed grading of the back slopes, subject to the maximum period of time allowed by statute.

d. Consultant shall monument the final Commission's boundary breaks at each project location with a 5/8-inch x 24-inch rebar with a 2-inch aluminum cap stamped "MODOT", and a defined datum point. See MoDOT EPG Category 238.2 Land Surveying for further additional.
e. In rural areas the consultant shall be responsible for the acquisition and installation of white 6 ft carsonite post witness to be installed at each monument location. Carsonite post shall contain a Boundary Marker decal. See MoDOT EPG Category 238.2 Land Surveying for more detail.
f. Consultant shall prepare the final location survey plat for each project site and submit to MoDOT for review prior to filing with the County Recorder of Deeds Office. Upon the completion of MoDOT's review and any corrections the consultant shall have four weeks to record a copy with the County Recorder of Deeds Office.

9. Deliverables.
    a. The CONSULTANT shall provide to the COMMISSION the following items:
    b. Copies of all horizontal control network records, vertical control records, raw data files (both GNSS & survey controller), and adjustment reports generated while executing the Control Survey section of this scope of service.
    c. Comma Separated Value (*.CSV) files of all survey data collected or produced. Boundary, Topographic, and Bridge Survey data shall be provided in a Modified State Plane Coordinate System. All control coordinate files shall be provided in Missouri State Plane and Modified State Plane. Projection Factor shall be applied to the coordinates from the origin (0,0), not a central project location. File naming conventions are as follows:

        i. JobNumber_HorizontalControl_SPC
        ii. JobNumber_HorizontalControl_MOD
        iii. JobNumber_VerticalControl_SPC
        iv. JobNumber_VerticalControl_MOD
        v. JobNumber_Boundary
        vi. JobNumber_Topo
        vii. JobNumber_Bridge

    d. Copies of all documentation, field notes and field survey controller (data collector) files created during the project
    e. An original recorded copy of the location survey plan, if required, from the County Recorder of Deeds Office
    f. The CONSULTANT shall provide Bentley ORD (*.dgn) design files for the following:

i. Planimetries and sub-surface utilities in a 2D design file. The file shall have the following name: JobNumber_SurveyGraphics.dgn
ii. Terrain Model in a 3D design file. The file shall have the following name: JobNumber_ExistingTerrain.dgn

iii. Boundary (existing alignments, ROW & easements, property boundary) in a 2D design file. The file shall have the following name: JobNumber_ExistingBoundaries.dgn.
iv. Final Location Survey Plat (if new right-of-way or permanent easements are acquired). The file shall have the following name: JobNumber_LocationPlat.dgn
v. All Bentley Open Roads Designer design files (*.dgn) shall conform to the department's standards as specified in the MoDOT Engineering Policy Guide and the MoDOT Microstation® CADD Standards.
vi. All Bentley ORD design files (*.dgn) shall be provided in modified state plane coordinates.

10. Data Quality. The CONSULTANT shall be responsible for the professional quality, technical accuracy and the coordination of data, documents and other services furnished for this project. The CONSULTANT shall, without additional compensation, correct or revise any errors or deficiencies in the services and information delivered.

11. Documentation. The CONSULTANT shall provide any documentation necessary to explain, support, and clarify the procedures used for data development. After the survey has been completed, the CONSULTANT shall be available to the COMMISSION to discuss and interpret provided data.

12. Data Ownership. All data and documents prepared for the performance of this Scope of Services shall be delivered to and become the property of the COMMISSION upon suspension, abandonment, cancellation, termination, or completion of the CONSULTANT'S services.

III Utility Coordination

The CONSULTANT shall perform the following utility coordination tasks:

1. Obtain maps from utilities of their known locations and adjust survey limits as needed.
2. Coordinate submittal of preliminary plans to utility companies.
3. Coordinate with utility companies on the development of the plan of adjustment and obtain cost estimates for reimbursable utilities for the District Utility Engineer's approval.
4. Show the existing utility facilities and plan of adjustments for proposed utilities facilities in the contract plans. (plans sheets, cross sections, culvert sections)
8 Coordinate with utility owner the relocation of each impacted utility on the project during design and construction.
9 Prepare special utility sheets as necessary (including utility profile and exhibits).

10 Assist District Utility Engineer in the preparation of agreements (includes municipal agreements).
11 Identify locations for power service needs, prepare service request for submittal and coordinate with the power company to obtain estimated costs.
12 Coordinate with MoDOT (PM and District Utility Engineer) and to provide SUE test hole information at critical utility locations.
13 Prepare utility job special provision and information for the preparation of the Utility Status Letter for District Utility Engineer.
14 Provide assistance and answer utility related questions during the construction phase for MoDOT staff and the roadway contractor.

IV Geotechnical Investigations

The CONSULTANT will perform all geotechnical work and provide the Preliminary Geotechnical Report and Foundation Investigation Report in accordance with section 320 of the MoDOT Engineering Policy Guide (EPG). Other chapters may be applicable.

Fertility samples will be collected by the CONSULTANT and sent to MoDOT's Central Laboratory for testing. The COMMISSION will provide the seeding report based on the fertility samples collected.

The CONSULTANT will provide staking for geotechnical boring locations.

1. Perform all geotechnical work necessary for the project including the Preliminary Geotechnical Report and the final bridge soundings.

2. Consultant is responsible for obtaining all necessary permits to perform the work.

3. Produce a preliminary geotechnical report which includes an initial geotechnical investigation of the site including recommended spill slopes. The site work for the preliminary geotechnical work and the final soundings may occur simultaneously.

4. Perform all necessary bridge soundings and testing and incorporate into a Foundation Investigation Report. The report shall include rock core photographs, recommended foundation types, recommended foundation capacities, applicable resistance factors and L-pile parameters for lateral load analysis of driven piles or drilled shafts.

5. All boring holes shall be filled with cuttings.

6. Public utilities shall be notified via Missouri One-Call before drilling begins.

7. The cores shall be handled and labeled following MoDOT procedures.

8. Laboratory testing will be performed to estimate pertinent engineering properties of the soil overburden and soil and rock properties for design. Consultant shall provide staking for boring locations.

9. The CONSULTANT shall provide the following information on their boring logs:

    a. N value of blows per foot
    b. N_{60} value of blows per foot (corrected for the energy efficiency of the auto-hammer)
    c. Energy efficiency of the auto hammer
    d. Drilling equipment identification
    e. Boring locations (Stations and/or Coordinates, and Elevations with datums)

10. The consultant shall provide, at a minimum, a geologist registrant in training (GRIT) or an engineer in training (FE) to log the borings in the field per MoDOT's logging protocol. The engineer or geologist shall have at least 2 years of experience logging boreholes. Logs shall be reported in gINT format. MoDOT will provide preferred gINT templates when requested. At final submittal, please provide a copy of the electronic gINT file, in addition to the final report deliverables.

11. The consultant will perform standard penetration testing (SPT) and split-barrel sampling in accordance with ASTM D1586 using an automatic hammer in accordance with section 7.4.1 Method A. The automatic hammers shall be calibrated in accordance with ASTM D4633 at least every 2 years or sooner as required therein. The calibration report shall be prepared in accordance with ASTM D4633 and shall be signed and stamped by a professional engineer.

12. A draft copy of the final draft report should be submitted to the MODOT Geotechnical Section for review prior to signing and sealing the report.

V Preliminary Roadway Design

The CONSULTANT'S attention is directed to Chapter 235 of the MoDOT Engineering Policy Guide (EPG) for general guidelines and requirements for preliminary design. Other chapters may be applicable for preliminary design preparation.

(A) Upon approval of the design criteria memorandum by COMMISSION, the CONSULTANT shall undertake the following to develop the preliminary design phase:

a. Prepare preliminary plans, as outlined in the MoDOT EPG.
    i. The COMMISSION shall furnish the CONSULTANT traffic information for the construction and design years to be used in the preliminary plans.
    ii. The COMMISSION shall furnish the CONSULTANT the latest accident data and traffic information used to calculate the project accident rate. The COMMISSION shall furnish the CONSULTANT the "statewide accident rate for a similar class of roadway" and any high hazard locations within the project limits.

iii. The CONSULTANT shall submit the preliminary plans to the COMMISSION for review and approval as shown in Exhibit IV.

b. The preliminary plans shall be prepared in accordance with the applicable sections of the MoDOT EPG, as to what shall be shown thereon, including proposed design features.
   i. The plan view English scale shall be 1"=50' horizontal (or different scale as determined by MoDOT Project Manager for clarity) and extend 100 feet beyond project limits.
   ii. The profile view English scale shall be 1"=50' horizontal, and 1"=10' vertical.

c. The CONSULTANT may have to review preliminary cross sections sufficiently to make a cost comparison between using retaining walls versus acquiring additional right of way for all proposed wall locations.

d. The CONSULTANT shall prepare the construction estimate. The COMMISSION shall prepare the right of way estimate based on the right of way requirements furnished by the CONSULTANT.

e. The preliminary plans shall be submitted to the COMMISSION for review and approval. A letter of transmittal shall be provided with the preliminary plan submittal. The COMMISSION shall furnish the template for the letter of transmittal. The construction cost estimate shall also be submitted with the preliminary plans.

f. The preliminary plans shall include the tentative additional easement and right of way limits, property lines and ownerships, section lines, township and ranges, any U.S. Surveys, city limits, and a general outline of the construction staging, critical design items and other items as outlined in the EPG.

g. Traffic assignments shall be shown on the respective roadways or on a line sketch of the roadways.

h. Typical sections shall indicate heavy, medium or light duty pavement for new roadways, along with descriptions of the existing roadway types remaining in place.

(B) A Preliminary Field Check will be arranged by the CONSULTANT with the COMMISSION to discuss design features in the project area.

(C) The CONSULTANT shall provide the COMMISSION with information for proper environmental and cultural clearance including submittal of the preliminary stage RES, right of way stage RES (if needed) and final stage RES. Items that may need to be addressed include historical buildings, archaeological sites, historic bridges, conversion of farmland, endangered species, wetlands, parklands and historical sites.

(D) The CONSULTANT shall prepare and submit the Bridge Survey Report, Bridge Survey Sheets, and Bridge Survey Checklist. (SE0062)

(E) The CONSULTANT shall set horizontal and vertical control for the project and provide the COMMISSION the combined adjustment factor. All control furnished by the CONSULTANT shall use current datums and adjustments.

(F) The CONSULTANT shall provide all land boundary work and legal descriptions to the COMMISSION for review and approval prior to right of way plans submittal.

(G) The COMMISSION shall provide the pavement design and general Job Special Provisions related to the project including any special design elements.

(H) The COMMISSION may hold a public meeting for this project either in person or virtually and the CONSULTANT will be required to attend and coordinate meeting. The CONSULTANT shall provide exhibits for MoDOT public meeting as requested and will refer to the sections of the EPG concerning public involvement.

VI Preliminary Bridge Design

(A) Perform the geometric analysis at the proposed bridge site necessary to develop type, size and location drawings consisting of a general plan and elevation plan of the structures, typical roadway sections and roadway profiles. This includes preparation of the Bridge Memorandum & Layout (including the itemized preliminary bridge estimate).

(B) The structure and/or box culvert type and size (if applicable) shall be based on roadway alignments, geometric analysis, hydraulic analysis (if applicable), spill slope requirements, roadway overpass clearances, grades and/or clear zone requirements.

(C) The superstructure type shall be dependent upon site constraints and a detailed cost analysis comparison.

(D) All requirements of the Federal Emergency Management Agency’s National Flood Insurance Program shall be met.

(E) Discharges will be estimated using USGS Regression Equations and available stream gauge data (if applicable).

(F) HEC-RAS shall be used to model of the natural, existing and proposed conditions (if applicable).

(G) Scour calculations shall be performed in accordance with FHWA Hydraulic Engineering Circular No. 18 (if applicable).

(H) The results of the hydrologic, hydraulic and scour analysis shall be documented in the Bridge Hydraulic and Scour Report (if applicable).

(I) All requirements outlined in the MoDOT Engineering Policy Guide (EPG) shall be met. The CONSULTANT shall follow MoDOT's "practical design" philosophy and submit any design exceptions as necessary.

(J) Develop final detailed design criteria in the form of Bridge Memorandum and Bridge Design Layout documents.

VII Section 404 Corps of Engineers Permit (if applicable)

The CONSULTANT shall provide the following information necessary to allow MoDOT staff to apply for any required Section 404 Corps of Engineer Permits. If the permit is required due to bridge construction, the application data shall be submitted no later than with the T.S.&L. drawings. All information should be provided to the MoDOT Project Manager who will forward the information to Central Office Design.

(A) Provide the amount and type of excavation and material that will be used in streams, lakes, and wetlands below the Corps of Engineers' ordinary high water line (OHL) elevations.

(B) Provide location and quantities of permanent berms and spill fills below OHL.
   a. Earth fill, rock blanket (square feet and cubic yards)
   b. Rock blanket along right descending bank and left descending bank (linear feet)
   c. Rock ditch (square feet)

(C) Provide location, excavation and size of pier below OHL.
   a. Excavation (cubic yards)
   b. Pier (square feet)

(D) Provide channel realignment data.
   a. Existing channel length of section to be modified (feet)
   b. Average channel width of section to be modified (feet)
   c. Realigned section, length and width (feet)

(E) Provide temporary fill amounts in wetlands or below OHL in streams.
   a. Earth fill (square feet and cubic yards)
   b. Class C (square feet and cubic yards)

(F) Provide information about temporary fills and shoring.
   a. Location of temporary fills and shoring
   b. Source of material
   c. Final disposition of removed materials

(G) Provide information about temporary culverts.
   a. Number of culverts
   b. Size (inches)
   c. Length (feet)

(H) Provide information on channel cleanout – excavation below OHL.
   a. Cleanout upstream and downstream of structure (linear feet)
   b. Total quantity of material to be removed below OHL (square feet and cubic yards)

(I) Provide 8 ½-inch by 11-inch copies of any plan or profile sheets required for the permit application.
(J) Provide bridge elevation and plan views with OHL indicated.

VIII Right of Way Design

(A) The CONSULTANT shall prepare right of way plans, which may be separate drawings from those used for design and construction details. The right of way plans shall show alignment, geometric design, removal of improvements, drainage facilities, property lines and ownership, sub-division lot lines, other land survey information, street lines and existing right of way and easements. The CONSULTANT should also include any plan details, which will require additional right of way or permanent, temporary or utility easements during the construction phase of the project such as bypasses, temporary erosion control, etc. Right of way plans include title sheet, typical sections, profile sheets, and cross sections of the roadway, entrances and side roads. Areas of new right of way, permanent easements and/or temporary easements required from each individual property owner may be shown in tabular form on the respective sheets.

a. The CONSULTANT shall finalize any previous review of the roadway cross sections sufficiently to determine the feasibility of constructing retaining walls versus obtaining additional right of way. This final review shall consist of construction estimates versus right of way estimates.
b. Upon completion of the estimates by COMMISSION and CONSULTANT, the CONSULTANT shall recommend to the COMMISSION a choice at the various locations which warrant consideration of the alternate retaining wall versus right of way solutions. The COMMISSION shall make the final determination of purchasing right of way, or constructing retaining walls.

(B) Right of way plans shall be submitted to the COMMISSION for review and approval. The right of way plans shall be at the same scale as the construction plans. The right of way plans shall include any design details that will control the width of right of way and necessary easements.

a. New right of way lines and all easements shall be dimensioned by station and offset distance from the centerline, or crossroad centerlines, if necessary. Bearings and distances on the right of way lines may be required.
b. The following minimum design features shall be included on the right of way plans:
    i. Title sheet with appropriate project limits, access note and traffic data completed.
    ii. Typical Sections
    iii. Cross sections at 100’ intervals, including additional sections at each entrance with new and existing entrance grades.

iv. Construction limits (slope lines); drainage facilities; entrances and their reference location, width and type along with their existing and future grade percentage; property owners, with areas of new right of way, easements and remaining property; centerline bearing, ties to legal land corners from centerline stations with notation for corner witness by a registered land surveyor; existing utility locations and easements, including replacement utility easements; horizontal curvature information; and proper right of way symbolization for new right of way (access control) and easements, including areas which may be required to accommodate temporary erosion control.

v. Township, Range, Section and/or U.S. Survey information broken down t ¼ ¼ section line level on each plan sheet near the title block or appropriate survey/section line.

(C) The CONSULTANT shall provide an updated construction estimate for the Right of Way design stage.

(D) The COMMISSION shall review, approve and certify the right of way plans as completed by the CONSULTANT. The CONSULTANT shall provide one (1) electronic set of fully signed and sealed right of way plans, for the COMMISSION'S use.

(E) The CONSULTANT shall provide title insurance information for all parcels with new right of way acquisition and the last deed of record for any parcel with easements.

(F) The COMMISSION will prepare right of way appraisals and secure the necessary right of way by negotiation or condemnation, if necessary, for construction of this project.

(G) The CONSULTANT shall be responsible for staking and re-staking tentative right of way on individual properties, as required by MoDOT staff, during right of way negotiation and acquisition phase of the project. The CONSULTANT shall also set permanent monuments as shown on the recordable land survey.

(H) The CONSULTANT shall be responsible for making all revisions to the right of way and construction plans due to negotiations with the property owners in an effort to acquire right of way.

(I) The CONSULTANT shall write, sign and seal deed descriptions for all right of way acquisitions on MoDOT's approved Exhibit A form and submit to COMMISSION.

(J) The CONSULTANT will provide the COMMISSION with information for proper environmental and cultural clearance including submittal of the Right of Way stage RES. Items that may need to be addressed include historical buildings, archaeological sites, historic bridges, conversion of farmland, endangered species, wetlands, parklands and historical sites.

IX Final Roadway Design

(A) The COMMISSION will secure execution of municipal agreements with the cities and/or county agreements. A copy of the executed agreements will be furnished to the CONSULTANT for his information. The CONSULTANT shall conform to all design provisions of these agreements.

(B) A final design field check shall be held with CONSULTANT and COMMISSION representatives prior to completing final design plan quantities. The CONSULTANT shall make any necessary revisions to the final plans as determined by this design field check.

(C) The CONSULTANT shall prepare detailed temporary erosion control plans for review and approval before inclusion in the final design plans. The CONSULTANT will submit a Final Plans stage RES and help ensure previous RES items have been addressed.

(D) The CONSULTANT shall prepare computations for all design plan quantities. All plan quantities shall be shown on the Quantity Sheets, by construction stage, if applicable. The format for these sheets shall be furnished by the COMMISSION. Specialty items may have separate sheets for quantity tabulations.

(E) The CONSULTANT shall prepare for review and approval by the COMMISSION all General Job Special Provisions, which are to supersede the Missouri Standard Specification for Highway Construction. A brief reason for the deviation from the standard plans and specifications should also be provided. The CONSULTANT shall prepare only Job Special Provisions related to design elements shown in the plans.

(F) The following list shall be considered the minimum requirements for a complete set of Final Design Plans.

a. Title Sheet
b. Typical Sections
c. Quantity Sheets
d. Plan Sheets at 1”=50’ horizontal (or different scale as determined by MoDOT Project Manager for clarity). Plan sheets shall include all necessary adjustments to signing and proposed pavement marking.
e. Profile Sheets at 1”=50’ horizontal and 1”=10’ vertical
f. Culvert Sections at 1”=10’, if needed
g. Special Sheets for geometrics, referenced points, grading plan, traffic control plan, temporary erosion control plan and any other sheets for special design features.
h. Earthwork Quantities, Cross Sections at 25’ intervals, 1”=10’ (1:100), horizontal and vertical, including entrance sections with existing and proposed grades
i. Tabulation of Quantity Sheets

j. Job Special Provisions in electronic format readable in COMMISSION'S current word processor
k. File with the bid items and quantities as generated by COMMISSION'S Estimate Program
l. Construction Workday Study
m. Transportation Management Plan
n. Final Plans Checklist Form D-12

(G) Additional plans and information may be required to complete the Final Design Plans. With the submittal of the Final Design the CONSULTANT shall also provide the COMMISSION a statement that an internal quality control check has been conducted and to the best of the CONSULTANT'S knowledge the final design plans are free of gross errors, misleading or confusing typos, and includes adequate information to construct the project.

(H) The CONSULTANT shall prepare all plans through the use of a Computer Aided Drafting (CAD) program. The CONSULTANT shall conform to MoDOT's Specifications for Computer Deliverable Contract Plans as referenced in the MoDOT EPG.

(I) The CONSULTANT shall furnish the COMMISSION the following completed sheets and documents, as applicable, for each separate construction project included in this contract, as follows:

a. Final Design Plans showing profile grades, geometric data, alignment data, etc.
b. One (1) electronic copy of the location sketch for Commission Approval submitted in electronic format.
c. Draft copy of the job special provisions related to design elements for review. After corrections, the job special provisions shall be furnished in electronic format utilizing the COMMISSION'S latest word processing program.
d. One (1) legible electronic copy of engineering calculations and analysis.
e. One (1) electronic copy of a complete summary of quantities and estimate of construction costs. The estimate shall be prepared using the latest version of MoDOT's ESTIMATE program.
f. One (1) electronic copy of Electronic Design Data.
g. One (1) electronic copy of a workday study showing the estimated number of workdays required to construct each project.
h. The CONSULTANT shall provide a 3D model of the project exported from Geopak Open Roads Designer software for the COMMISSION'S use.

X Final Bridge Design

Furnish to the COMMISSION fully checked design plans, job special provisions, design computations, quantity computations, final cost estimate, and a construction workday study for the structure(s). The CONSULTANT is expected to make the COMMISSION aware of more

economical design alternatives that may become apparent during the preparation of the final design.

(A) The plans shall be complete and shall cover all parts of the structure they represent. The degree of detail shall be comparable to that furnished on typical plans prepared by the COMMISSION. High resolution final signed and sealed plans, will be submitted in Adobe Acrobat Reader format version 7 or higher. Final signed and sealed plans shall be in pdf full size (34" x 22") format. These deliverables shall use the file naming convention and be in accordance with the "Specifications of Computer Deliverable Contract Plans" requirement outlined in the Commission's Engineering Policy Guide, Section 237.13.3. The electronic plans in Microstation format cannot be signed and sealed. The electronic submittals shall be made in a method suitable to MoDOT.

(B) All construction changes made to the plans during construction of the project shall also be submitted electronically in Adobe Acrobat and Microstation format.

(C) The job special provisions shall be complete and describe all design features, construction procedures, or material requirements in the plans that are deviations from the latest edition of the Missouri Standard Plans for Highway Construction. Typical job special provisions that have been developed by MoDOT for previous jobs are posted on MoDOT's website and are available for use and modification as needed. The job special provisions shall include a table of contents sheet that is signed and sealed by a professional engineer registered in Missouri. The signed and sealed job special provisions shall also be submitted in Adobe Acrobat Reader format, version 7 or higher. Job Special Provisions shall also be submitted in Microstation Word format. The submittal letter shall explain the need for each provision.

(D) The design computations and plans shall be acceptable to and will become the property of the Commission. The CONSULTANT shall submit design computations in Adobe Acrobat Reader version 7.0 format or greater. The files shall be transferred in a manner acceptable to MoDOT. The design computations shall contain an index file, with electronic links to the files contained within. Submittals shall include a set of design computations for each bridge. The design computations shall not be combined with the Microstation or the Adobe Acrobat Reader submittals.

(E) The final estimate submitted by the CONSULTANT shall include backup material that supports the estimates made for non-standard or lump sum pay items.

(F) The CONSULTANT shall submit the hours and cost summarizing the design effort for each bridge. The summary shall include separate amounts for: Number of Hours for Bridge Preliminary Design, Cost of Bridge Preliminary Design, Number of Hours for Bridge Final Design, Cost of Bridge Final Design. Generally, the above amounts should include all hours and costs invoiced that are attributable to bridge design and plans preparation up to the point of turning in the signed and sealed plans. It should not

include hours attributable to preparing the bridge survey, final construction cost estimate, or workday study.

(G) Bridge Load Rating: The CONSULTANT shall furnish to the COMMISSION fully checked load ratings for the structure(s) in accordance with EPG Section 753.15. The load rating files shall be acceptable to, and will become the property of, the COMMISSION. The CONSULTANT shall submit the load ratings in an acceptable electronic format (.xml or other approved method) created using AASHTOWare BrR Bridge Rating software version 6.8 or higher. The CONSULTANT shall verify the accuracy of any load rating files provided by the COMMISSION prior to making modifications.

XI Construction Support

(A) The CONSULTANT shall be available to the COMMISSION to discuss and interpret plans and specifications during the bidding and construction phase of the project as determined necessary by the Engineer.

(B) The CONSULTANT shall be available to provide Shop Drawing review of CONTRACTOR submittals pertaining to essential structural components and review any contractor's Value Engineering Proposals.

(C) The CONSULTANT may be required to attend a pre-construction meeting, and a post construction meeting via TEAMS.

(D) If issues arise during construction, there will be a direct line of communication established between the MoDOT Construction Office and the CONSULTANT. The CONSULTANT will immediately inform the MoDOT Design Division or MoDOT Bridge Division of any recommendations or clarifications made to the Construction Office.

EXHIBIT II

SERVICES PROVIDED BY THE COMMISSION

The Commission will furnish to the Consultant without charge the following information:

A. General design criteria.
B. Available standard detail sheets in Microstation format.
C. Traffic and accident data.
D. Pavement Design Selection
E. All necessary environment services identified through the Request for Environmental Services
F. Right of way and easement acquisition.

The Consultant shall proceed with the final design and detail plans in accordance with the data approved or furnished by the Commission which will meet with the general standards adopted by AASHTO and approved by the Department of Transportation as provided by Title 23, United States Code, Section 109(b).

EXHIBIT IV

PERIOD OF SERVICE

The Consultant shall make submittals in accordance with the schedule described below:

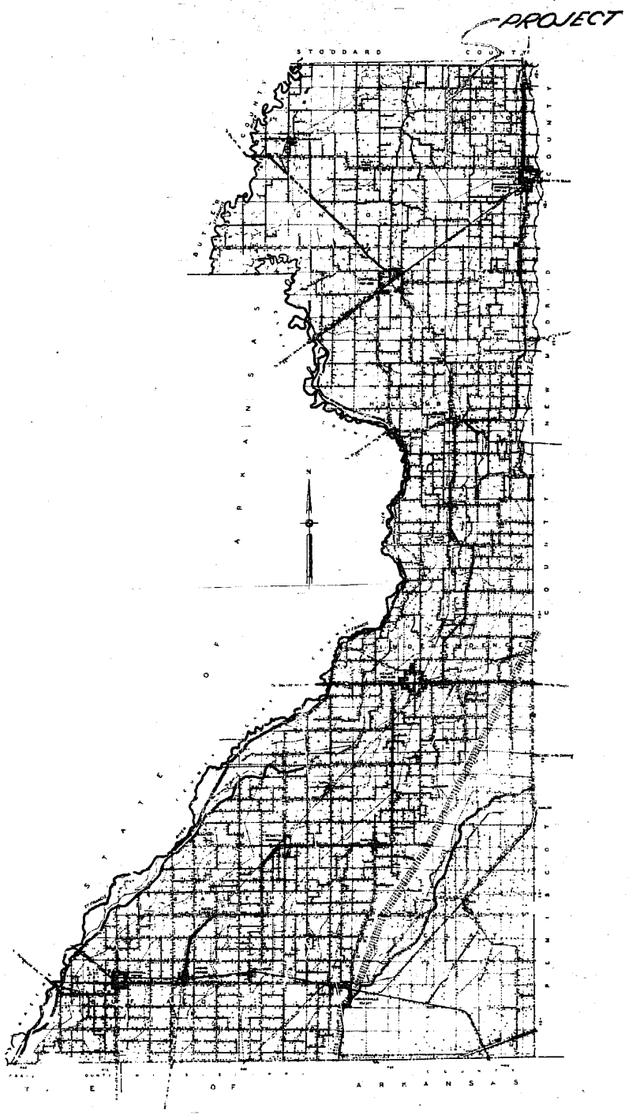
Period of Service	
Letting	August 2027
PSE	6/1/2027
100% Review Plans	4/1/2027
Final RES	4/6/2027
TSL Bridge Drawings	5/1/2026
ROW Plans/ROW RES	5/1/2026
Public Meeting Exhibits	4/15/2026
Bridge Memo	3/2/2026
Preliminary Roadway Plans	3/2/2026
Preliminary RES	3/2/2026

Construction support as needed post award – Anticipated for 24 months

PERIOD OF SERVICE – The total period of service including construction services is expected to be completed by December 1, 2029.

6-3-13

LOCATION MAP

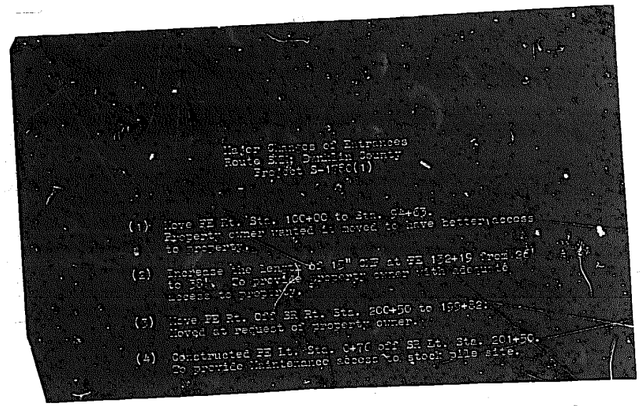


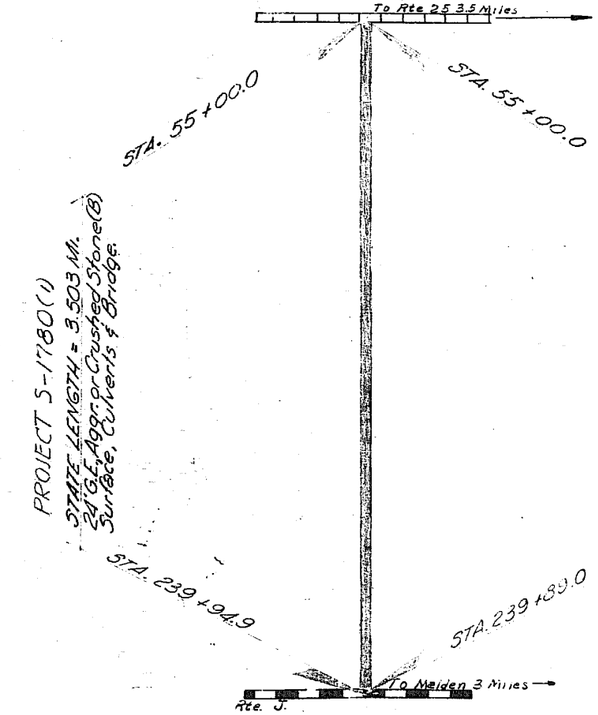
MISSOURI
STATE HIGHWAY COMMISSION
PLAN AND PROFILE
OF PROPOSED
STATE ROAD

FEDERAL AID PROJECT

DUNKLIN COUNTY

COUNTY
DUNKLIN
STATE ROUTE NO.
84
PROJECT NO.
S-1780(1)





FEDERAL AID IMPROVEMENT
LENGTH = 3.502 MI.

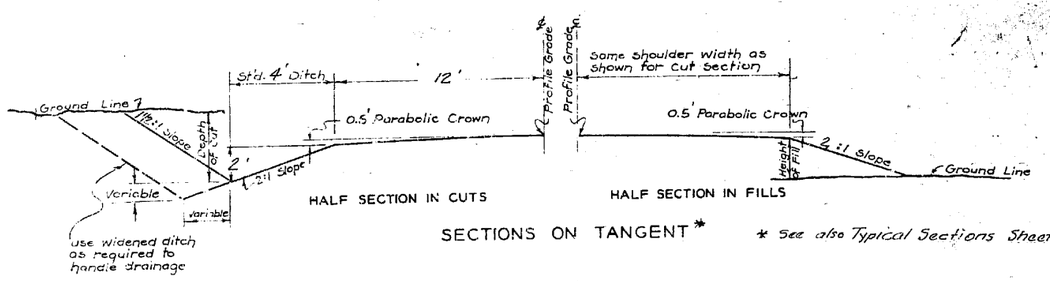
AWARDED
SEP 4 1956

SUBMITTED BY [redacted] DATE [redacted]

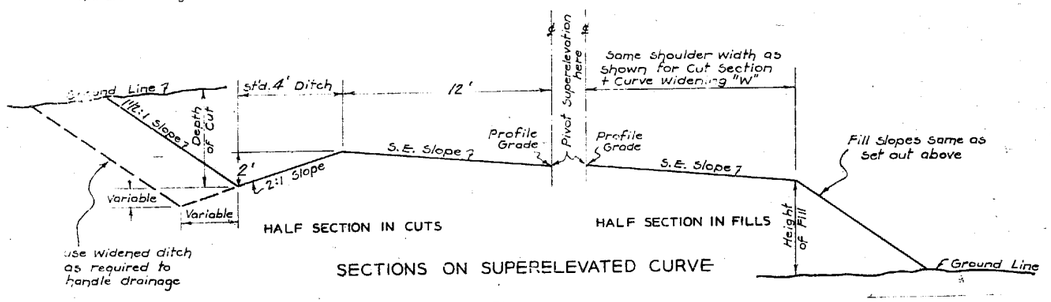
CHIEF ENGINEER
MISSOURI STATE HIGHWAY COMMISSION

CONVENTIONAL SIGNS

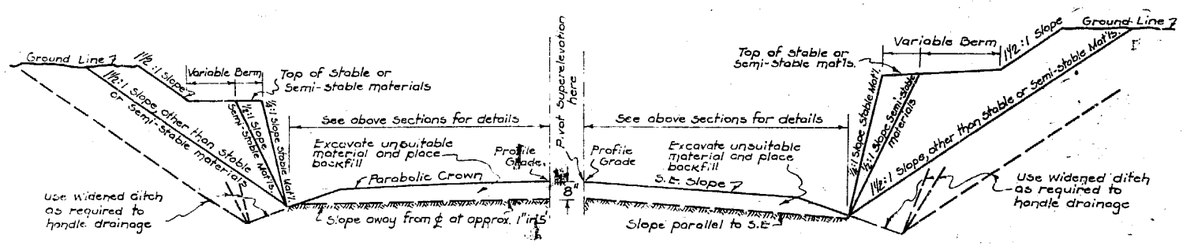
STATE AND NATIONAL LINE	LEVEE
COUNTY LINE	CULVERTS
CITY, VILLAGE OR BOROUGH	DROP INLET
TOWNSHIP LINE	TROLLEY POLE
SECTION LINE	POWER POLE
GRANT LINE	TELEPHONE OR TELEGRAPH POLE
FENCE LINE	MARSH
GUARD RAIL	HEDGE
UNFENCED PROPERTY	
RIGHT OF WAY LINE	GROUND ELEVATION
TRAVELED WAY	
RAILROADS	GRADE ELEVATION
RETAINING WALL	SURFACE LINE
BASE OR SURVEY LINE	GRADE LINE



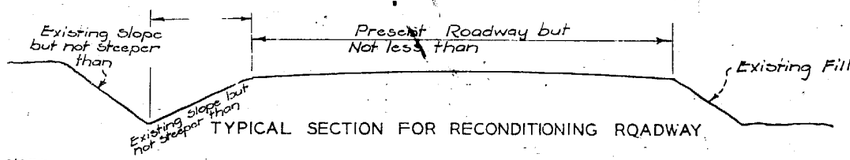
SECTIONS ON TANGENT * * See also Typical Sections Sheet No. 3 & 5



SECTIONS ON SUPERELEVATED CURVE



SECTIONS IN UNDERGRADED CUTS



TYPICAL SECTION FOR RECONDITIONING ROADWAY

GENERAL NOTES:—

Machine Grading and Reconditioning Rdwy. shall be completed in accordance with these Typical Sections using the standard depth of ditch except as otherwise noted on Plan Sheets and as required to provide proper drainage. Covering of at least 1 foot will be required over all drainage structures located within machine and Reconditioning Rdwy sections.

In transitioning from one slope to another, use a 25 foot length of transition.

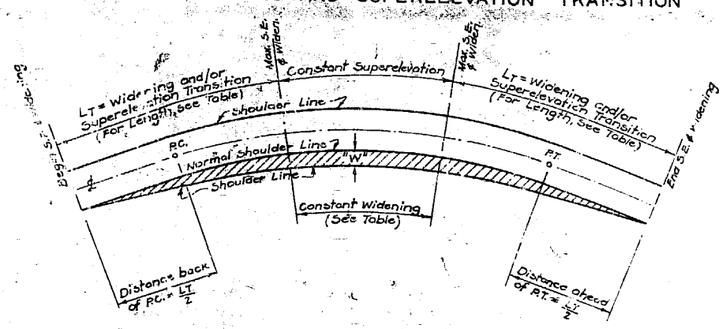
All information shown on these TYPICAL SECTIONS is for the purpose of indicating the required parabolic crown on tangent section, and general design and construction details. Actual construction of roadbed widths, slopes, depth and width of ditches, undergraded cuts and other features shall conform to the details shown on CROSS-SECTIONS and PLAN & PROFILE Sheets or as directed by the Engineer.

Hand finishing of side slopes of cuts and fills will not be required. Machine finishing to a smooth plane will be considered satisfactory.

Unless otherwise shown on the plans, the roadway ditch at all cross road culverts shall be widened to five (5) feet at the inlet with a fifty (50) foot transition to the standard roadway ditch. In "Machine Grading" limits the cost of this excavation is to be included in the contract unit price for Machine Grading.

The cost of constructing Ditch Blocks in "Machine Grading" limits is to be included in the contract unit price for "Machine Grading."

SCHEME OF WIDENING AND SUPERELEVATION TRANSITION



SUPERELEVATION AND WIDENING DATA

Degree of Curve Dc	Design Speeds: 30 or Less S	W	LT	35 M.P.H. S	W	LT	40 M.P.H. S	W	LT	45 M.P.H. S	W	LT	50 M.P.H. S	W	LT	55 M.P.H. S	W	LT
0° to 1°00'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1°01' to 1°30'	.01	0	150	.01	0	150	.02	0	150	.02	0	150	.02	0	150	.03	0	150
2°00'	.01	0	150	.02	0	150	.02	0	150	.03	0	150	.03	0	150	.04	0	150
2°30'	.01	0	150	.02	0	150	.03	0	150	.03	0	150	.04	0	150	.05	0	150
3°00'	.02	0	150	.02	0	150	.03	0	150	.04	0	150	.05	0	150	.06	0	150
3°30'	.02	0	150	.03	0	150	.04	0	150	.05	0	150	.06	0	150	.07	0	150
4°	.02	0	150	.03	0	150	.04	0	150	.05	0	150	.06	0	150	.08	0	200
5°	.03	0	150	.04	0	150	.05	0	150	.07	0	150	.08	0	150	.08	2.0'	250
6°	.03	0	150	.05	0	150	.06	0	150	.08	0	150	.08	2.0	200	.08	2.0'	300
7°	.04	0	150	.06	0	150	.07	0	150	.08	2.0'	200	.08	2.0	250	.08	2.0	350
8°	.05	0	150	.06	0	150	.08	2.0	150	.08	2.0'	200	.08	2.0	300	7° MAX. CURVE		
9°	.05	2.0'	150	.07	2.0'	150	.08	2.0	150	.08	2.0'	250	.08	3.0	300			
10°	.06	2.0'	150	.08	2.0'	150	.08	2.0	200	.08	3.0'	250	9° MAX. CURVE					
11°	.06	2.0'	150	.08	2.0'	150	.08	3.0	200	.08	3.0	300	11° MAX. CURVE					
12°	.07	2.0'	150	.08	2.0'	150	.08	3.0	200	14° MAX. CURVE								
13°	.07	2.0'	150	.08	3.0'	150	.08	3.0	250									
14°	.08	2.0'	150	.08	3.0'	150	.08	3.0	250									
15°	.08	3.0'	150	.08	3.0'	200	18° MAX. CURVE											
15°00' to 22°59'	.08	3.0'	150	.08	3.0'	200												
23°00' to 23°59'	.08	4.0'	150															
24°00' & above	.08	4.0'	200															

— NOTES —

S-denotes Superelevation in feet per foot.
W-denotes Widening of surfacing and inside shoulder in feet.
LT-denotes length of Superelevation and/or Widening transition in feet.
Crown is to be eliminated on all Superelevated Curves.
Values for degrees of curve not shown in above table shall be identical with those for the nearest tabulated curve. In case of tie, use values for next higher degree curve.

REVISED
11-12-54

APPROVED [signature] ENGR. SURVEYS AND PLANS
APPROVED [signature] CHIEF ENGINEER

MISSOURI STATE HIGHWAY COMMISSION

TYPICAL SECTIONS FOR 24 FT. GRADED EARTH FOR SUPPLEMENTARY ROADS

(DESIGN SPEED 45 M.P.H.) Flat Terrain

ROUTE: SMM COUNTY: Dunklin

PROJ. [redacted] S-1780(1)

IAC-BC

LOCATION *FROM ROUTE 53 ABOUT 3 MILES WEST OF MALDEN NORTH*

TYPE *24' G.E., CULVERTS, BRIDGE, AND GRAVEL SURFACE*

MISSOURI STATE HIGHWAY COMMISSION

SUMMARY OF QUANTITIES

FED ROAD DIST. No.	STATE	PROJECT	FISCAL YEAR	SHEET No.	TOTAL SHEETS
5	MO.	S-1780(1)		2-A	
DIST. No.	COUNTY			ROUTE	SEC. No.
10	DUNKLIN			SMM	

EXCAVATION

STATION	CLASS A	M.G. 1	M.G. 2
55+00			
215+00			163.0
220+27.8	1162		
221+48.2	GRADING	EXCEPTION	
224+00	1181		
239+949			15.9
SUB-TOTALS	2343		178.9
ENTRANCES		17.3	
TOTALS	2343	17.3	178.9

CLEARING AND GRUBBING

SHEET No.	CLEARING UNITS	GRUBBING UNITS
3	8	8
4	75	47
5	65	49
6	88	52
7	85	72
8	60	54
9	98	83
TOTAL UNITS	479	365
ACRES	5.5	4.2

REMOVAL OF EXISTING STRUCTURES

REMOVAL OF (6) SIX EXISTING STRUCTURES AS PER ORIGINAL PLANS WITH THE EXCEPTION OF THE FOLLOWING:

STATION	LOCATION	DESCRIPTION	No OMISSIONS	REMARKS
173+51	℄	30"x26" C.M.P. & R.C.P.	1	RELAID
		TOTAL	1	

6 (PLAN) MINUS 1 = 5/6 OF 1 LUMP SUM

AUTOMATIC FLOODGATES

STATION	LOCATION	15"	18"
221+90	F.E. Lt.		1
222+31	F.E. Rt.	1	
TOTALS		1	1

FEDERAL LENGTH

END OF PROJECT	STATION	239+690
BEGINNING OF PROJECT	STATION	55+000
APPARENT LENGTH		184890
EQUATIONS AND EXCEPTIONS:		NONE
TOTAL CORRECTIONS		0
FEDERAL LENGTH		184890 FEET
		3.502 MILES

LENGTH OF PROJECT

End of Project	Station	239+749	
Beginning of Project	Station	55+000	
Apparent Length		184949	Feet
Equations and Exceptions:		NONE	
Total Corrections		0	Feet
Net Length of Project		184949	Feet
State Length =		3.503	Miles
Federal Length =		3.502	Miles

CROSS ROAD PIPE CULVERTS (C.M.P.)

STATION	18"	24"	30"	36"	C.I. 3	REMARKS
55+75		34'			12	
88+75			38'		10	
121+00			36'		22	
173+64				38'	13	SKEW 20° RA
200+27	32'				9	
201+21	36'				15	
226+45	38'				10	
411+86	6'				1	*L.F. = U.L.P. 18"x36" C.M.P. EXTENDED ON L.F. 30° SKEW
TOTALS	112'	34'	74'	38'	110	

ENTRANCES (C.M.P.)

STATION	TYPE & SIDE	15"	18"	24"	RELAID	M.G. 1	REMARKS
55+09	S.R. Rt.					0.5	No Pipe
55+09	S.R. Lt.					0.5	No Pipe
58+09	P.E. Rt.		28'			0.3	
68+00	F.E. Lt.		28'			0.3	
73+09	P.E. Rt.					0.3	No Pipe
81+40	F.E. Lt.		28'			0.3	
82+00	S.R. Lt.					0.3	No Pipe
82+81	P.E. Rt.	26'				0.3	
83+23	F.E. Rt.	26'				0.3	
94+63	F.E. Rt.	26'				0.3	
100+79	P.E. Rt.	26'				0.3	
103+46	F.E. Lt.	26'				0.3	
108+45	S.R. Rt.					1.0	No Pipe, Skew
108+45	S.R. Lt.					1.0	No Pipe, Skew
0+49	F.E. Rt.		28'			0.3	Off S.R.Lt. Sta. 108+45
132+19	P.E. Rt.	38'				0.3	
134+38	S.R. Lt.					0.3	No Pipe
135+00	F.E. Lt.	26'				0.3	
135+11	F.E. Rt.					0.3	No Pipe
137+24	F.E. Rt.	26'				0.3	
155+83	F.E. Rt.	26'				0.3	
160+73	S.R. Rt.					0.3	No Pipe
160+73	S.R. Lt.			32'		0.3	
161+66	P.E. Rt.					0.3	No Pipe
168+53	P.E. Rt.	26'				0.3	
172+81	F.E. Rt.	26'				0.3	
174+04	P.E. Rt.		28'			0.3	
180+00	F.E. Lt.	26'				0.3	
180+02	P.E. Rt.	26'				0.3	
186+95	F.E. Lt.	26'				0.3	
187+42	F.E. Rt.	26'				0.3	
198+74	P.E. Rt.	26'				0.3	
199+36	W.E. Lt.	10'				0.3	
199+82	P.E. Rt.	26'				0.3	
200+00	P.E. Lt.	26'				0.3	
200+48	S.R. Rt.					1.0	No Pipe (Pipe furnished by Contr. orig. pipe damaged beyond use) Off S.R.W. Sta. 201+20
Ct+76	P.E. Lt.				20'	0.3	
201+50	S.R. Lt.	30'				1.0	
203+98	P.E. Lt.	26'				0.3	
207+02	F.E. Lt.	26'				0.3	
207+02	F.E. Rt.	26'				0.3	
213+98	F.E. Lt.		28'			0.3	
213+98	F.E. Rt.		28'			0.3	
220+04	P.E. Rt.		30'			0.4	Skew
221+90	F.E. Lt.		38'			0.4	With Floodgate
222+31	F.E. Rt.	38'				0.4	With Floodgate
TOTALS		636'	264'	32'	20'	17.3	

GENERAL SUMMARY — FINAL PLANS

ITEM NO.	DESCRIPTION	UNIT	TOTAL UNITS	NO. UNITS FED AID ONLY
1A-A	CLEARING	ACRE	5.5	
1A-B	GRUBBING	ACRE	4.2	
1A-D	CLASS A EXCAVATION	C.Y.	2343	
1-J	CLASS J EXCAVATION FOR STRUCTURES	C.Y.	110	
1A-O	MACHINE GRADING (CLASS 1)	STA.	17.3	
1A-OO	MACHINE GRADING (CLASS 2)	STA.	178.9	
13-C	GRAVEL SURFACE	C.Y.	3116	
13-H	GRAVEL IN STOCK PILES	C.Y.	343	
18-B	15" CORRUGATED METAL CULVERT PIPE	L.F.	636	
18-B	18" CORRUGATED METAL CULVERT PIPE	L.F.	316	
18-B	24" CORRUGATED METAL CULVERT PIPE	L.F.	56	
18-B	30" CORRUGATED METAL CULVERT PIPE	L.F.	74	
18-B	36" CORRUGATED METAL CULVERT PIPE	L.F.	38	
33-A	REMOVAL OF (6) EXISTING STRUCTURES	L.S.	5/6	
36-B	AUTOMATIC FLOOD GATES (15")	EACH	1	
36-B	AUTOMATIC FLOOD GATES (18")	EACH	1	
	ROADWAY CONTINGENT ITEM			
	RELAID PIPE CULVERT	L.F.	20	
	BRIDGE AT STATION 220+27.8 (Dwg. No. N-626)			
1-G	CLASS 1 EXCAVATION FOR STRUCTURES	C.Y.	79.5	
16-B	CLASS B CONCRETE (SUPERSTRUCTURE)	C.Y.	58.8	
16-B	CLASS B CONCRETE (SUBSTRUCTURE)	C.Y.	53.5	
17-B	FABRICATED STRUCTURAL STEEL	LB.	48620	
17-C	STEEL CASTINGS	LB.	430	
19-A	REINFORCING STEEL	LB.	16190	
22-C	PRECAST CONCRETE PILES IN PLACE	L.F.	471	
22-C1	PRECAST CONCRETE PILE CUT-OFFS	L.F.	0	
22-E	TEST PILE	L.F.	40	

Prepared By *H. R. Smith* Date *6/12* 19*59*

Checked in Dist. Office By _____ Date _____ 19____

Checked in Central Office By _____ Date *7-1* 19*59*

Revised By _____ Date _____ 19____

FED. ROAD DIV. NO.	STATE	FEDERAL PROJECT No. & SEC.		SHEET NO.
5	MO.	S-1780 (1)		3
DIST. NO.	COUNTY		ROUTE	SEC.
10	DUNKLIN		MM	

FINAL PLANS

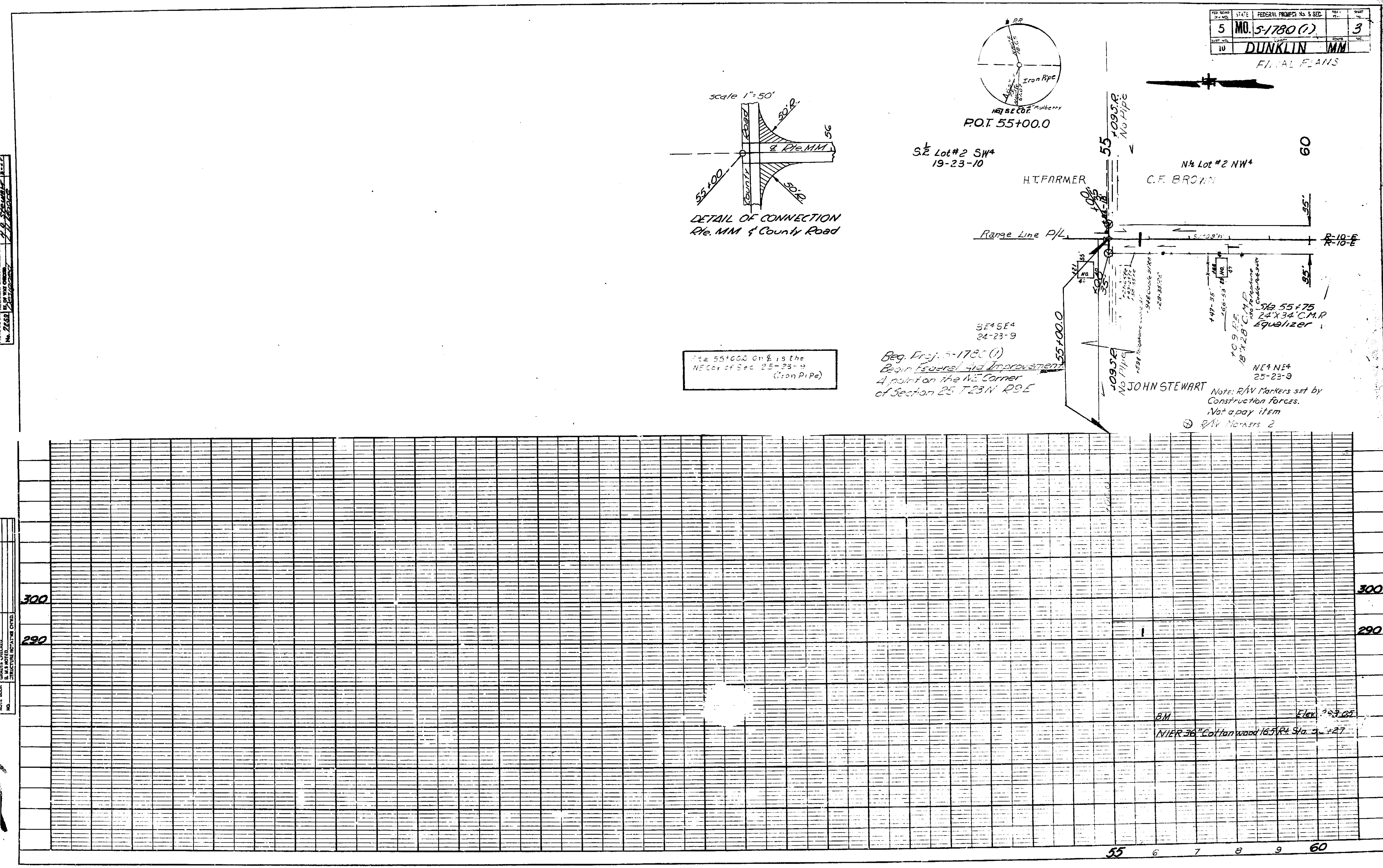


PLATE 1—PLAN-PROFILE O.P.R. & R.E. STANDARD

U. S. BLUE PRINT PAPER CO.—CHICAGO

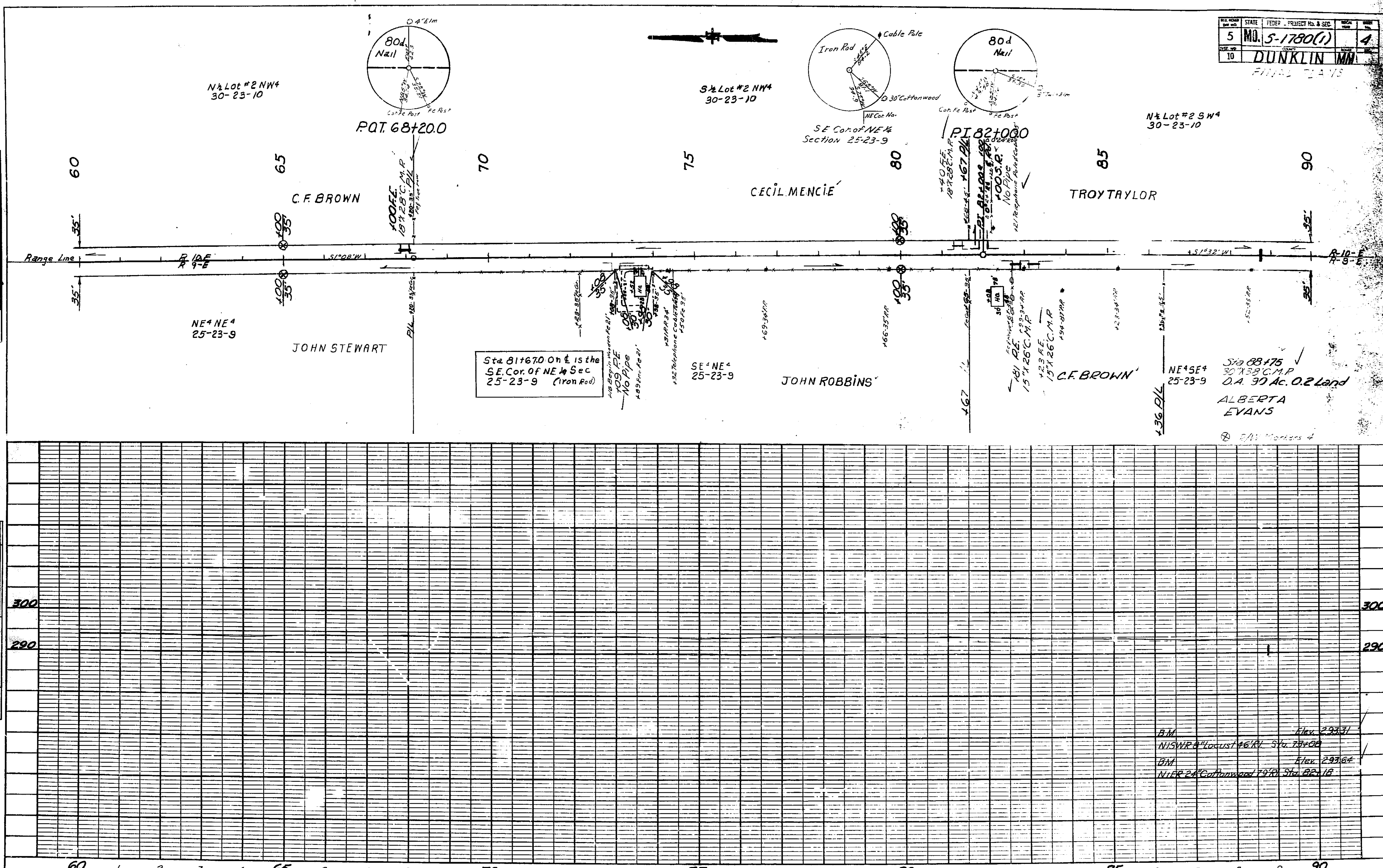
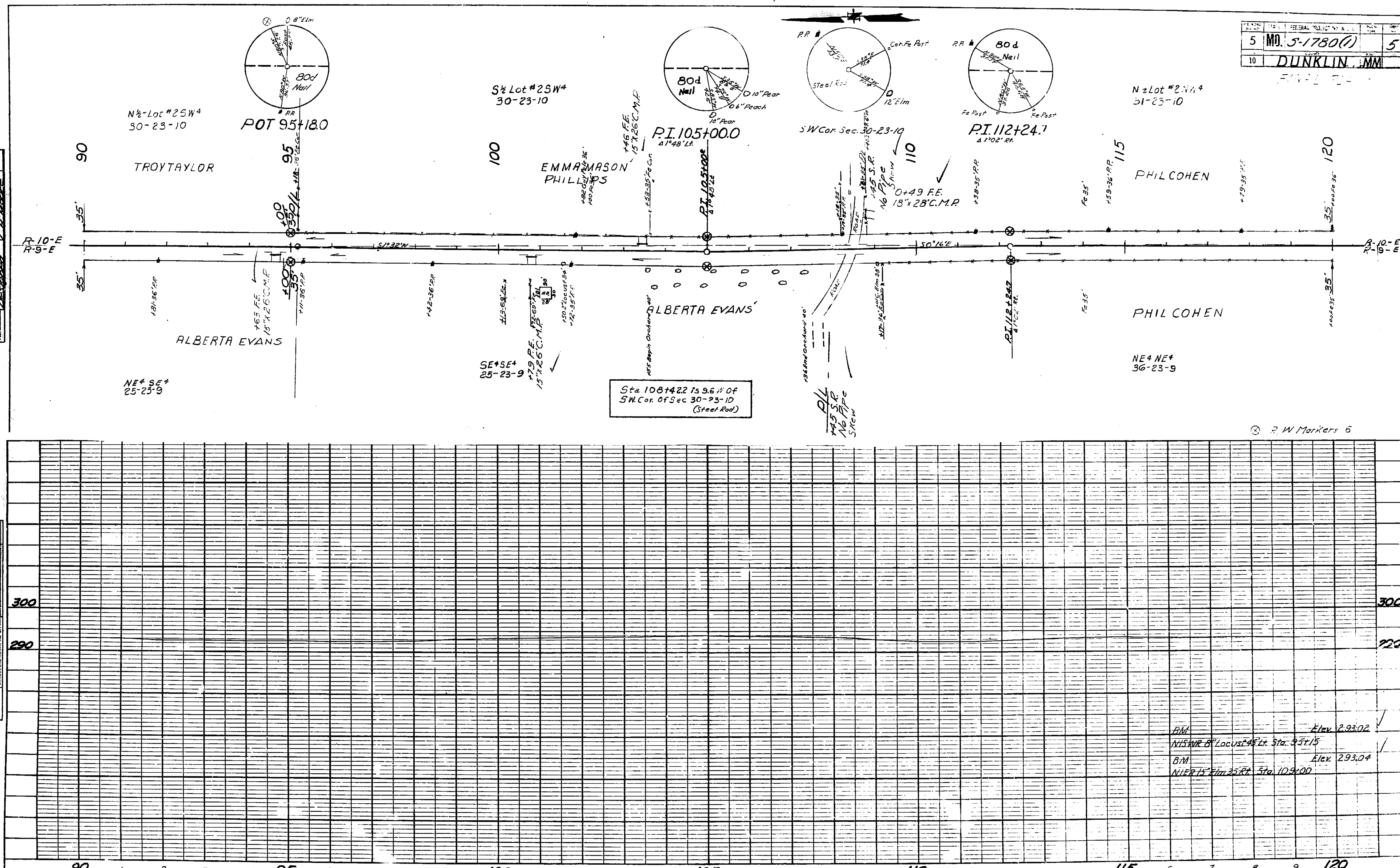


PLATE 1—PLAN-PROFILE O.P.R. & R.E. STANDARD

U. S. BLUE PRINT PAPER CO.—CHICAGO



5 MO. S-1780(1) 5
10 DUNKLIN MM
N½-Lot #2 SW4 30-23-10
POT 95+18.0
80d Nail
S½ Lot #2 SW4 30-23-10
80d Nail
P.I. 105+00.0
Δ 1°48' Lt.
SW Cor. Sec. 30-23-10
80d Nail
P.I. 112+24.7
Δ 1°02' Rt.
N½ Lot #2 NW4 31-23-10
TROY TAYLOR
EMMA MASON PHILLIPS
PHIL COHEN
R-10-E
R-9-E
ALBERTA EVANS
ALBERTA EVANS
PHIL COHEN
NE4 SE4 25-23-9
SE4 SE4 25-23-9
NE4 NE4 36-23-9
Sta 108+42.2 is 9.6' W of SW. Cor. of Sec 30-23-10 (Steel Rod)
0+49 F.E. 18"x28" C.M.P.
+45 S.P. No Pipe Skew
⊗ R/W Markers 6
BM Elev. 293.02
N1SWR 8" Locust 45' Lt. Sta. 93+15
BM Elev. 293.04
N1ER 15" Elm 35' Rt. Sta. 109+00
300
290
90 1 2 3 4 95 6 7 8 9 100 1 2 3 4 105 6 7 8 9 110 1 2 3 4 115 6 7 8 9 120
PLATE 1—PLAN-PROFILE O.P.R. & R.E. STANDARD
U.S. BLUE PRINT PAPER CO.—CHICAGO

FED. ROAD DIV. NO.	STATE	FEDERAL PROJECT No.	SHEET NO.	TOTAL SHEETS
5	MO.	S-1780(1)		6
DIST. NO. 10	COUNTY DUNKLIN		ROUTE	REC.

WINFORD MILLS

P.O.T. 121+520

P.I. 136+440
Δ 0°33' Rt.

S.W. Cor. NW¼ Sec. 31-23-10

PHIL COHEN

S½ Lot #2 NW¼ 31-23-10

N½ Lot #2 NW¼ 31-23-10

S½ Lot #2 SW¼ 31-23-10

N½ Lot #2 SW¼ 31-23-10

JOSEPHINE VAN CLEVE

MRS. VERA LESTER

ALBERTA EVANS

Sta. 121+00
30"X 36' C.M.P.
D.A. 95 Ac. 0.2 Land

Sta 134+34 is 9.2 E. of S.W. Cor. of NW¼ Sec 31-23-10 (Steel Rod)

NE¼ NE¼ 36-23-9

SE¼ NE¼ 36-23-9

NE¼ SE¼ 36-23-9

SE¼ SE¼ 36-23-9

Range Line

P-10-E
R-9-E

⊗ R/W Markers 4

BM — Elev. 294.01
Cut in NE Cor. Sec. Stop of Ha 50 Rt Sta 134+76

BM — Elev. 291.50
NISER 36" Oak 15' Rt Sta 149+00

PLATE 1—PLAN-PROFILE O. P. R. & R. E. STANDARD

U. S. BLUE PRINT PAPER CO.—CHICAGO

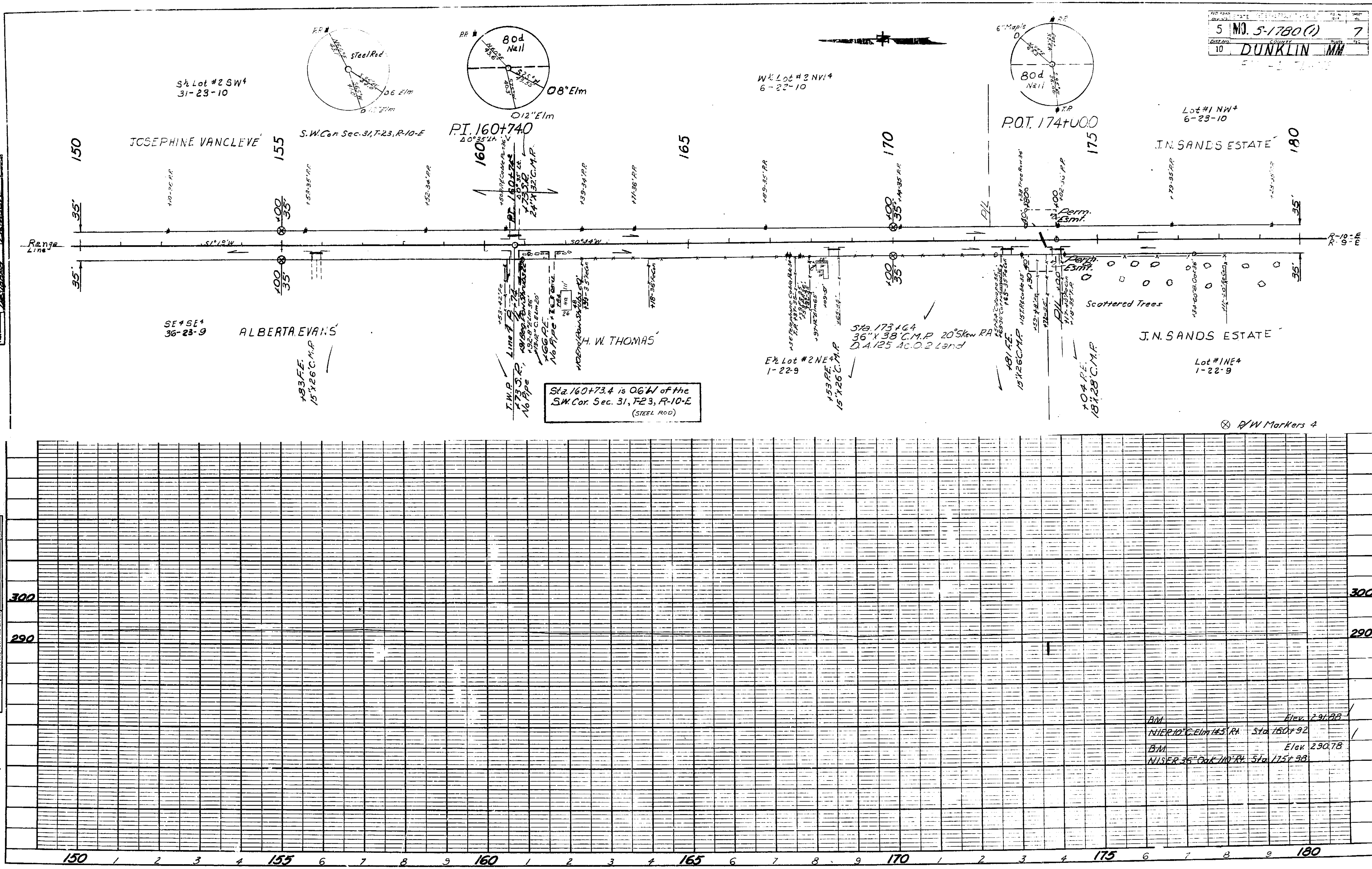


PLATE 1—PLAN-PROFILE O. P. R. & R. E. STANDARD

U. S. BLUE PRINT PAPER CO.—CHICAGO

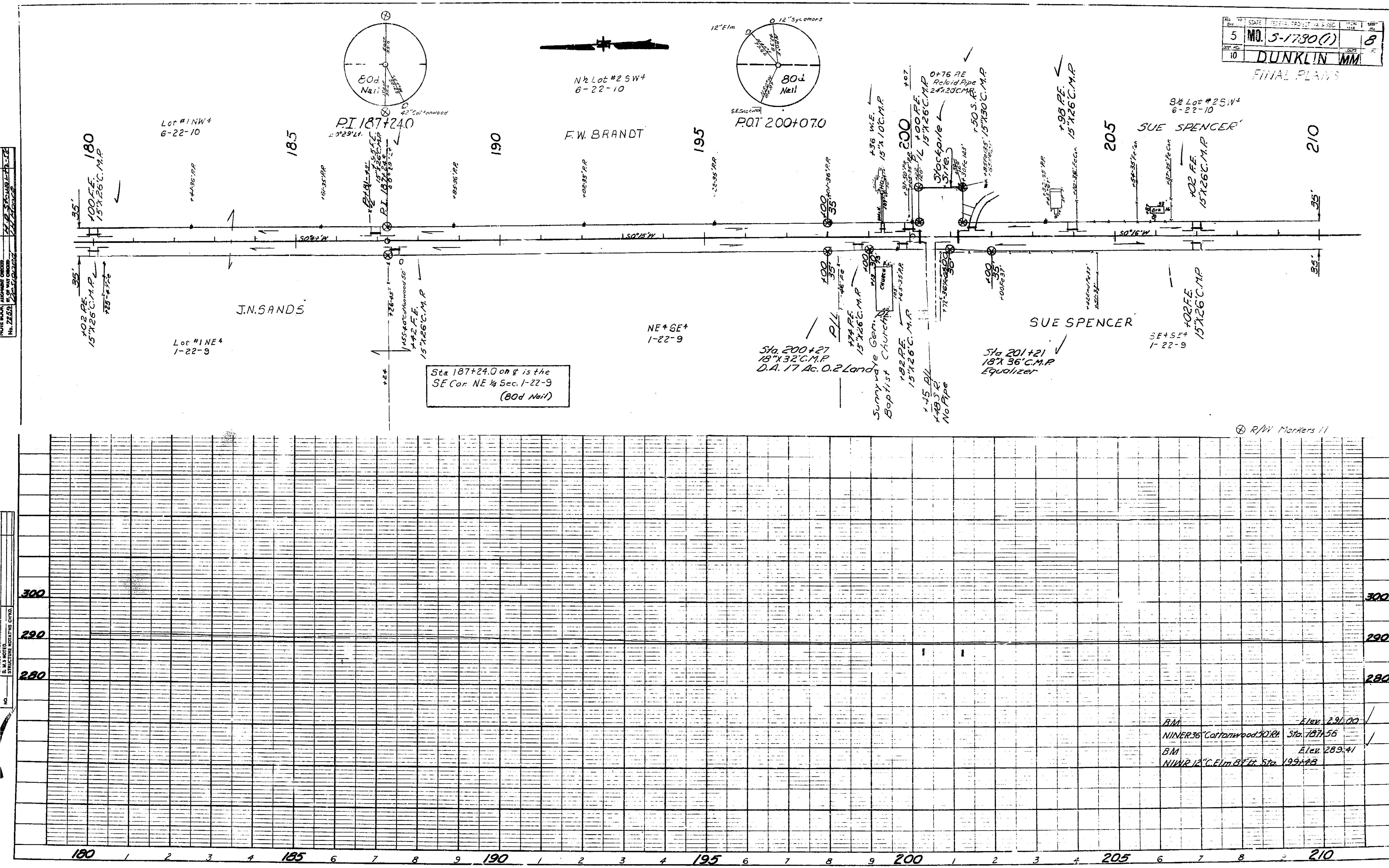
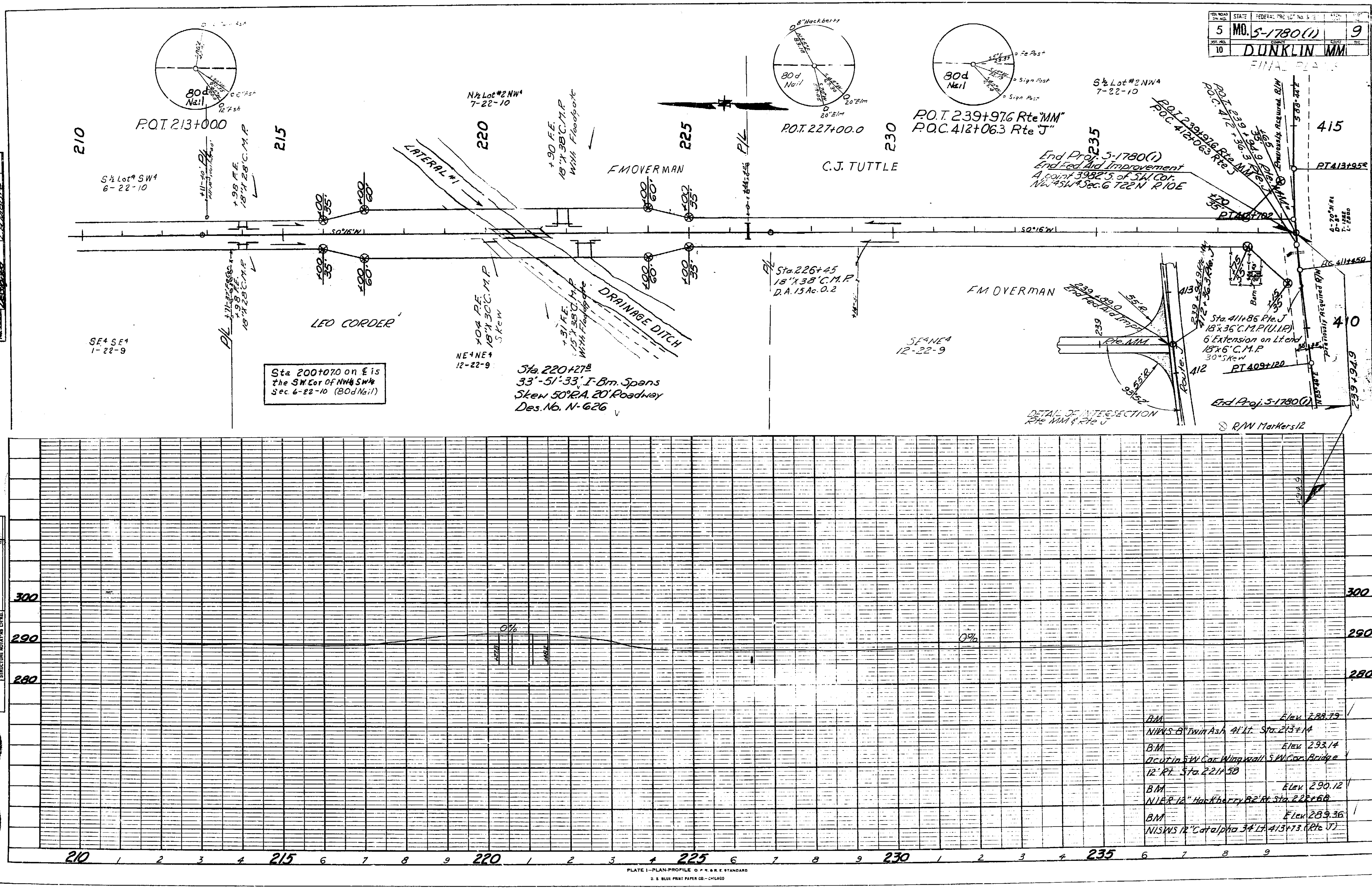


PLATE 1—PLAN-PROFILE O.P.R. & R.E. STANDARD

U. S. BLUE PRINT PAPER CO.—CHICAGO


5 MO. S-1780(1) 9
10 DUNKLIN MM
P.O.T. 213+00.0
80d Nail
S½ Lot#SW¼ 6-22-10
N½ Lot#2 NW¼ 7-22-10
LATERAL #1
DRAINAGE DITCH
F.M. OVERMAN
C.J. TUTTLE
LEO CORDER
P.O.T. 227+00.0
P.O.T. 239+97.6 Rte "MM"
P.O.C. 412+06.3 Rte "J"
S½ Lot#2 NW¼ 7-22-10
End Proj. S-1780(1)
End Fed. Aid Improvement
A point 398.2' S. of S.W. Cor. NW¼ SW¼ Sec. 6 T22N R10E
SE¼ SE¼ 1-22-9
NE¼ NE¼ 12-22-9
SE¼ NE¼ 12-22-9
Sta. 200+07.0 on ℄ is the S.W. Cor. of NW¼ SW¼ Sec. 6-22-10 (80d Nail)
Sta. 220+27.8
33'-51'-33' I-Bm. Spans
Skew 50° R.A. 20' Roadway
Des. No. N-626
Sta. 226+45
18"x38" C.M.P.
D.A. 15 Ac. O.2
Sta. 411+86 Rte. J
18"x36" C.M.P. (U.I.P.)
6' Extension on Lt. end
18"x6' C.M.P.
30° Skew
PT 413+95
PT 409+120
End Proj. S-1780(1)
DETAIL OF INTERSECTION Rte MM & Rte J
R/W Markers 12
415
410
0%
300
290
280
BM Elev. 288.79
NIWS 8" Twin Ash 41' Lt. Sta. 213+14
BM Elev. 293.14
□ cut in SW Cor. Wingwall S.W. Cor. Bridge 12' Rt. Sta. 221+58
BM Elev. 290.12
N1ER 12" Hackberry 82' Rt. Sta. 222+68
BM Elev. 289.36
N1SWS 12" Catalpha 34' Lt. 413+73 (Rte J)
210 215 220 225 230 235
PLATE I—PLAN-PROFILE
U.S. BLUE PRINT PAPER CO.—CHICAGO

LIST OF STANDARD PLANS

PROJ.	SHEET
S-1780(1)	10
CO.	RTE.
	MM

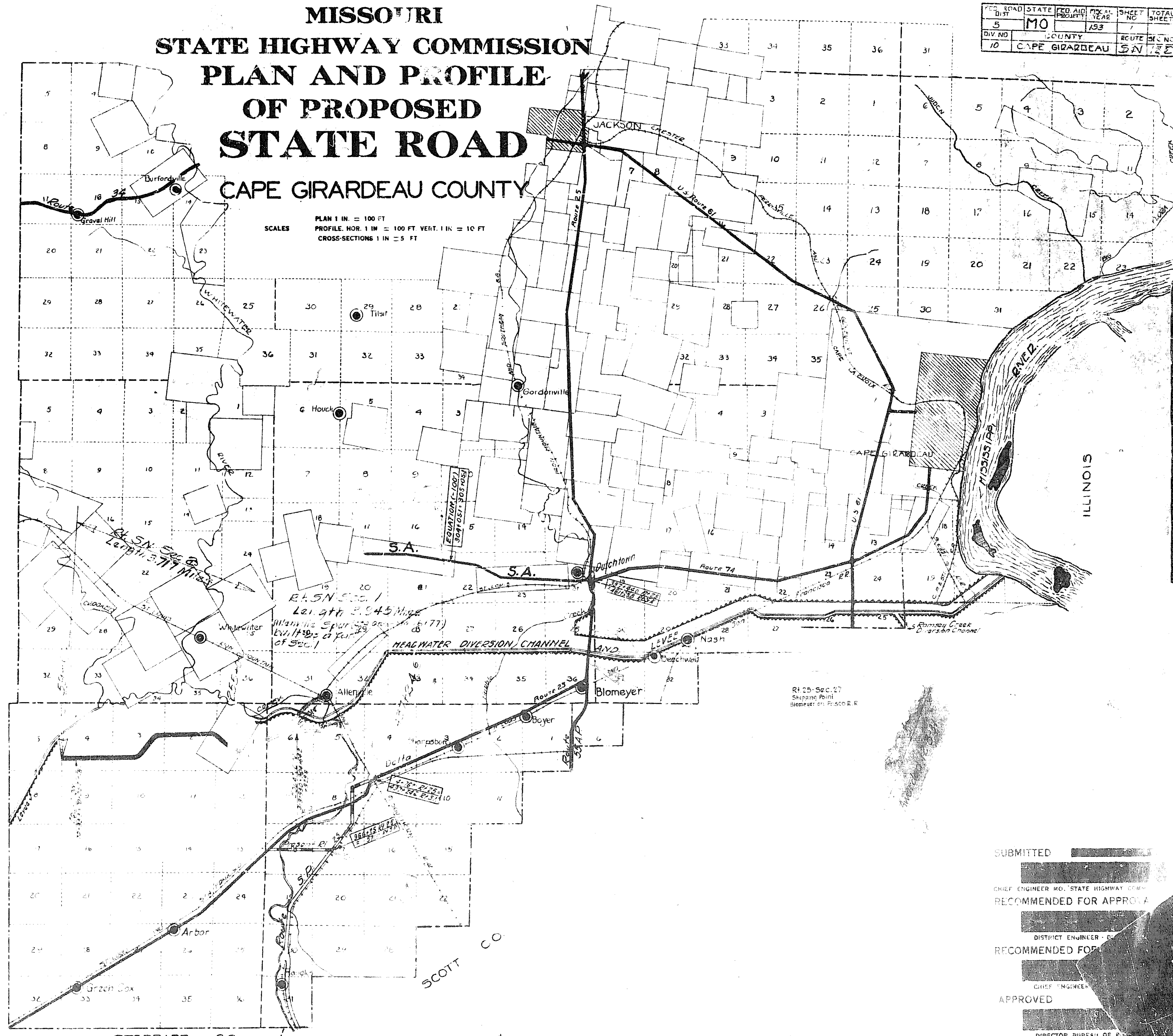
1BB-3 (6-1-54)		
C110R7		
P-3R1		

USE FOR RT. SN ONLY

FED. ROAD DIST	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET NO	TOTAL SHEETS
5	MO		193	1	
DIV. NO	COUNTY			ROUTE	SEC. NO
10	CAPE GIRARDEAU			SN	1&2

MISSOURI
STATE HIGHWAY COMMISSION
PLAN AND PROFILE OF PROPOSED
STATE ROAD
CAPE GIRARDEAU COUNTY

SCALES
PLAN 1 IN. = 100 FT
PROFILE. HOR. 1 IN = 100 FT. VERT. 1 IN = 10 FT
CROSS-SECTIONS 1 IN = 5 FT



CONVENTIONAL SIGNS

STATE AND NATIONAL LINE	LEVEE
COUNTY LINE	CULVERTS
CITY, VILLAGE OR BOROUGH	DROP INLET
TOWNSHIP LINE	TROLLEY POLE
SECTION LINE	POWER POLE
GRANT LINE	TELEPHONE OR TELEGRAPH POLE
FENCE LINE	MARSH
GUARD RAIL	HEDGE
UNFENCED PROPERTY	
RIGHT OF WAY LINE	GROUND ELEVATION — DATUM LINE
TRAVELED WAY	
RAILROADS	GRADE ELEVATION — GRADE LINE
RETAINING WALL	SURFACE LINE
BASE OR SURVEY LINE	GRADE LINE

SUBMITTED

CHIEF ENGINEER MO. STATE HIGHWAY COMM

RECOMMENDED FOR APPROVA[L]

DISTRICT ENGINEER

RECOMMENDED FO[R]

CHIEF ENGINEER

APPROVED

DIRECTOR BUREAU OF P[UBLIC ROADS]

Name of Road DRUM TO DELTA

Type of Improvement 24' GRADED EARTH

MISSOURI STATE HIGHWAY COMMISSION

FINAL ESTIMATE SHEET

County of CAPE GIRARDEAU

Length 3.945 Miles

Fed. Road Dist. No.	State	Project
5	MO.	2-A
Div. No.	County	
10	Cape Girardeau SN	1

EXCAVATION

Station	Cl. A	Bor.	O'Haul	Mach. Gr.	Lin. Gr.
255+00					
262+45	403	681			
269+25	1330	489			
276+00	128	1747			
281+87	214	635			
288+00	434	157			
292+18	297	781			
297+33	325	1060			
300+00	489	154			
304+31	949	107			
311+50	452	1			
308+43	340				
315+00	445	273			
321+04	147	900			
325+00	63	698			
335+00		7		10.00	
340+00	276	543			
353+00		138		13.00	
359+20	515	605			
359+40	Bridge				
366+57	431	2060			
366+63	R.R.	X-ing			
378+71	542	3625	996		
383+45	277	855			
388+95	279	1197			
390+47	99	155			
398+00	599	476			
409+43	1833	4	252		
414+29	1426				
418+00	117				
421+40	124				
427+83	285				
430+00	90				
437+15.9		13			7.16
437+24.6	Pav.	Exc.			
Allenville		Spur			
0+12					
7+34	554	508			
16+77	569	894	552		
Sub-total	14032	18763	1800	23.00	7.16
Bor.	18763				
Total	**32795**		**1800**	**23.00**	**7.16**

CLEARING & GRUBBING

Sheet No.	Clearing Units	Grubbing Units
3	14	11
4	24	24
5	3	3
6	6	7
7	72	79
8	71	69
9	209	129
10	27	22
11	0	0
Total Units	426	347
Acres	**9.8**	**8.0**

REINFORCED CONCRETE BOX CULVERTS

Station	Standard	Size	Length	Concrete	Reinf.	Excav.	Remarks
279+44	C-244	4'x2.5'	28'	10.38	1474	21	2-9" Hdwlls.
290+58	Spec.	2(4'x3')	29.5'	20.80	2300	30	15° Skew Drwg. #5575
320+85	C-424	5'x3	28'	13.32	1212	26	2-9" Hdwlls.
336+33	C-243	3'x2'	30'	8.50	1266	24	
384+09	C-244	4'x2.5'	31'	11.32	1587	14	1-9" Hdwll. Rt.
Total				**64.32**	**7839**	**115**	

C.M. PIPE CULVERTS

Station	Side	15"	18"	24"	36"	Excav.	Remarks
258+00	Lt.	20'					S.R.
258+00	Lt.					3	Removal
258+35	Rt.		20'				F.E.
258+50	℄			38'		7	10° Skew
310+85	Rt.		22'				F.E.
315+00	Rt. & Lt.		40'				F.E.
335+50	Lt.		20'				F.E.
337+91	℄					2	Removal
342+15	℄			36'		15	
347+00	Lt.	20'					F.E.
356+95	Rt. & Lt.		44'				F.E.
360+06	Lt.		26'				F.E.
362+45	Rt.		22'				F.E.
371+90	Rt.		20'				F.E.
381+35	Rt.			22'			F.E.
398+00	℄			36'		16	
399+00	Lt.		34'				S.R.
403+35	Rt.				22'		F.E.
413+90	Lt.	20'					F.E.
414+18	℄				50'	41	
415+20	Rt.	20'					F.E.
421+95	Rt.	30'					S.R.
423+35	Lt.	20'					F.E.
424+70	Rt.	20'					F.E.
427+58	℄				40'	22	
434+00	Rt. & Lt.	60'					S.R.
Allenville		Spur					
1+65	Rt.	20'					F.E.
7+05	℄				40'	5	
10+25	Lt.					3	Removal
11+00	℄	32'				5	
Total		**262'**	**248'**	**132'**	**152'**	**119**	

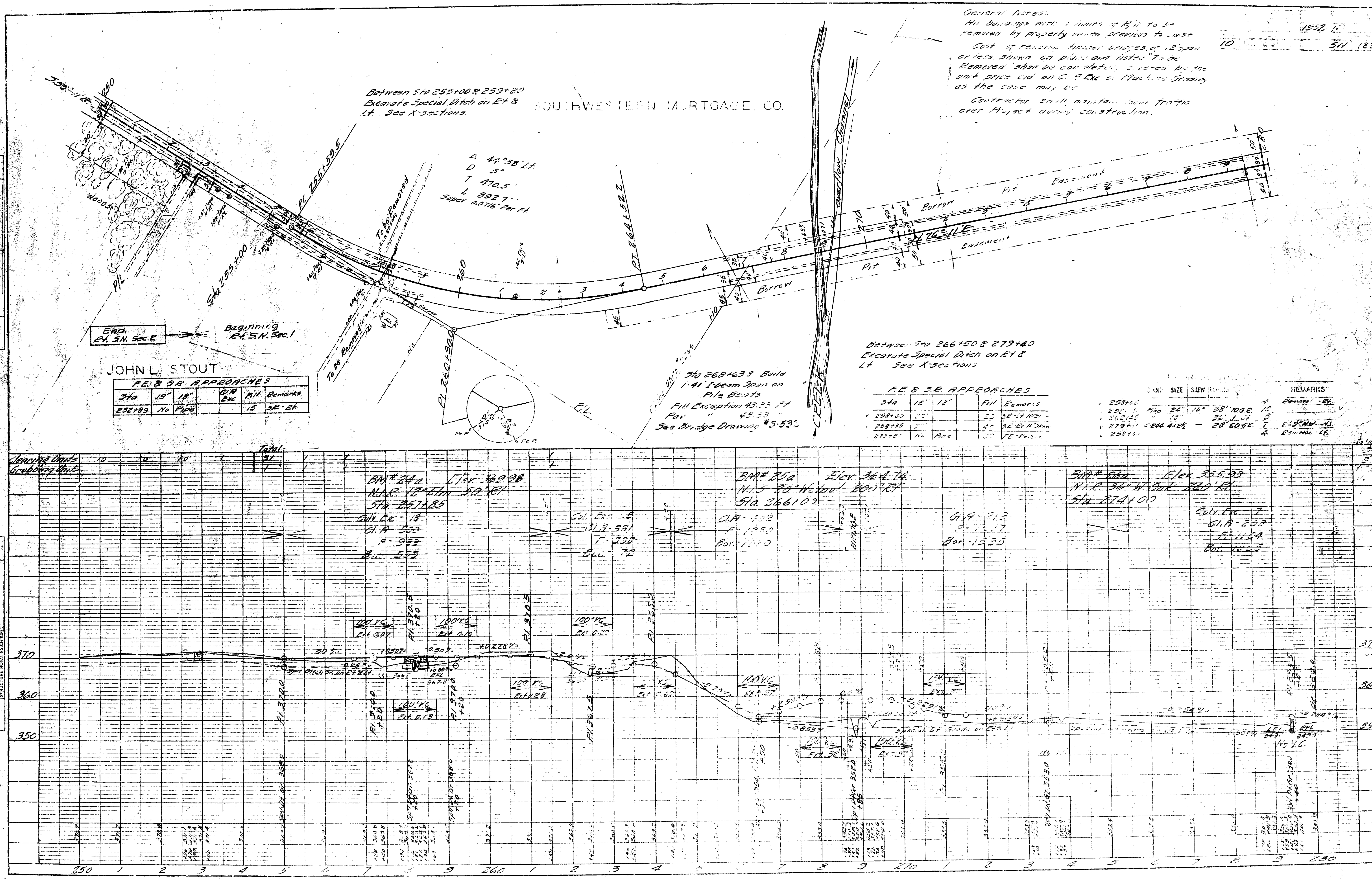
LENGTH OF PROJECT

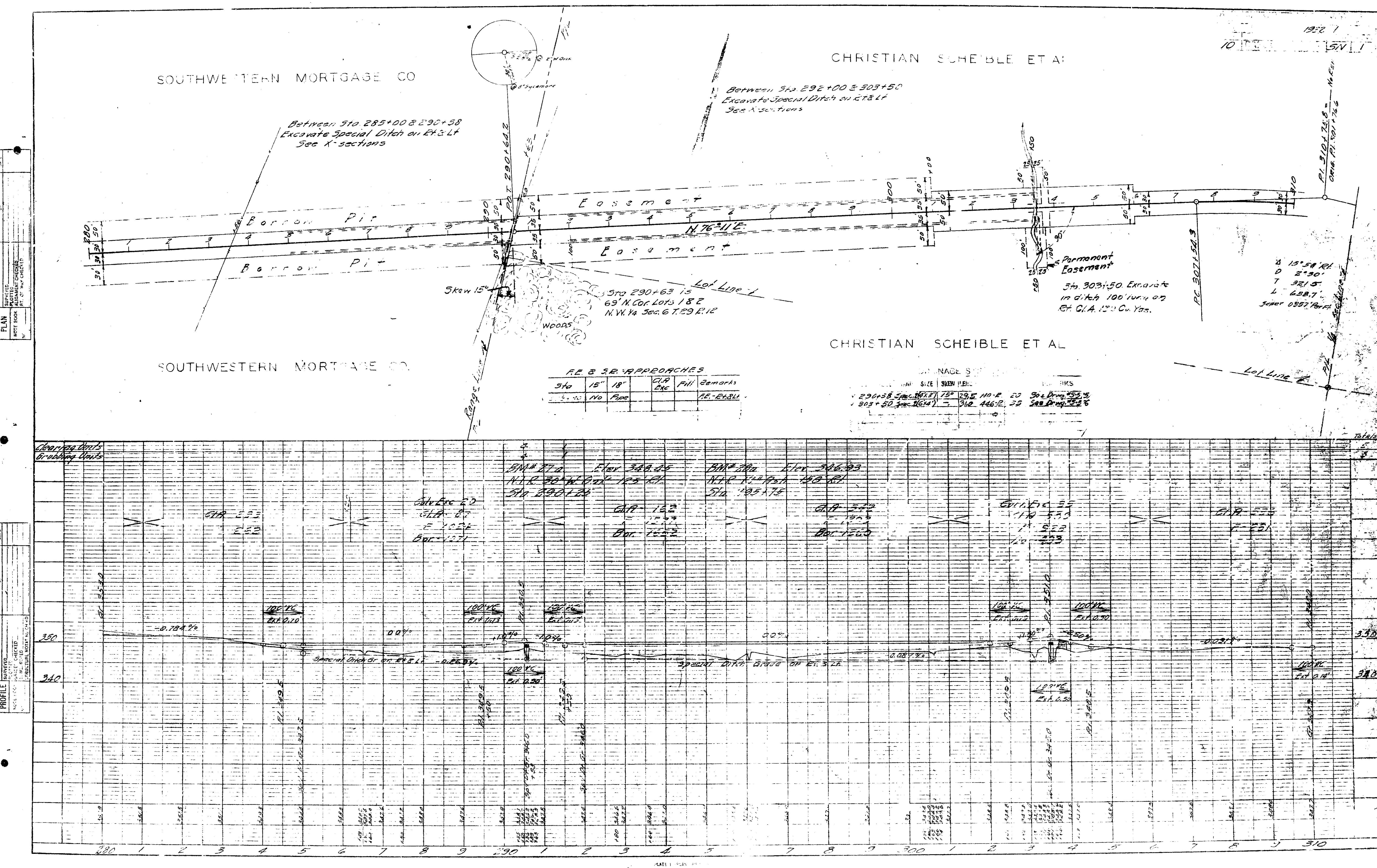
End of Project	Station	437+24.6	
Beginning of Project	Station	255+00.0	
Apparent Length		18224.6	Feet
Equations and Exceptions:			
Sta. 313+93.0 Bk. = Sta. 304+64.2 Ah.	+928.8 ft.		
Allenville Spur Sta. 0+00 to Sta. 16+77	+1677.0 ft.		
Total Corrections		+2605.8	Feet
Net Length of Project		20830.4	Feet
20830.4 Feet : 5280 =		**3.945**	Miles

SUMMARY FINAL PLANS

Item No.	Description	Unit	Total Units	No. Units Fed. Aid Only
1-A	Clearing	Acre	9.8	
1-B	Grubbing	Acre	8.0	
1-D	Cl. "A" Excavation	Cu. Yd.	32795	
1-I	Culvert Excavation	Cu. Yd.	234	
1-M	Overhaul	Sta. Yd.	1800	
1-N	Machine Grading	Station	23.00	
1-P	Linear Grading	Station	7.16	
16-B	Cl. "B" Conc. Masonry	Cu. Yd.	64.32	
18-	15" Pipe Culvert	Lin. Ft.	262	
18-	18" Pipe Culvert	Lin. Ft.	248	
18-	24" Pipe Culvert	Lin. Ft.	132	
18-	36" Pipe Culvert	Lin. Ft.	152	
19-A	Reinf. for Conc. Structures	Pound	7839	
	Contingent Items			
	Force Account #2	F.A.	$28.88	
	15" C.M.P. on hand	Lin. Ft.	18	
	18" C.M.P. on hand	Lin. Ft.	16	
	BRIDGE STA. 268+65 DRWG. NO. 5532			
	1-41' I-BM. Span on Pile Bents			
1-G	Cl. 1 Bridge Excavation	Cu. Yd.	48	
16-D	Cl. "X" Conc. Masonry	Cu. Yd.	20.9	
17-B	Fab. Structural Steel	Pound	16380	
19-A	Reinf. for Conc. Structures	Pound	5350	
23-A	Creo. Piles in Place	Lin. Ft.	244	
23-B	Creo. Pile Cut-Offs	Lin. Ft.	16	
34	Timber	Ft. B.M.	1592	
	BRIDGE STA. 303+50 DWG. NO. 5576			
	Double 6'x4' Box Culvert			
1-I	Culvert Excavation	Cu. Yd.	65	
16-B	Cl. "B" Conc. Masonry	Cu. Yd.	32.1	
19-A	Reinf. for Conc. Structures	Pound	3390	
	BRIDGE STA. 359+06 DWG. NO. 5291			
	1-49' I-BM. Span on Pile Bents			
1-G	Cl. 1 Bridge Excavation	Cu. Yd.	10	
16-D	Cl. "X" Conc. Masonry	Cu. Yd.	25.3	
17-B	Fab. Structural Steel	Pound	21850	
19-A	Reinf. for Conc. Structures	Pound	[illegible]	
23-A	Creo. Piles in Place	Lin. Ft.	340	
23-B	Creo. Pile Cut-Offs	Lin. Ft.	32	
34	Timber	Ft. B.M.	[illegible]	
36-A	Temporary Bridge	Lin. Ft.	[illegible]	
37-A	Removal of Old Bridge	Lump Sum	1	
	Contingent Items [illegible]			
	State Furnished Piling	Lin. Ft.	[illegible]	
	Plain Timber Piles	Lin. Ft.	[illegible]	
	Force Account #1	F.A.	[illegible]	

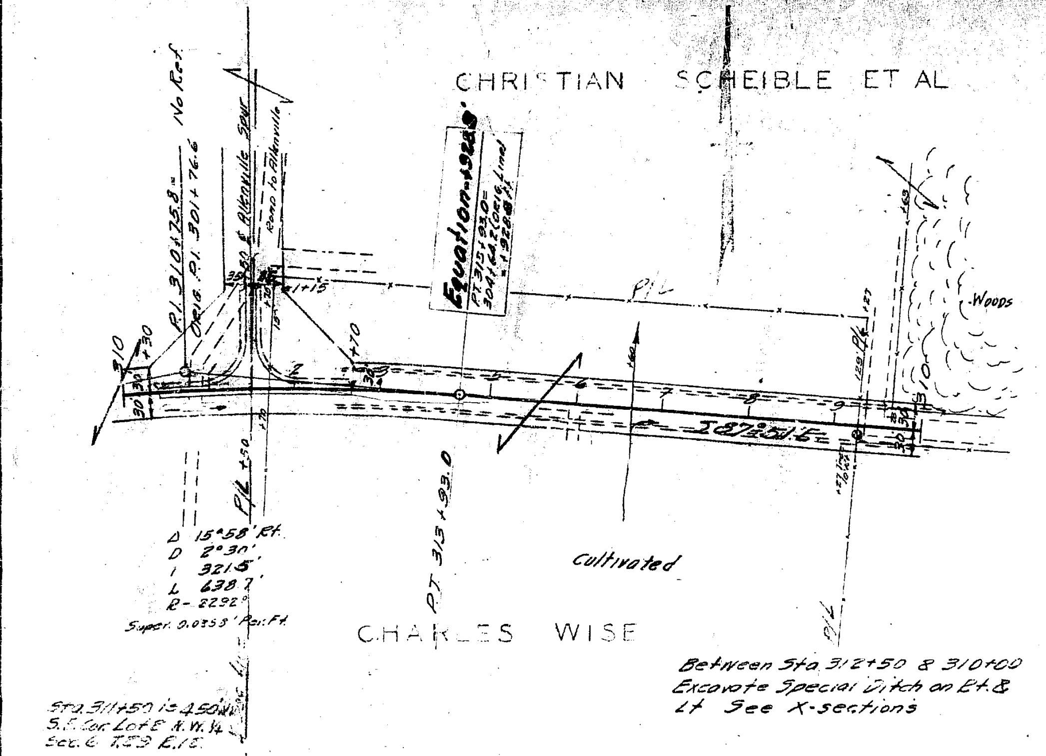
Prepared By [illegible] Date [illegible] 1933 Checked in Div. Office By ____ Date ____ 193_ Checked in Central Office By ____ Date ____


General Notes:
Cost of remaining timber bridges of 12 span or less shown on plans and listed "To be Removed" shall be completed, covered by the unit price bid on C. & Exc or Machine Grading as the case may be.
Contractor shall maintain local traffic over Project during construction.
Between Sta 255+00 & 259+20 Excavate Special Ditch on Rt & Lt. See X-sections.
SOUTHWESTERN MORTGAGE CO.
Δ 41°38' Lt
D 5°
T 470.5
L 892.7
Super 0.0716' Per Ft.
PC 255+59.5
PI 264+52.2
PI 260+30.0
Sta 255+00
To be Removed
Borrow
Pit
Easement
Overflow Channel
CREEK
WOODS
End Rt. S.N. Sec. E
Beginning Rt. S.N. Sec. I
JOHN L. STOUT
P.E. & S.R. APPROACHES
Sta 268+63.8 Build 1-41' I-beam Span on Pile Bents
Fill Exception 43.33 Ft
See Bridge Drawing # S-535
Between Sta 266+50 & 279+40 Excavate Special Ditch on Rt & Lt See X-sections
REMARKS
Clearing Units
Grubbing Units
BM# 24a Elev 369.96 Sta 257+85
BM# 25a Elev 364.74 Sta 266+00
BM# 26a Elev 355.93 Sta 274+00
370
360
350
250
260
270
5N 182



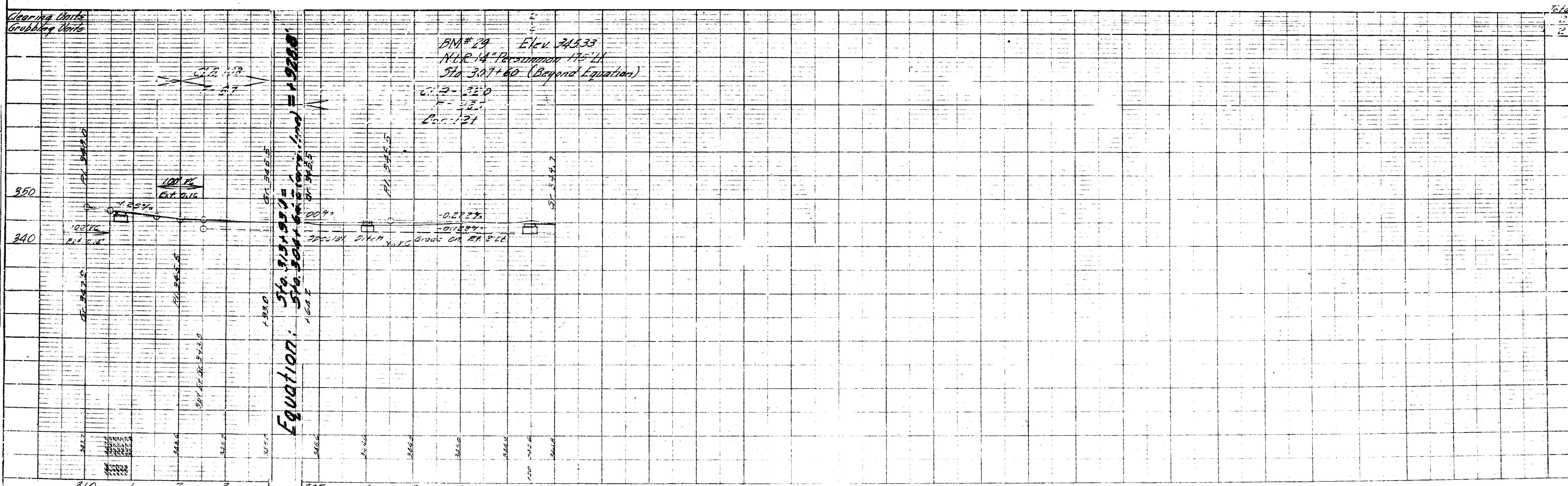
SOUTHWESTERN MORTGAGE CO
CHRISTIAN SCHEIBLE ET AL
Between Sta. 285+00 & 290+58
Excavate Special Ditch on Rt & Lt
See X-sections
Between Sta. 292+00 & 303+50
Excavate Special Ditch on Rt & Lt
See X-sections
Borrow Pit
Easement
N 76°11' E
Permanent Easement
Skew 15°
Sta. 290+63 is
69' N. Cor. Lots 1 & 2
N.W. 1/4 Sec. 6 T.29 R.12
WOODS
Lot Line
Range Line
Sta. 303+50. Excavate in ditch 100' long on Rt. Cl. A. 150 Cu. Yds.
PC 307+54.3
Δ 15°58' Rt.
D 2°30'
T 321.5
L 638.7
F.E. & S.R. APPROACHES
Sta
15"
18"
Cl. A Exc
Fill
Remarks
Clearing Units
Grubbing Units
Totals
BM# 27a Elev 348.85
BM# 28a Elev 346.93
Special Ditch Grade on Rt & Lt
-0.784%
0.0%
100' VC
350
340
280
290
300
310

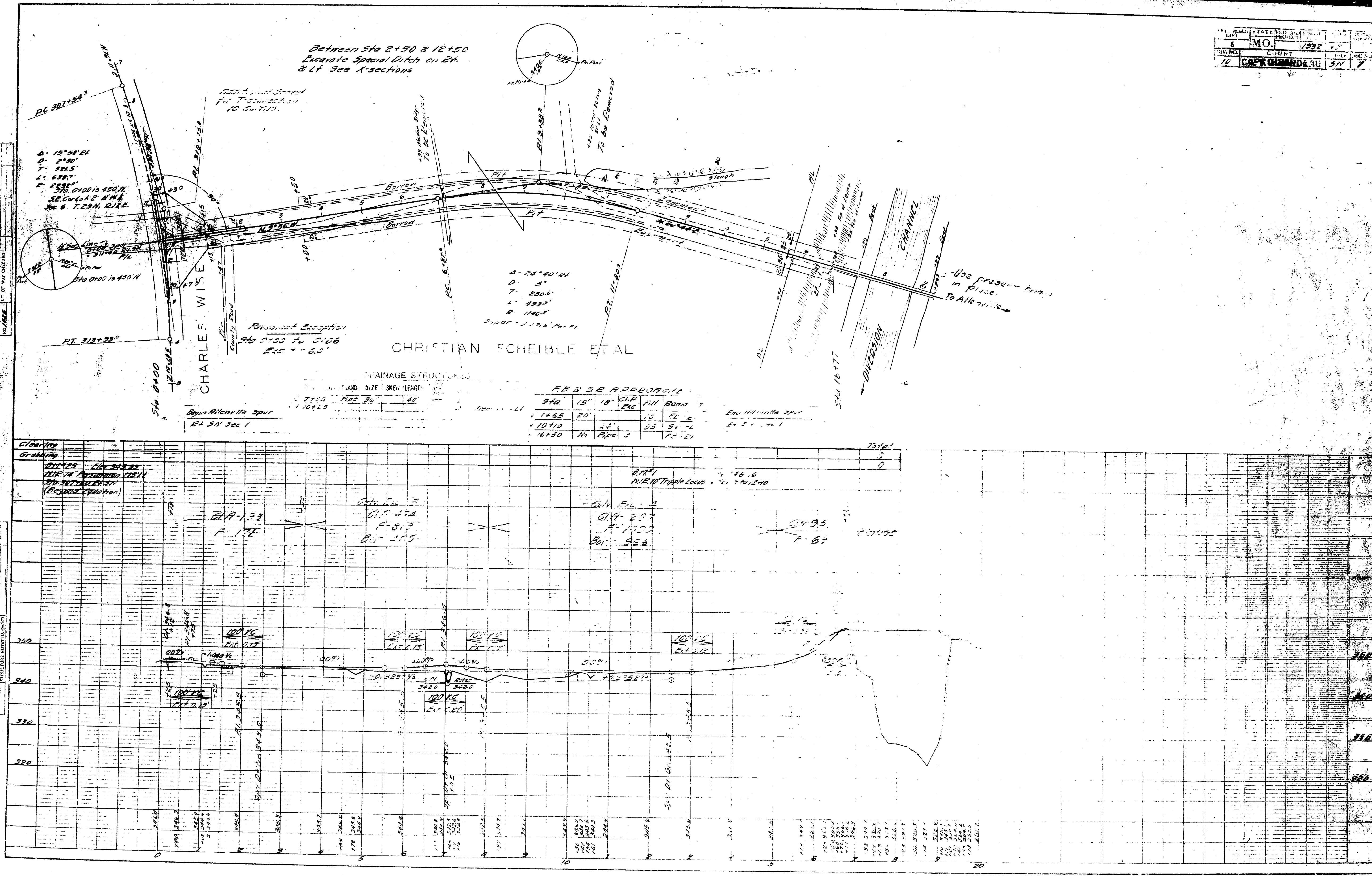
1932 ... SN 1

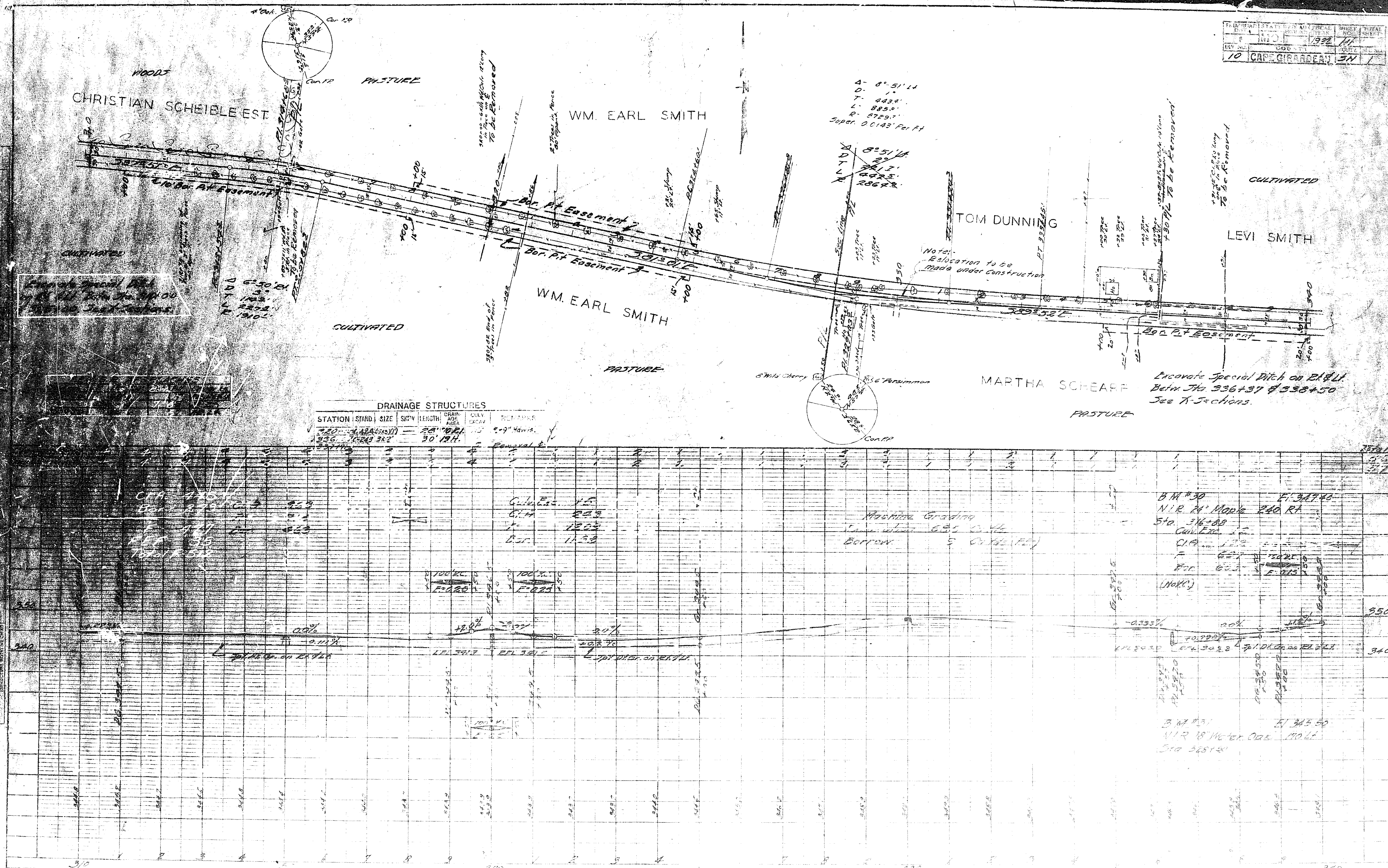


F.E & S.R. APPROACHES

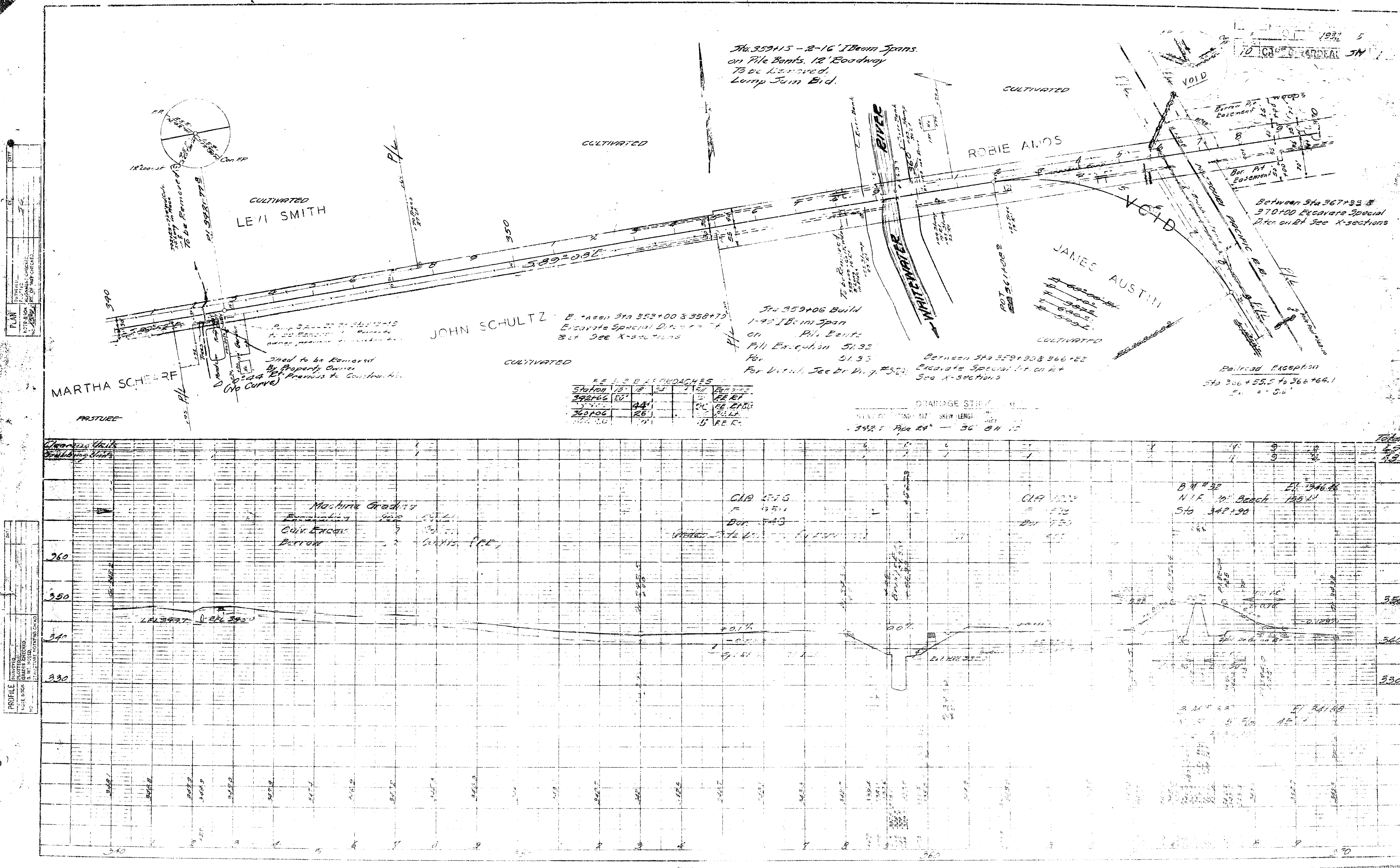
Sta	15"	18"		C/A Exc	Fill	Remarks
310+85		22'			[illegible]	F.E. Rt.
30[illegible]+00		22'			[illegible]	F.E. L[illegible]



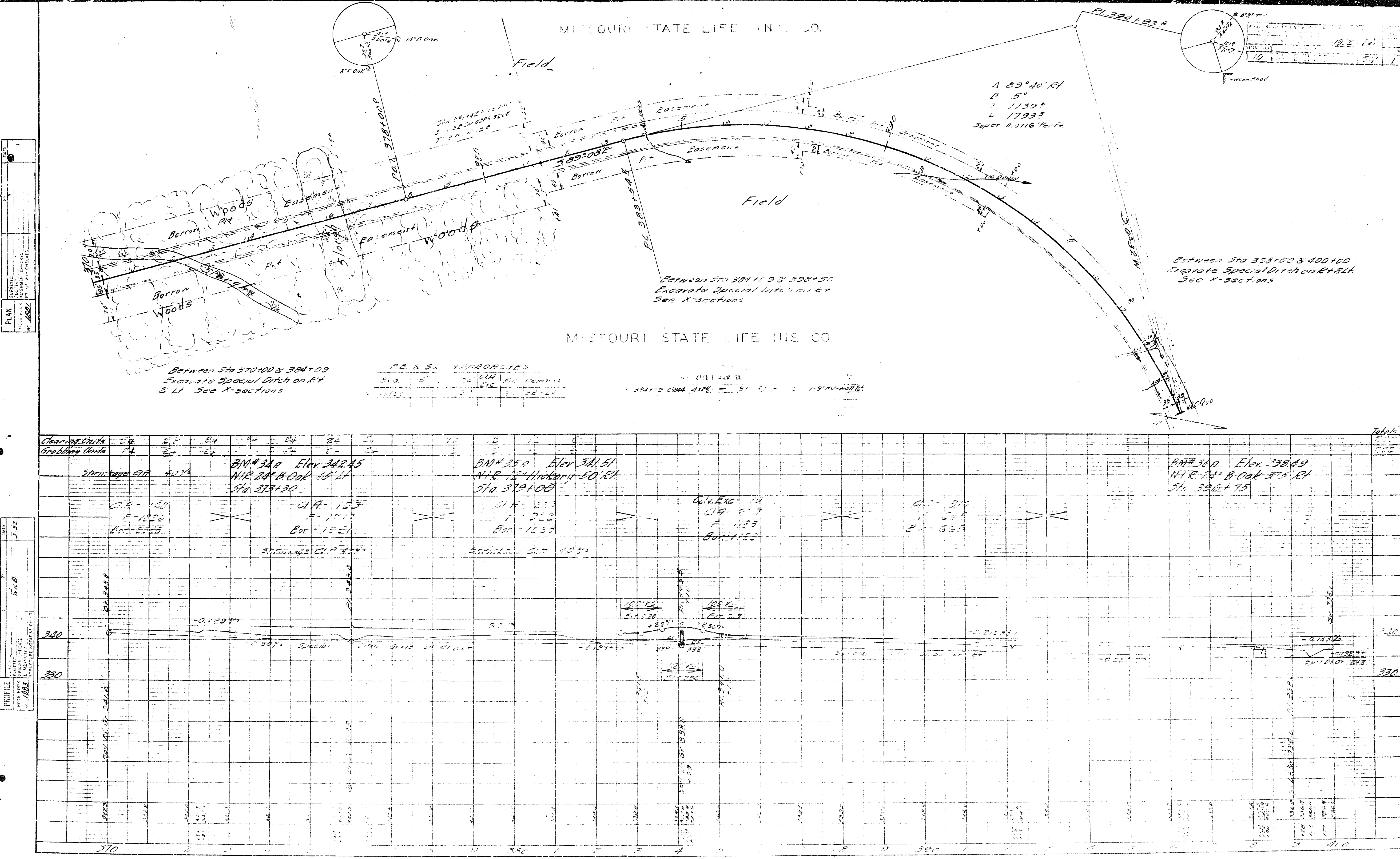

MO.
CAPE GIRARDEAU
PLAN
PROFILE
Between Sta 2+50 & 12+50
Excavate Special Ditch on Rt.
& Lt See X-sections
Sta. 0+00 is 450' N.
PT. 313+33.0
Sta. 0+00
CHARLES WISE
County Road
CHRISTIAN SCHEIBLE ET AL
Borrow
Pit
Easement
Slough
CHANNEL
DIVERSION
To Allenville
DRAINAGE STRUCTURES
Begin Allenville Spur
Clearing
Grubbing



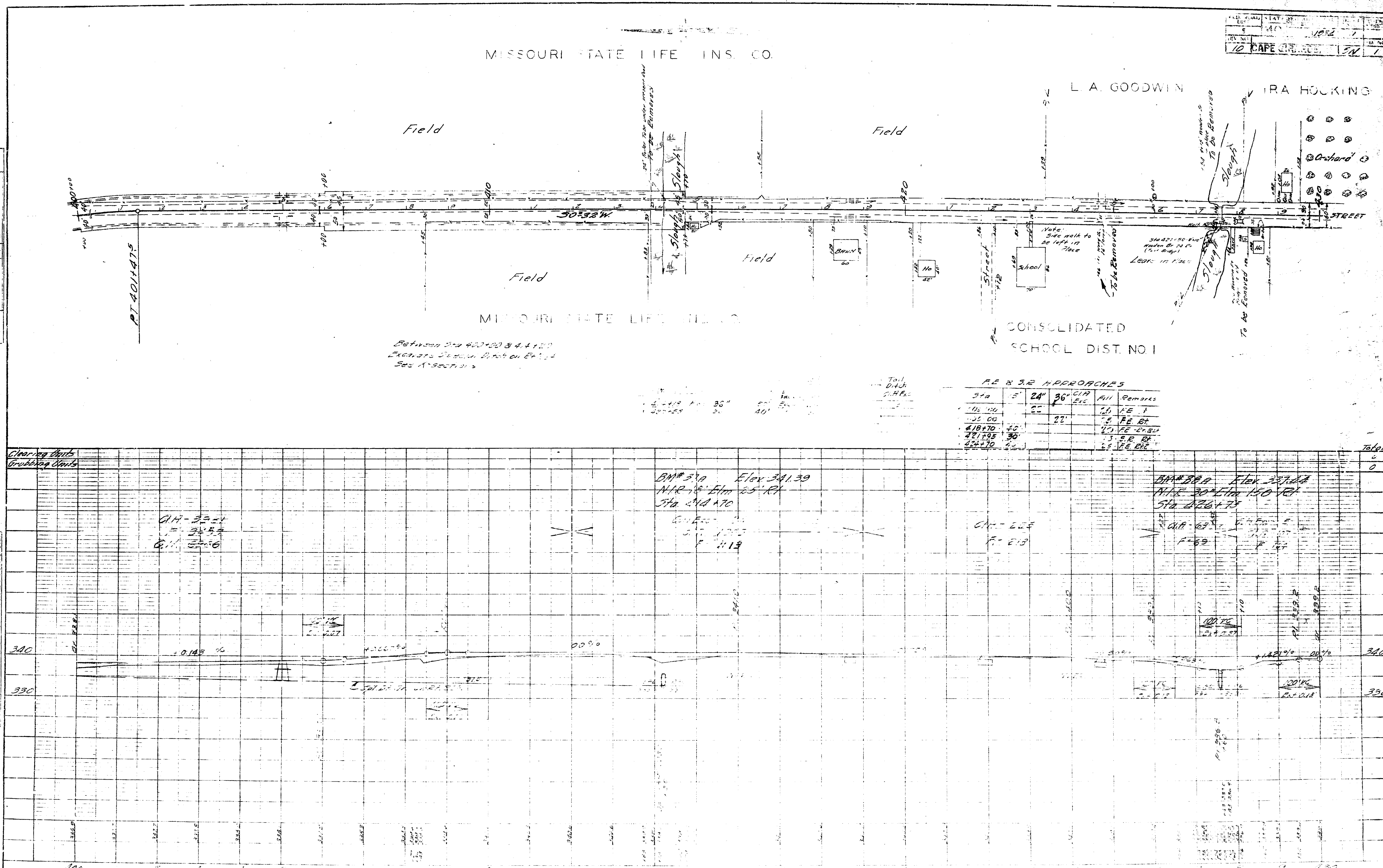
CAPE GIRARDEAU
WOODS
PASTURE
CHRISTIAN SCHEIBLE EST.
WM. EARL SMITH
TOM DUNNING
LEVI SMITH
CULTIVATED
CULTIVATED
WM. EARL SMITH
CULTIVATED
PASTURE
MARTHA SCHEARF
PASTURE
Bor. Pit Easement
Bor. Pit Easement
Bor. Pit Easement
Note: Relocation to be made under Construction
Excavate Special Ditch on Rt.& Lt. Betw. Sta. 336+37 & 338+50 See X-Sections.
DRAINAGE STRUCTURES
STATION
STAND
SIZE
LENGTH
REMARKS
Machine Grading
Borrow
B.M.#30
N.I.R. 24" Maple 240 Rt.
Sta. 316+88
350
340



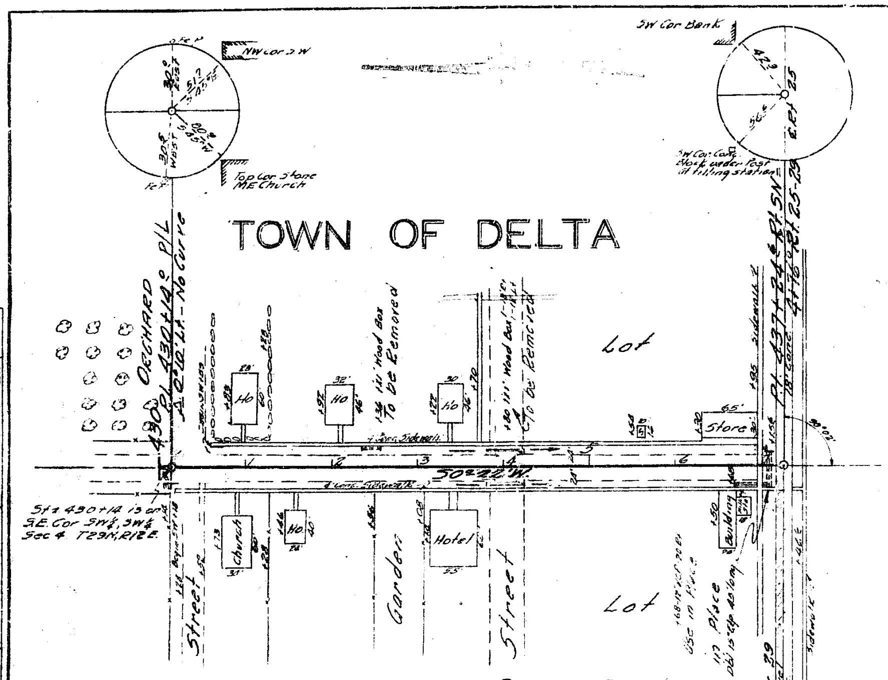
PLAN
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
NOTE BOOK
BY
DATE
Sta. 359+15 – 2-16' I Beam Spans.
on Pile Bents. 12' Roadway
To be Removed.
Lump Sum Bid.
CULTIVATED
CULTIVATED
CULTIVATED
CULTIVATED
CULTIVATED
PASTURE
LEVI SMITH
JOHN SCHULTZ
MARTHA SCHEARF
ROBIE AMOS
JAMES AUSTIN
WHITEWATER RIVER
MISSOURI PACIFIC R.R.
VOID
WOODS
Borrow Pit Easement
Bor. Pit Easement
S 89° 08' E
350
360
370
P/L
To be Removed
Con F.P.
Shed to be Removed
By Property Owner
Rt. Previous to Construction
(No Curve)
Between Sta 353+00 & 358+75
Excavate Special Ditch on Rt
& Lt See X-sections
Sta 359+06 Build
1-42' I Beam Span
on Pile Bents
Fill Exception 51.33
For Detail See Br. Dwg. #S-29
Between Sta 359+90 & 366+22
Excavate Special Ditch on Rt
See X-sections
Between Sta 367+33 &
370+00 Excavate Special
Ditch on Rt See X-sections
Railroad Exception
Sta 366+55.5 to 366+64.1
POT 361+08.2
Mile Post
F.E. & S.B. APPROACHES
Station | 15" | 18" | 24" | Sill | Remarks
342+66 | 20' | | | | F.E. Rt
| | 44' | | 20 | F.E. Rt & Lt
360+06 | | 26' | | | F.E. Lt
| | 20' | | 15 | F.E. Rt
DRAINAGE STRUCTURES
STATION | STAND. SIZE | SKEW | LENGTH
342.? Pipe 24" — 36' 8 ft
1932
10 CAPE GIRARDEAU
PROFILE
SURVEYED
PLOTTED
GRADES CHECKED
B. M.S. NOTED
STRUCTURE NOTATIONS CHKD
Clearing Units
Grubbing Units
Total
Machine Grading
Excavation
Culv. Excav.
Borrow
CLA
Bor.
B.M. #32
N.I.F. 10" Beech
Sta 342+90
+0.1%
0.0%
-0.125%
360
350
340
330



MISSOURI STATE LIFE INS. CO.
Field
Woods
Borrow Pit
Easement
Borrow
Pit
Field
Woods
P.O.T. 378+00.0
S 89°08' E
P.C. 383+54.4
P.I. 394+93.9
Δ 89°40' Rt
D 5°
T 1139.6
L 1793.3
Super 0.0716' Per Ft.
Between Sta 384+09 & 398+50
Excavate Special Ditch on Rt
See X-sections
Between Sta 398+50 & 400+00
Excavate Special Ditch on Rt & Lt.
See X-sections
Between Sta 370+00 & 384+09
Excavate Special Ditch on Rt
& Lt See X-sections
MISSOURI STATE LIFE INS. CO.
Clearing Units
Grubbing Units
Totals
BM# 34A Elev. 342.45
N.T.R. 24" B Oak 55' Lt
Sta. 373+30
BM# 35.9 Elev. 341.51
N.T.R. 12" Hickory 50' Rt
Sta 379+00
BM# 36A Elev. 338.49
Sta. 396+75
Culv. Exc.
Shrinkage 40%
Shrinkage Cl.P 40%
340
330
PLAN
PROFILE
370
380
390
400



MISSOURI STATE LIFE INS. CO.
L. A. GOODWIN
IRA HOCKING
Field
Field
Field
Field
Field
Slough
Slough
Orchard
STREET
Street
School
BARN
Ho
30°32'W
PT 401+475
To be Removed
Leave in Place
CONSOLIDATED SCHOOL DIST. NO. 1
Between Sta 400+00 & 414+20 Excavate Special Ditch on Rt. Side See X-Sections
F.E. & S.R. APPROACHES
Clearing Units
Grubbing Units
Totals
BM# 37A Elev. 341.39
Sta. 414+70
BM# 38A Elev. 337.44
Sta. 426+75
340
330
400
420
CAPE GIRARDEAU



F.E. & S.R. APPROACHES						
Sta	15"			C.I.P. Exc	Fill	Remarks
430-40	No	Pipe			10	S.R. - E+8Lt
434+00	60'				120	S.R. - E+8Lt

Pavement Exception
Sta. 437+15.6 to 437+24.
Exc. = -9.0'

DRAINAGE STRUCTURES

STATION	STAND	SIZE	SKEW	LENGTH	DRAINAGE AREA	CULV EXCAV	REMARKS
432+36						=	Removal - Lt
433+80						=	" E+8Lt

End Rt 5N
Section 1

	Total
Clearing Units	0
Grubbing Units	0

BM# 39A Elev. 337.85
□ in Sidewalk SW Cor. of old
Bank Bldg. 27' Lt. Sta. 436+37

USBM. Elev. 336.83
Iron post 200' E 35' N Frisco
& Mo. Pac. R.R. X-ing at Delta
(New elev. painted on pole - 335.9)

Linear Grading

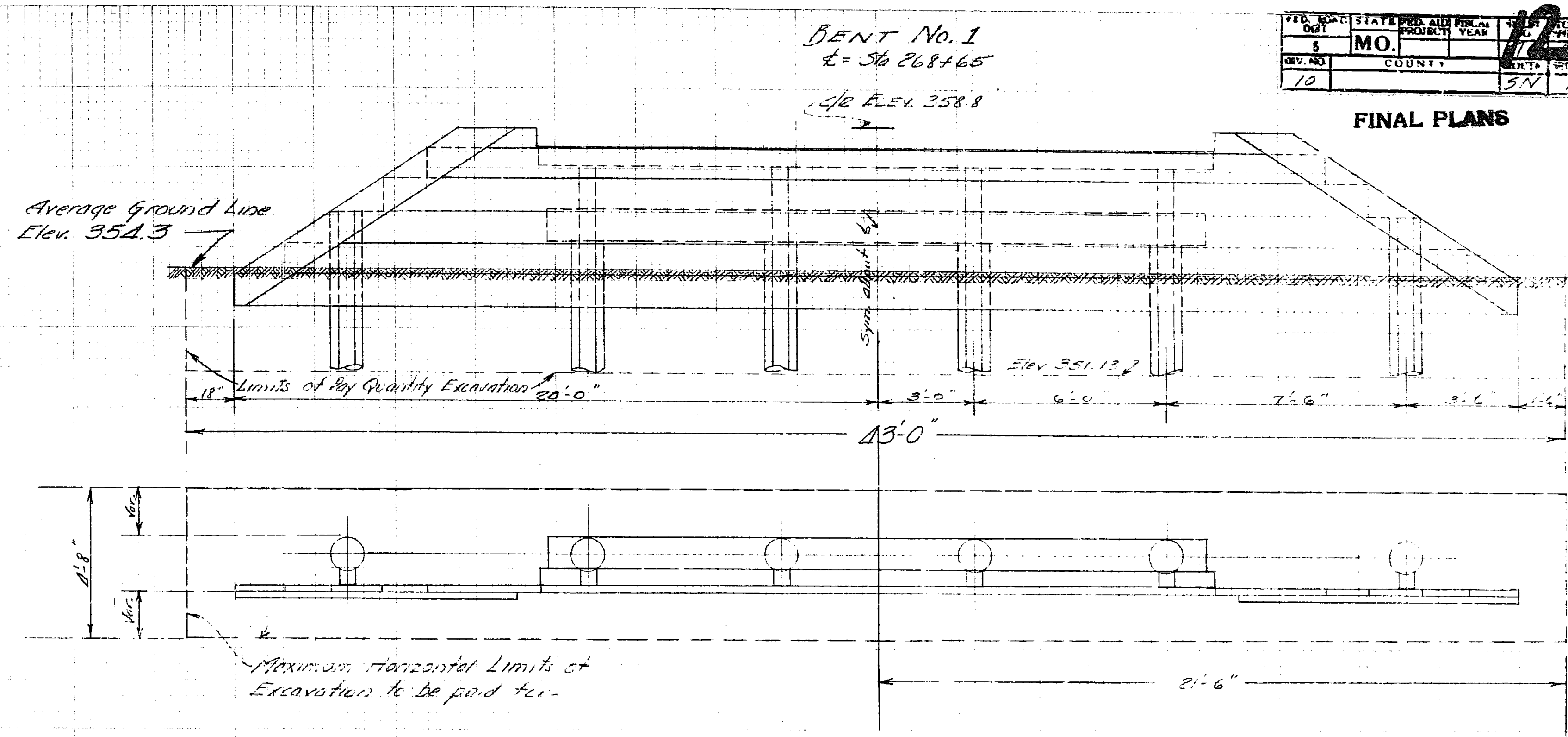
340

330

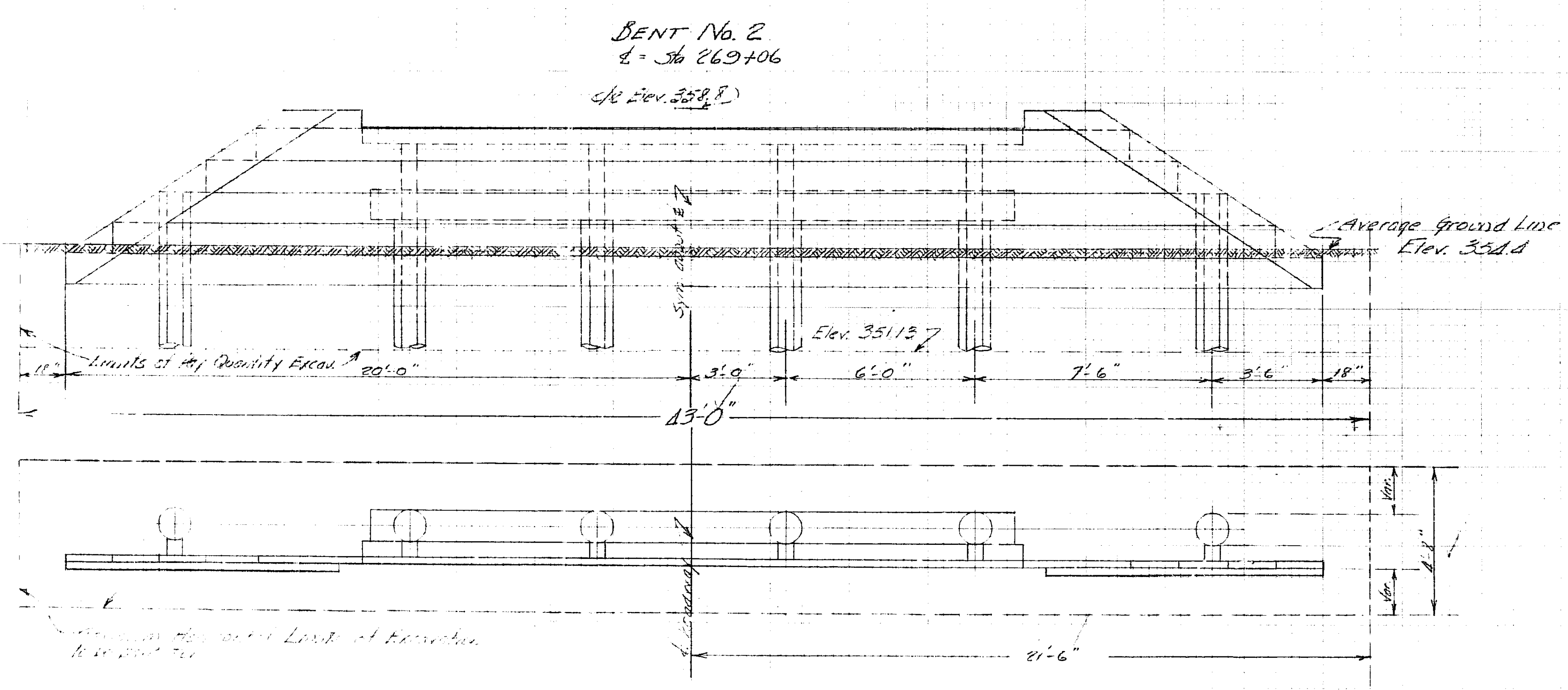
430 2 3 4 5 7

FED. ROAD DIST	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.			12	25
DIV. NO.	COUNTY			ROUTE	SEC.
10				SN	1

FINAL PLANS



$$\frac{43.0 \times 4.67 \times 3.17}{27} = 23.6 \text{ Cu. Yds.}$$

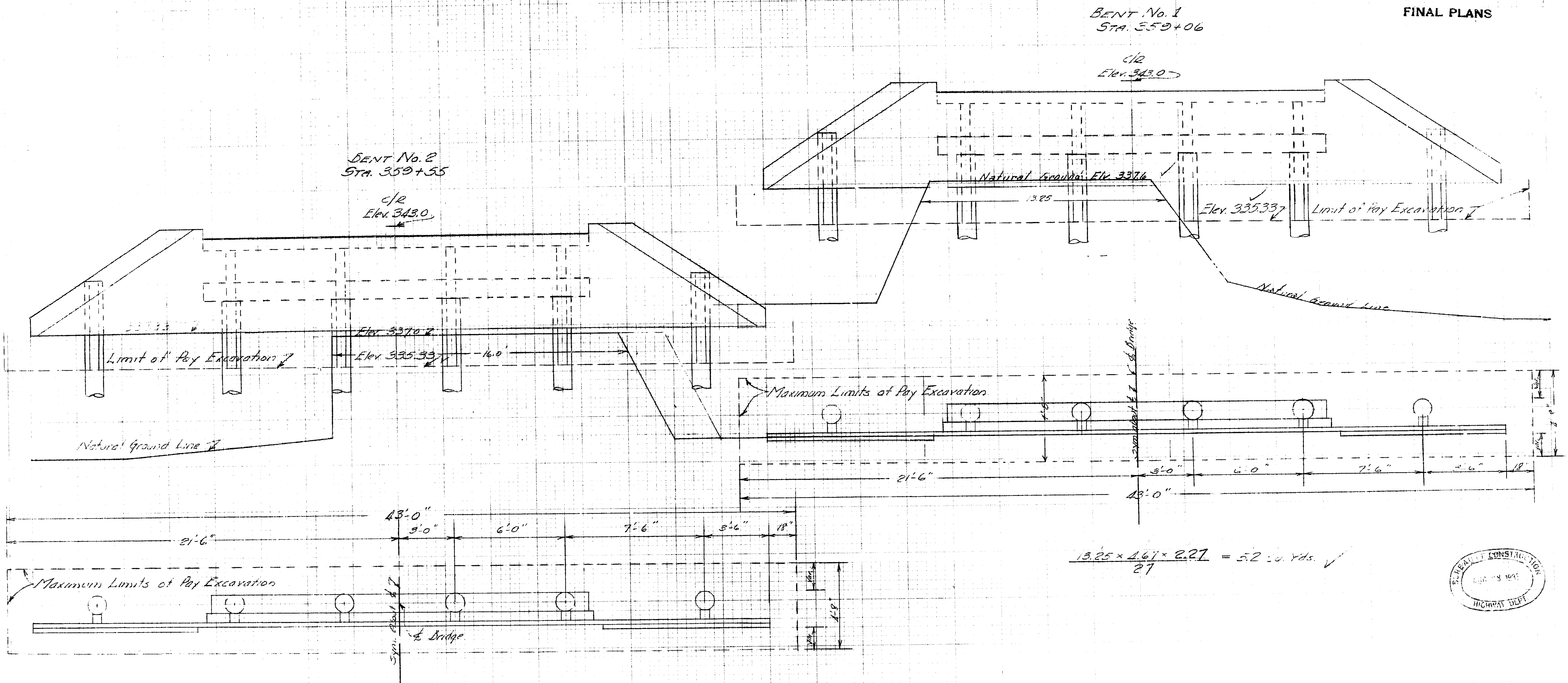


$$\frac{43.0 \times 4.67 \times 3.27}{27} = 24.3 \text{ Cu. Yds.}$$

BRIDGE OVER SMALL CREEK
RT. S.N. SEC. 1 STA. 268+65
Total Yds. Bridge Excavation = 48 Cu. Yds.
Cape Girardeau County

FED. ROAD DIST	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	MO.			13	85
DIV. NO.	COUNTY			ROUTE	SEC. NO.
10	CAPE GIRARDEAU			SN	1

FINAL PLANS



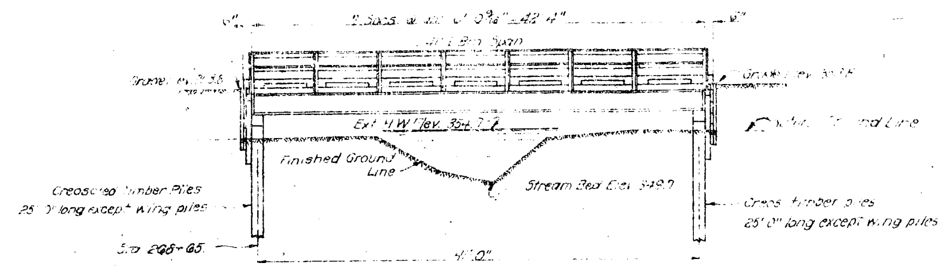
$\frac{13.25 \times 4.67 \times 2.27}{27} = 5.2$ Cu. Yds. ✓

$\frac{4.67 \times 16.0 \times 1.67}{27} = 4.6$ Cu. Yds. ✓

Bridge over Old Channel Whitewater Riv.
Route S.N. Section 1 Station 359+06
Cape Girardeau County
Total Bridge Excavation = 10 Cu. Yds.

MISSOURI STATE HIGHWAY DEPARTMENT

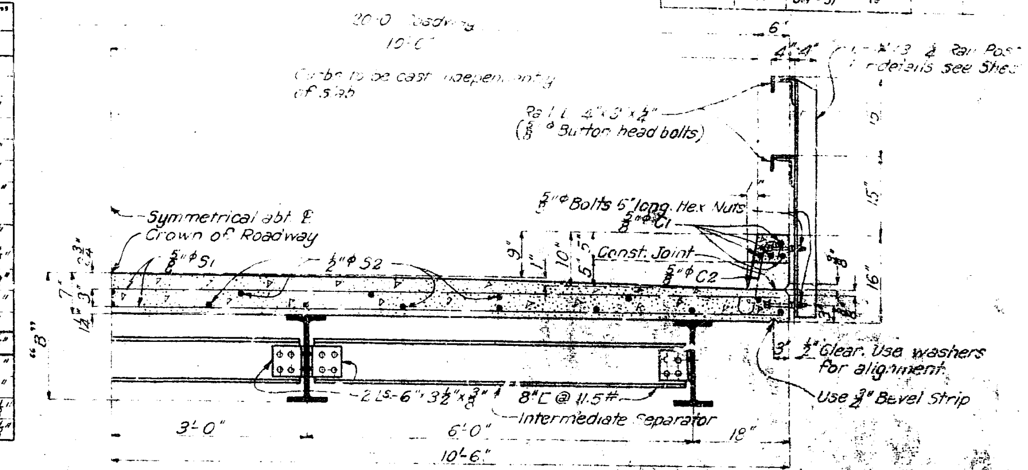
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR
5	MO	SN-51	19



GENERAL ELEVATION

Note:- See Special Provisions in regard to ordering Piles. All piling to be creosoted timber and ordered in the following lengths: 8 @ 25'-0" and 4 @ 15'-0". These lengths include 12" cut-offs. Wing wall piles to be driven to full penetration. All other piles to be driven to full penetration unless a bearing of 15 ton is obtained at a lesser depth, in which case tips shall be driven to Elev. 335.0.

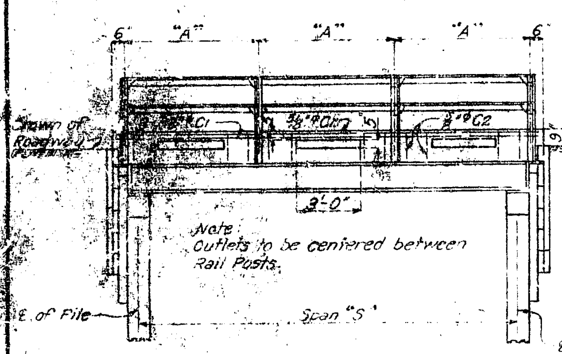
DIMENSION "B"	
SPAN "S"	"B"
15'-0"	20 7/8
17'-0"	21"
19'-0"	22 7/8"
21'-0"	23"
23'-0"	23 5/8"
25'-0"	2'-1"
27'-0"	2'-1 7/8"
29'-0"	2'-3"
31'-0"	2'-4"
33'-0"	2'-4 7/8"
35'-0"	2'-4 1/4"
37'-0"	2'-6 7/8"
39'-0"	2'-7"
41'-0"	2'-7 5/8"
43'-0"	2'-7 5/8"
45'-0"	2'-10"
47'-0"	2'-10 1/8"
49'-0"	2'-10 1/8"



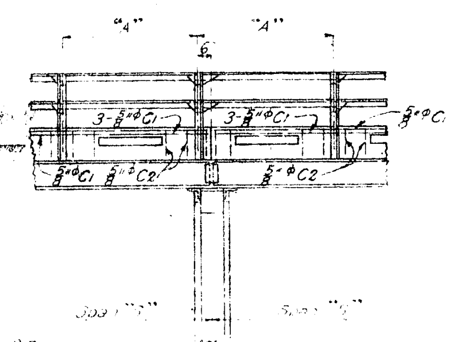
Note: Top of channel separators at ends of each I-Beam Span to be flush with bottom of floor slab as shown in section thru end bent at ℄.

Note: Depth of outside stringers will in some cases be a fraction of an inch less than that of inside stringers and in order to keep bottom of slab horizontal it will be necessary to haunch slab down to top of outside stringers.

HALF SECTION THRU SPAN



ELEVATION



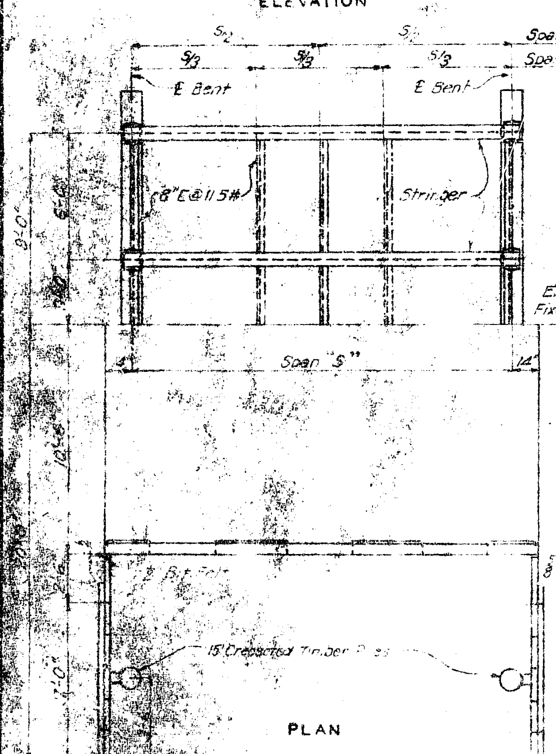
PART ELEVATION AT INT. BENT

HANDRAIL SPACING					
SPAN "S"	NO. PANELS	"A" DIMENSIONS			
		SINGLE SPAN	1ST END SPAN	ALL INT. SPANS	LAST END SPAN
15'-0"	3	5'-5 5/16" abt.	5'-0 11/16" abt.	5'-0"	5'-4 11/16" abt.
17'-0"	3	6'-1 5/16" abt.	5'-8 11/16" abt.	5'-8"	6'-0 1/16" abt.
19'-0"	3	6'-9 5/16" abt.	6'-4 11/16" abt.	6'-4"	6'-8 11/16" abt.
21'-0"	4	5'-7"	5'-3 1/2"	5'-3"	5'-6 1/2"
23'-0"	4	6'-1"	5'-9 1/2"	5'-9"	6'-0 1/2"
25'-0"	4	6'-7"	6'-3 1/2"	6'-3"	6'-6 1/2"
27'-0"	5	5'-8"	5'-5 3/16" abt.	5'-4 13/16" abt.	5'-7 5/8" abt.
29'-0"	5	6'-0 13/16" abt.	5'-10"	5'-9 3/8" abt.	6'-0 3/8" abt.
31'-0"	5	6'-5 3/8" abt.	6'-2 13/16" abt.	6'-2 3/8" abt.	6'-5 3/16" abt.
33'-0"	6	5'-8 11/16" abt.	5'-6 5/16" abt.	5'-6"	5'-8 5/16" abt.
35'-0"	6	6'-0 11/16" abt.	5'-10 5/16" abt.	5'-10"	6'-0 5/16" abt.
37'-0"	6	6'-4 11/16" abt.	6'-2 5/16" abt.	6'-2"	6'-4 5/16" abt.
39'-0"	7	5'-9 5/8" abt.	5'-7 1/8" abt.	5'-6 7/8" abt.	5'-8 7/8" abt.
41'-0"	[illegible]	6'-0 9/16" abt.	5'-10 3/8" abt.	5'-10 5/16" abt.	6'-0 3/16" abt.
43'-0"	7	6'-4"	6'-2"	6'-1 11/16" abt.	6'-3 1/16" abt.
45'-0"	8	5'-9 1/2"	5'-[illegible] 3/4"	5'-7 1/2"	[illegible]
47'-0"	8	6'-0 1/2"	5'-10 3/4"	5'-10 1/2"	6'-0 1/2"
49'-0"	8	6'-3 1/2"	6'-[illegible] 3/4"	6'-1 1/2"	6'-3 1/2"

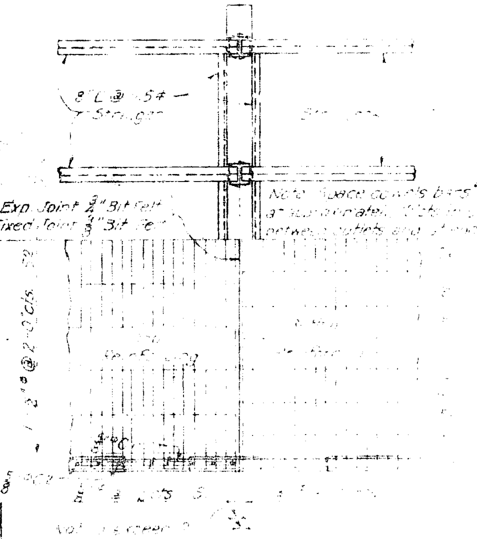
TABLE OF STRINGERS						
SPAN "S"	PER PLANS		PERMISSIBLE SUBSTITUTIONS			
	CARNEGIE BEAMS		STANDARD I-BEAMS		BETHLEHEM BEAMS	
	Inside	Outside	Inside	Outside	Inside	Outside
15'-0"	14"@30#	14"@30#	12"@40.8#	12"@35#	14"@30#	14"@30#
17'-0"	14"@33#	14"@33#	15"@42.9#	15"@42.3#	14"@33#	14"@33#
19'-0"	16"@37#	16"@37#	15"@42.9#	15"@42.9#	16"@37#	16"@37#
21'-0"	16"@40#	16"@37#	15"@50#	15"@45#	16"@40#	16"@37#
23'-0"	16"@45#	16"@40#	18"@54.7#	18"@54.7#	16"@45#	16"@40#
25'-0"	18"@47#	18"@47#	18"@54.7#	18"@54.7#	18"@47#	18"@47#
27'-0"	18"@52#	18"@47#	18"@60#	18"@54.7#	18"@52#	18"@47#
29'-0"	20"@55#	20"@55#	20"@65.4#	20"@65.4#	20"@55#	20"@55#
31'-0"	21"@58#	21"@58#	20"@70#	20"@65.4#	22"@58#	22"@58#
33'-0"	21"@62#	21"@58#	20"@75#	20"@70#	22"@62#	22"@58#
35'-0"	21"@[illegible]#	21"@62#	20"@81.4#	20"@75#	22"@[illegible]	22"@[illegible]#
37'-0"	24"@70#	24"@70#	24"@79.9#	24"@79.9#	24"@[illegible]	24"@[illegible]
39'-0"	24"@74#	24"@70#	24"@79.9#	24"@79.9#	24"@74#	24"@70#
41'-0"	24"@81#	24"@74#	24"@85#	24"@79.9#	24"@[illegible]#	24"@74#
43'-0"	24"@85#	24"@81#	24"@100#	24"@90#	26"@85#	26"@81#
45'-0"	27"@85#	27"@85#	24"@105.9#	24"@100#	26"@85#	26"@85#
47'-0"	27"@9[illegible]#	27"@85#	24"@105.9#	24"@105.9#	28"@9[illegible]#	28"@85#
49'-0"	27"@9[illegible]#	27"@91#	24"@115#	24"@105.9#	28"@91#	28"@91#

GENERAL NOTES:

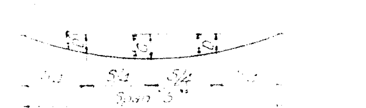
Loading: One 10 Ton Truck, 80% of weight on rear axle, 30% impact, 14'-0" wheel base, 6'-0" gage, 10" tire.
All concrete to be 1:2:3 1/2 mix "X".
Exposed edges to be beveled 3/4" where no other bevel is noted.
All timber to be creosoted Douglas Fir of the West Coast Region, Close-grained Structural Grade; creosoted Southern Yellow Pine, Dense Structural Square Edge and Sound Grade; or untreated California Redwood, Prime Structural Grade. [illegible] in timber bill for pile caps. Slight variations in sawing to be in accordance with grading rules. All treated timber to be cut to lengths, shaped and bored as shown before treating. Backing plank are all billed 6' long and are to be fitted and cut in the field.
Field holes for drift pins shall be field bored 23/32" Φ. Unless otherwise noted all other field holes in timber shall be field bored 3/4" Φ.
When bolts with countersunk heads are indicated on plans cut washers shall be used under heads. O.G. washers shall be used under heads of all other bolts and under nuts of all bolts.
Number of bolts, drift pins, nails and washers given exact; no allowance made for excess. Cost of substructure hardware to be included in price bid for timber in place.
I-Beams with fastenings, spacers, handrail, handrail posts with fastenings, clip angles and cap plate on end bent with fastenings, will be paid for as structural steel. Cost of metallic edge moulding will be included in unit bid price for concrete.
[illegible] holes 13/16", except in handrail where rivets shall be 5/8" Φ. [illegible] punched and reamed to [illegible] Field connections, except handrail, shall be [illegible]. Field connections for handrail shall be 5/8" Φ button head bolts, [illegible].
[illegible] shall be submitted to the State Highway [illegible] and shall be approved before steel is [illegible].
[illegible] substitution.



PLAN



PART PLAN AT INT. BENT



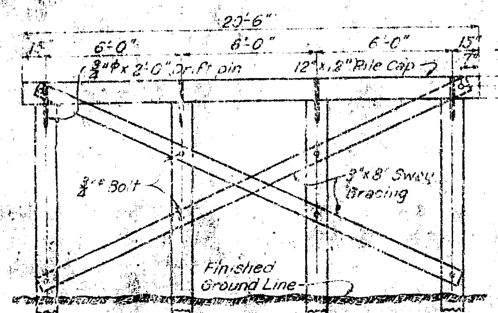
DEFLECTION DIAGRAM

ESTIMATED QUANTITIES		
ITEM	SUPERS.	[illegible]

Designed Nov. 1929 By F.W.H.
Drawn Mar. 1930 By R.J.G.
Traced Dec. 1931 By R.J.G.
Checked Dec. 1931 By J.H.M.
Assembled June 1932 By [illegible]
Checked July 1932 By R.A.B.

MISSOURI STATE HIGHWAY DEPARTMENT

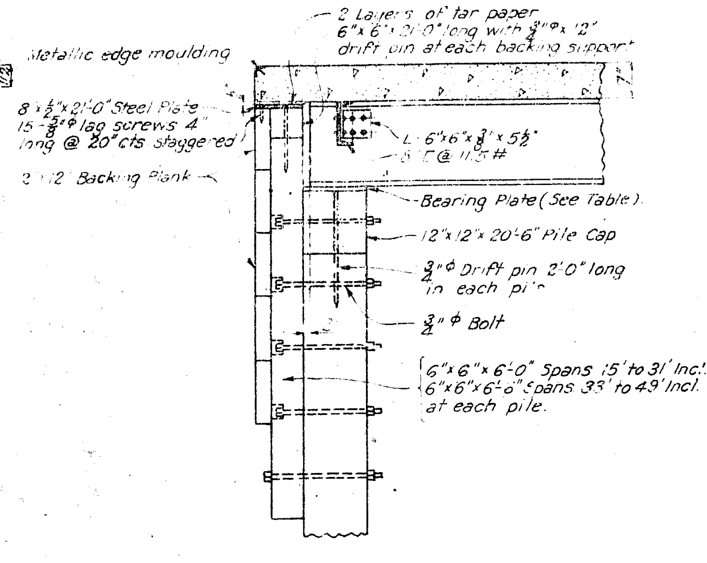
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	SN-51	19		



Note: Omit sway bracing when distance from bottom of pile cap to ground is less than 5'-0".

DETAIL OF INTERIOR BENTS

Note: Any irregularity in alignment of piling in end bents to be corrected by facing one surface of the 6"x6" backing support or by varying the thickness of the backing support such as to place the surface of the backing in a true plane and eliminate any strain on the backing plank.
Splice in backing plank to be made at center of 6"x6" backing support and to be alternated on the two intermediate supports.



SECTION THRU END BENT AT ℄

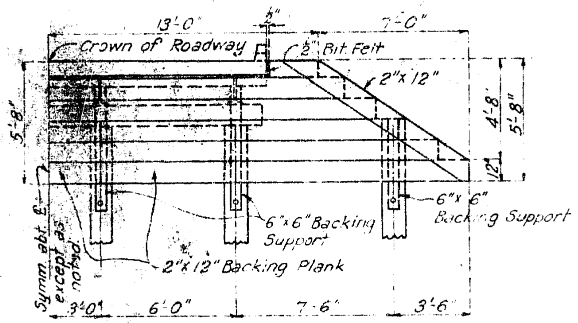
BILL OF REINFORCING STEEL					
NO.	SIZE	LENGTH	MARK	LOCATION	BENDING SKETCH
"A"	5/8"φ	"B"	C1	Curb	
"C"	5/8"φ	2'-0"	C2	"	C2
"D"	5/8"φ	20'-9"	S1	Slab	
"E"	5/8"φ	"F"	S2	"	

SPAN "S"	SINGLE SPAN "A"	"B"	"C"	"D"	"E"	"F"	ONE END SPAN "A"	"B"	"C"	"D"	"E"	"F"	ONE INT. SPAN "A"	"B"	"C"	"D"	"E"	"F"
15'-0"	8	16'-9"	24	76	26	16'-9"	8	15'-9"	22	70	26	15'-9"	8	14'-9"	20	64	26	14'-9"
17'-0"	8	18'-9"	28	86	26	18'-9"	8	17'-9"	24	80	26	17'-9"	8	16'-9"	20	74	26	16'-9"
19'-0"	8	20'-9"	28	92	26	20'-9"	8	19'-9"	28	88	26	19'-9"	8	18'-9"	28	84	26	18'-9"
21'-0"	8	22'-9"	30	100	26	22'-9"	8	21'-9"	28	96	26	21'-9"	8	20'-9"	26	92	26	20'-9"
23'-0"	8	24'-9"	36	112	26	24'-9"	8	23'-9"	34	106	26	23'-9"	8	22'-9"	32	100	26	22'-9"
25'-0"	8	26'-9"	36	118	26	26'-9"	8	25'-9"	36	114	26	25'-9"	8	24'-9"	36	110	26	24'-9"
27'-0"	8	28'-9"	36	130	26	28'-9"	8	27'-9"	34	124	26	27'-9"	8	26'-9"	32	118	26	26'-9"
29'-0"	8	30'-9"	44	138	26	30'-9"	8	29'-9"	42	132	26	29'-9"	8	28'-9"	40	126	26	28'-9"
31'-0"	8	32'-9"	44	146	26	32'-9"	8	31'-9"	44	140	26	31'-9"	8	30'-9"	44	134	26	30'-9"
33'-0"	16	18'-6"	52	154	52	18'-6"	16	18'-0"	50	150	52	18'-0"	16	17'-6"	48	146	52	17'-6"
35'-0"	16	19'-6"	52	162	52	19'-6"	16	19'-0"	50	158	52	19'-0"	16	18'-6"	48	154	52	18'-6"
37'-0"	16	20'-6"	52	172	52	20'-6"	16	20'-0"	50	168	52	20'-0"	16	19'-6"	48	164	52	19'-6"
39'-0"	16	21'-6"	60	180	52	21'-6"	16	21'-0"	58	176	52	21'-0"	16	20'-6"	56	172	52	20'-6"
41'-0"	16	22'-6"	60	188	52	22'-6"	16	22'-0"	58	184	52	22'-0"	16	21'-6"	56	180	52	21'-6"
43'-0"	16	23'-6"	60	198	52	23'-6"	16	23'-0"	58	194	52	23'-0"	16	22'-6"	56	190	52	22'-6"
45'-0"	16	24'-6"	68	206	52	24'-6"	16	24'-0"	66	202	52	24'-0"	16	23'-6"	64	198	52	23'-6"
47'-0"	16	25'-6"	68	216	52	25'-6"	16	25'-0"	66	210	52	25'-0"	16	24'-6"	64	204	52	24'-6"
49'-0"	16	26'-6"	68	224	52	26'-6"	16	26'-0"	66	220	52	26'-0"	16	25'-6"	64	216	52	25'-6"

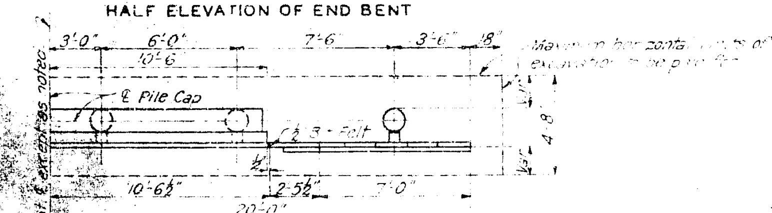
Note: Reinforcing bars in each span to be billed and tagged separately.

SUPERSTRUCTURE HARDWARE BILL							
	PIECE	LOCATION	NO. PCS.	SIZE	LENGTH	REMARKS	
SINGLE SPAN	Cap Plate	Under Cap		8"x 1/2"	2'-0"	See detail	
	1/2"φ Lag Screws	Cap Pl.	30	1/2"φ	4"	Flat csk. heads	
	Spacer Bolts	Spans 15' to 31' Incl.	48	3/4"φ	Varies	Turn bolts, washer for nut	
	Spacer Bolts	Spans 33' to 49' Incl.	64	3/4"φ	Varies	Turn bolts, washer for nut	
	Handrail Bolts	Spans 15'	16	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 19' Incl.	32	5/8"φ	1/4"	Button heads	
	" "	Spans 21'	20	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 25' Incl.	40	5/8"φ	1 1/4"	Button heads	
	" "	Spans 27'	24	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 31' Incl.	48	5/8"φ	1 1/4"	Button heads	
	" "	Spans 33'	28	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 37' Incl.	56	5/8"φ	1 1/4"	Button heads	
	" "	Spans 39'	32	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 43' Incl.	64	5/8"φ	1 1/4"	Button heads	
	" "	Spans 45'	36	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 49' Incl.	72	5/8"φ	1 1/4"	Button heads	
	Bolts	Bearing Pls.	16	3/4"φ	12"	Sq. heads, no threads.	
	Flange Clamp	Bearings	16	See	Detail	Detailed on this sheet	
EACH ADDITIONAL SPAN	Spacer Bolts	Spans 15' 31' Incl.	48	3/4"φ	Varies	Turn bolts, washer for nut	
	Spacer Bolts	Spans 33' to 49' Incl.	64	3/4"φ	Varies	Turn bolts, washer for nut	
	Handrail Bolts	Spans 15'	12	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 19' Incl.	32	5/8"φ	1 1/4"	Button heads	
	" "	Spans 21'	16	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 25' Incl.	40	5/8"φ	1 1/4"	Button heads	
	" "	Spans 27'	20	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 31' Incl.	48	5/8"φ	1 1/4"	Button heads	
	" "	Spans 33'	24	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 37' Incl.	56	5/8"φ	1 1/4"	Button heads	
	" "	Spans 39'	28	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 43' Incl.	64	5/8"φ	1 1/4"	Button heads	
	" "	Spans 45'	32	5/8"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 49' Incl.	72	5/8"φ	1 1/4"	Button heads	
	Bolts	Bearing Pls.	16	3/4"φ	12"	Sq. heads, no threads	
	Splice Pl. Bolts	Spans 15' to 31'	40	3/4"φ	2"	Turn bolts, washer for nut	
	" " "	Spans 33' to 49'	48	3/4"φ	2"	" " " " "	
	Flange Clamp	Bearings	16	See	Detail	Detailed on this sheet	
	Clip [illegible]	At Bent		"	"	" " Sheet # 3 of 3	
	Bolts	[illegible]		[illegible]	[illegible]	Plow Bolts	

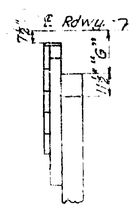
* [illegible] washers for [illegible] required for alignment of railposts



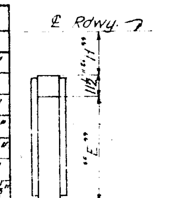
HALF ELEVATION OF END BENT



HALF PLAN OF END BENT



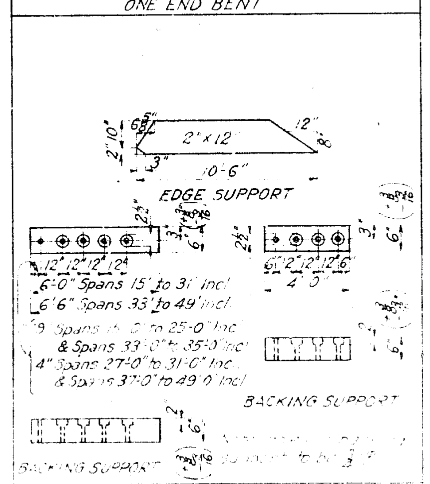
DIMENSIONS		
SPAN "S"	"G"	"H"
15'-0"	21 1/2"	21 3/4"
17'-0"	21 5/8"	22"
19'-0"	23 5/8"	23 7/8"
21'-0"	23 3/4"	2'-0"
23'-0"	23 7/8"	2'-0 1/8"
25'-0"	2'-1 3/4"	2'-2"
27'-0"	2'-1 7/8"	2'-2 1/8"
29'-0"	2'-3 3/4"	2'-4"
31'-0"	2'-4 3/4"	2'-5 1/8"
33'-0"	2'-4 7/8"	2'-5 1/4"
35'-0"	2'-5"	2'-5 3/8"
37'-0"	2'-7 5/8"	2'-8 1/8"
39'-0"	2'-7 3/4"	2'-8 1/4"
41'-0"	2'-7 7/8"	2'-8 5/8"
43'-0"	2'-7 7/8"	2'-8 3/8"
45'-0"	2'-10 3/4"	2'-11 1/2"
47'-0"	2'-11"	2'-11 3/4"
49'-0"	2'-11"	2'-11 3/4"



Note: Omit sway bracing when "E" is less than 5'-0".

TIMBER FRAMING DIAGRAMS

ONE END BENT



SUBSTRUCTURE TIMBER BILLS					
	PIECE	NO. PCS.	SIZE	LENGTH	REMARKS
ONE END BENT	Backing Plank	1	2"x12"	23'-6"	Cut to length.
	" "	1	2"x12"	17'-6"	" " "
	" "	1	2"x12"	22'-0"	Cut to length.
	" "	1	2"x12"	16'-0"	" " "
	" "	1	2"x12"	20'-6"	" " "
	" "	1	2"x12"	14'-6"	" " "
	" "	1	2"x12"	19'-0"	" " "
	" "	1	2"x12"	[illegible]	" " "
	" "	1	2"x12"	[illegible]	" " "
	" "	1	2"x12"	[illegible]	" " "
	Shoulder Plank	2	2"x8"	[illegible]	" " "
	Edge Support	2	2"x12"	10'-6"	Cut to length [illegible]
	Backing Support Spans 15' to 31' Incl.	4	6"x6"	6'-0"	" " " " "
	Backing Support Spans 33' to 49' Incl.	4	6"x6"	6'-6"	" " " " "
	Backing Support	[illegible]	6"x6"	4'-0"	" " " " "
	Backing Support Cap	1	6"x6"	[illegible]	Cut to length
	Pile Cap	1	12"x12"	20'-6"	" " " **
INT. BENTS	Pile Cap		12"x12"	20'-6"	Cut to length **
	Bracing		3"x8"		" " "
	"		3"x8"		" " "
	"		3"x8"		" " "
	"		3"x8"		" " "

Note: Pile caps to be classified as beams and stringers. All other timber to be classified as [illegible].

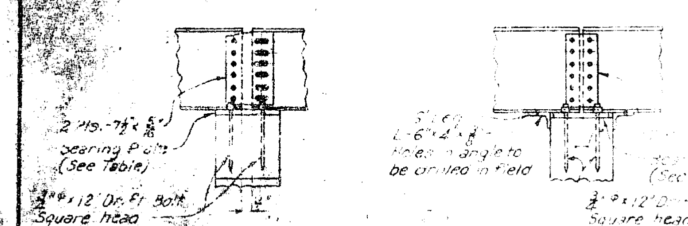
** S2S to exact depth of 12"

SUBSTRUCTURE HARDWARE BILL							
	PIECE	LOCATION	NO. PCS.	SIZE	LENGTH	[illegible]	REMARKS
	Dr. Ft. Pin	Backing Cap	4	3/4"φ	12		
	" "	Pile Cap	4	3/4"φ	2'-0"		
	[illegible]	[illegible]	[illegible]	3/4"φ	22		
	[illegible]	Bracing	[illegible]	[illegible]	[illegible]		
	[illegible]	[illegible]	[illegible]	[illegible]			
INT. BENTS	Drift Pin	Pile Cap		3/4"φ	2'-0"		
	Bolts §	Bracing		3/4"φ	18		
	Bolts §	Bracing		3/4"φ	22		

§ [illegible]

Note: [illegible]

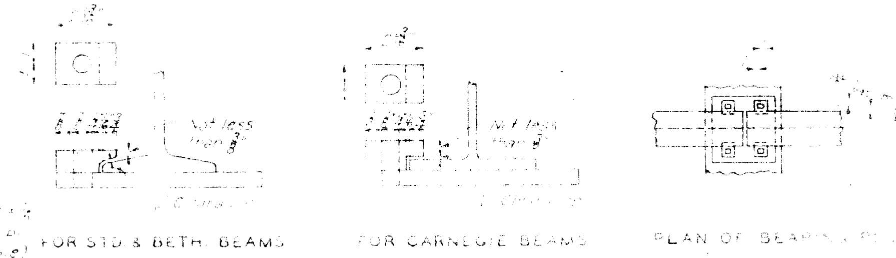
NAILING SCHEDULE:
Backing plank to supports: 3-30d at each support at splices, 3-30d each side of splice.
Pieces at ends of backwall to backing plank [illegible] each backing plank.



EXPANSION

FIXED

TYPICAL JOINTS OVER INT. BENT

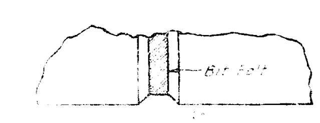


FOR STD. & BETH. BEAMS

FOR CARNEGIE BEAMS

PLAN OF BEAMS

DETAILS OF FLANGE CLAMPS



Note: [illegible] as shown for exposed faces of [illegible] consisting of bituminous felt except [illegible] of roadway slab [illegible]

DETAILS OF BEVEL FOR BIT. FELT JOINTS

OVER SMALL CREEK

[illegible] FROM DRUM TO DELTA

[illegible] 2 MILES WEST OF DELTA

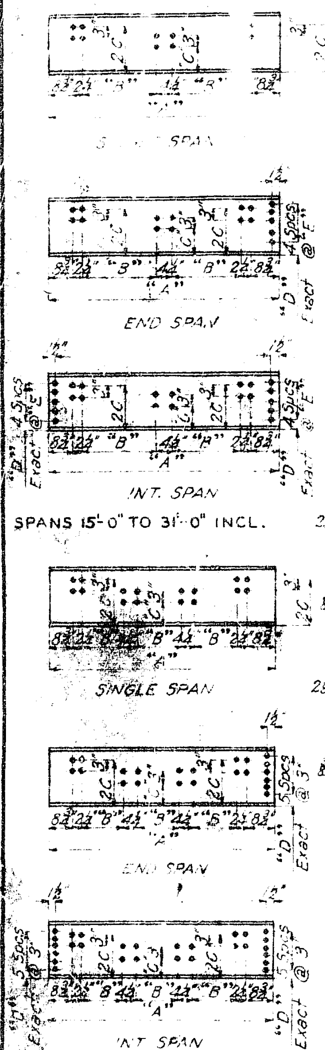
[illegible] SN-51 [illegible] 268+65

CAPE GIRARDEAU COUNTY

Designed Nov. 1929 By F.W.H.
Drawn Dec. 1930 By R.J.C.
Traced Dec. 1931 By R.J.C.
Checked Dec. 1931 By J.M.B.

S-533

MISSOURI STATE HIGHWAY DEPARTMENT

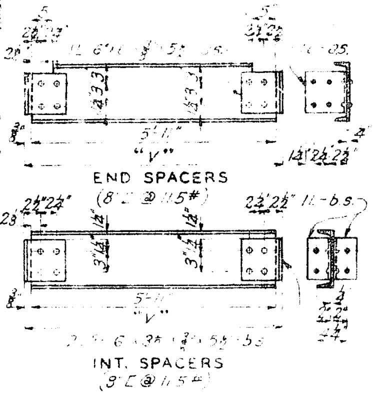


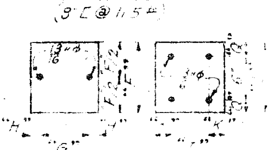
DETAILS OF STRINGERS

Note: Lower Flange of Beams to be punched standard gage [illegible] at Bents except at exp. joints as shown on General Elevation [illegible]

TABLE OF SPACERS

SPAN "S"	END SPACERS NO.	END SPACERS "V"	INT. SPACERS NO.	INT. SPACERS "V"
15'-0"	6	5'-11 3/4"	3	5'-11 3/4"
[illegible]	6	5'-11 3/4"	3	5'-11 3/4"
[illegible]	6	[illegible]	3	[illegible]
21'-0"	6	[illegible]	3	[illegible]
23'-0"	6	5'-11 11/16"	3	5'-11 11/16"
25'-0"	6	5'-11 11/16"	3	5'-11 11/16"
27'-0"	6	5'-11 5/8"	3	5'-11 5/8"
29'-0"	6	5'-11 5/8"	3	5'-11 5/8"
31'-0"	6	5'-11 5/8"	3	5'-11 5/8"
33'-0"	6	5'-11 5/8"	6	5'-11 5/8"
35'-0"	6	5'-11 9/16"	6	[illegible]
37'-0"	6	5'-11 9/16"	6	[illegible]
39'-0"	6	5'-11 9/16"	6	[illegible]
41'-0"	6	5'-11 9/16"	6	[illegible]
43'-0"	6	5'-11 9/16"	6	[illegible]
45'-0"	6	5'-11 9/16"	6	5'-11 9/16"
47'-0"	6	5'-11 1/2"	6	5'-11 1/2"
49'-0"	[illegible]	[illegible]	6	[illegible]

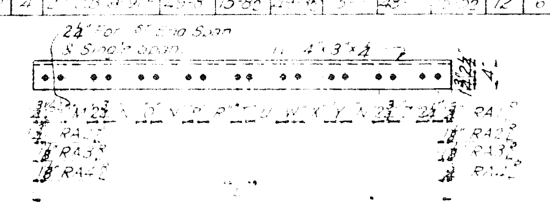




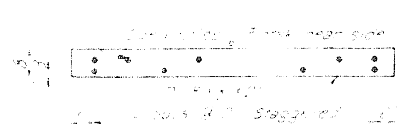
BEARING PLATES

TABLE OF STRINGERS

SPAN "S"	NO.	SIZE	SINGLE SPAN "A"	SINGLE SPAN "B"	END SPAN "A"	END SPAN "B"	INT. SPAN "A"	INT. SPAN "B"	"C"	"D"	"E"
15'-0"	4	14" C.B @ 3[illegible]	15'-[illegible]	6'-8 7/8"	[illegible]	6'-6 5/8"	14'-[illegible]	6'-4 3/8"	5 1/2	2"	2 1/2"
[illegible]	4	14" C.B @ 3[illegible]#	[illegible]	7'-[illegible]	[illegible]	[illegible]	[illegible]	7'-4 3/8"	5 1/2	2	2 1/2"
19'-0"	4	16" C.B @ 3[illegible]#	19'-8"	8'-8 7/8"	19'-3[illegible]	8'-6 5/8"	18'-[illegible]	8'-4 3/8"	6 1/2	2 1/2"	2 3/4"
21'-0"	2 2	16" C.B @ 3[illegible]# 16" C.B @ 40#	2[illegible]-8"	9'-8 7/8"	2[illegible]	9'-6 5/8"	20'-[illegible]	9'-4 3/8"	6 1/2"	2 1/2"	2 3/4"
23'-0"	2 2	16" C.B @ 40# 16" C.B @ 45#	23'-8"	10'-8 7/8"	23'-[illegible]	10'-6 5/8"	22'-11"	10'-4 3/8"	6 1/2"	2 1/2"	2 3/4"
25'-0"	4	18" C.B @ 47#	25'-[illegible]	11'-8 7/8"	25'-3[illegible]	11'-6 5/8"	24'-11"	11'-4 3/8"	7 1/2"	3 1/2"	2 3/4"
27'-0"	2 2	18" C.B @ 47# 18" C.B @ 52#	27'-8"	12'-8 7/8"	27'-3[illegible]	12'-6 5/8"	26'-11"	12'-4 3/8"	7 1/2"	3 1/2"	2 3/4"
29'-0"	4	20" C.B @ 55#	29'-8"	13'-3 3/8"	29'-3[illegible]	13'-6 5/8"	28'-11"	13'-4 3/8"	3 1/2"	4 1/2"	2 3/4"
31'-0"	4	2[illegible]" C.B @ 5[illegible]#	31'-[illegible]	[illegible]-9 3/8"	31'-3[illegible]	14'-6 5/8"	30'-11"	14'-4 3/8"	9"	5"	2 3/4"
33'-0"	[illegible]	[illegible] @ 55# [illegible] @ 62#	33'-8"	[illegible]-4 1/2"	33'-3[illegible]"	10'-3"	32'-11"	10'-1 1/2"	9"	3"	—
35'-0"	[illegible]	[illegible] @ 62# [illegible]	3[illegible]	[illegible]	35'-3[illegible]	10'-[illegible]	3[illegible]	[illegible]-9 1/2"	[illegible]	[illegible]	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11'-[illegible]	[illegible]	[illegible]	10 1/2"	4 1/2"	—
39'-0"	[illegible]	[illegible] 2[illegible]" C.B @ [illegible]#	39'-[illegible]	[illegible]	39'-3[illegible]"	12'-[illegible]	3[illegible]	[illegible]	10 1/2"	[illegible]	—
41'-[illegible]	[illegible]	24" C.B @ [illegible]# 24" C.B @ [illegible]#	4[illegible]-8"	[illegible]	41'-3 1/2"	12'-11"	40'-11"	12'-9 1/2"	[illegible]0 1/2"	4 1/2"	—
43'-0"	2 2	24" C.B @ [illegible]# 24" C.B @ 85#	43'-8"	13'-8 1/2"	43'-3 1/2"	3'-[illegible]	4[illegible]	[illegible]-5 1/2"	10 1/2"	4 1/2"	—
45'-0"	4	2[illegible]" C.B @ 85#	45'-8"	14'-4 1/2"	45'-3 1/2"	4'-3"	44'-[illegible]	[illegible]-1 1/2"	12	6"	—
47'-0"	4	27" C.B @ 85# 27" C.B @ 91#	47'-8"	15'-0 1/2"	[illegible]	[illegible]	46'	[illegible]-9 1/2"	12"	6"	—
49'-0"	4	2[illegible]" C.B @ 9[illegible]	[illegible]-8"	15'-8 1/2"	[illegible]	5'-[illegible]	48'-[illegible]	[illegible]-5 1/2"	12	6"	—



DETAIL OF RAIL ANGLES RA1 TO RA4 INCL.



END BENT CAP PLATE

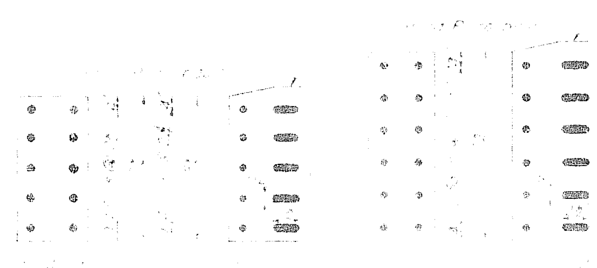
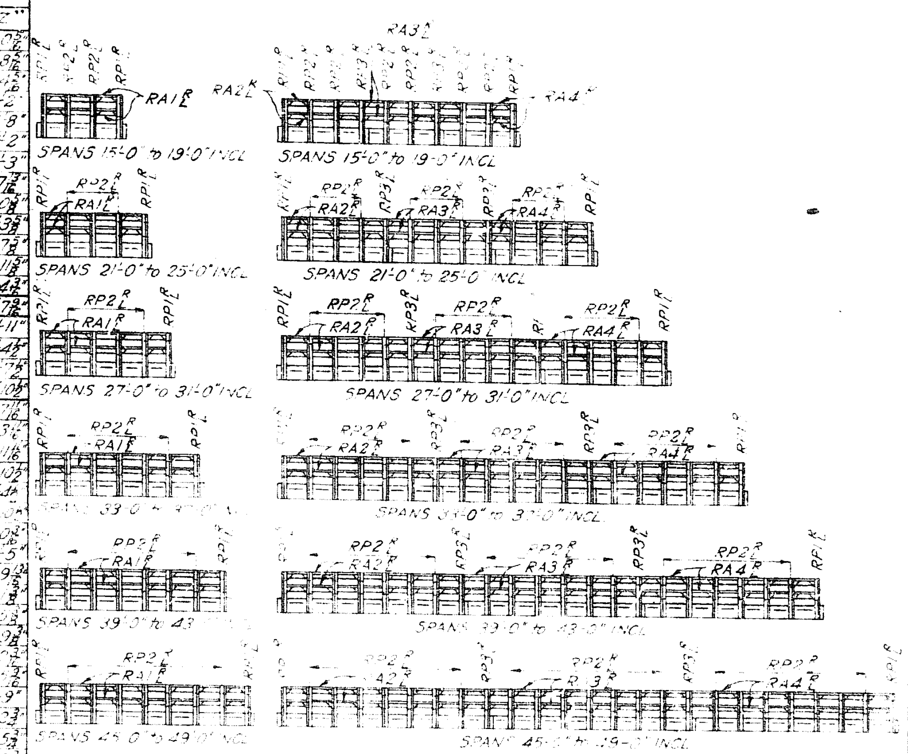
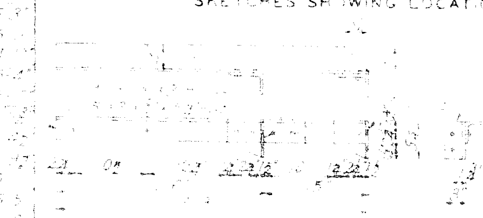


TABLE OF RAIL ANGLE DIMENSIONS

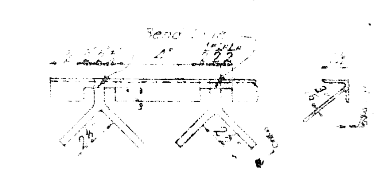
	SPAN	MARK	"L"	"M"	"N"	"O"	"P"	[illegible]	"T"	"U"	"W"	"X"	"Y"	"Z"
SINGLE SPAN	15'-0"	RA1	16'-7 1/2"	5'-0 5/16"	0	0	0	0	0	5'-5 3/8"	0	0	0	5'-0 5/16"
	17'-0"	"	18'-7 1/2"	5'-6 5/16"	0	0	0	0	0	6'-[illegible]	0	0	0	5'-8 5/16"
	19'-0"	"	20'-7 1/2"	6'-4 [illegible]	0	0	0	0	0	5'-9 3/8"	0	0	0	6'-4 5/16"
	21'-0"	"	22'-7 1/2"	5'-2"	0	0	0	5'-4 1/4"	2 3/4"	5'-7"	0	0	0	5'-2"
	23'-0"	"	24'-7 1/2"	5'-8"	0	0	0	5'-10 1/4"	2 3/4"	6'-1"	0	0	0	5'-8"
	25'-0"	"	26'-7 1/2"	6'-2"	0	0	0	6'-4 1/4"	2 3/4"	6'-7"	0	0	0	6'-2"
	27'-0"	"	28'-7 1/2"	5'-3"	0	0	0	5'-5 1/4"	2 3/4"	5'-8"	2 3/4"	5'-5 1/4"	0	5'-3"
	29'-0"	"	30'-7 1/2"	5'-7 13/16"	0	0	0	5'-10 1/16"	2 3/4"	6'-0 3/4"	2 3/4"	5'-10 1/16"	0	5'-7 13/16"
	31'-0"	"	32'-7 1/2"	6'-0 5/8"	0	0	0	6'-2 7/8"	2 3/4"	6'-5 1/2"	2 3/4"	6'-2 7/8"	0	6'-0 5/8"
	33'-0"	"	34'-7 1/2"	5'-3 5/8"	5'-5 15/16"	2 3/4"	0	0	0	0	2 3/4"	5'-8 11/16"	2 3/4"	5'-3 5/8"
	35'-0"	"	36'-7 1/2"	5'-7 5/8"	5'-9 15/16"	2 3/4"	0	0	0	0	2 3/4"	6'-0 11/16"	2 3/4"	5'-7 5/8"
	37'-0"	"	38'-7 1/2"	5'-11 5/8"	6'-1 15/16"	2 3/4"	0	0	0	0	2 3/4"	6'-4 11/16"	2 3/4"	5'-11 5/8"
	39'-0"	"	40'-7 1/2"	5'-4 3/16"	5'-6 3/8"	2 3/4"	0	0	[illegible]	[illegible]9 3/8"	2 3/4"	5'-6 3/8"	2 3/4"	5'-4 3/16"
	41'-0"	"	42'-7 1/2"	5'-7 9/16"	5'-9 13/16"	2 3/4"	0	0	2 3/4"	6'-0 5/8"	2 3/4"	5'-9 13/16"	2 3/4"	5'-7 9/16"
	43'-0"	"	44'-7 1/2"	5'-11"	6'-1 1/4"	2 3/4"	0	0	2 3/4"	6'-4"	2 3/4"	6'-1 1/4"	2 3/4"	5'-11"
	45'-0"	"	46'-7 1/2"	5'-4 1/2"	5'-6 3/4"	2 3/4"	2 3/4"	5'-6 3/4"	2 3/4"	5'-9 1/2"	2 3/4"	5'-6 3/4"	2 3/4"	5'-4 1/2"
	47'-0"	"	48'-7 1/2"	5'-7 1/2"	5'-9 3/4"	2 3/4"	2 3/4"	5'-9 3/4"	2 3/4"	6'-0 1/2"	2 3/4"	5'-9 3/4"	2 3/4"	5'-7 1/2"
	49'-0"	"	50'-7 1/2"	5'-10 1/2"	6'-0 3/4"	2 3/4"	2 3/4"	6'-0 3/4"	2 3/4"	6'-3 1/2"	2 3/4"	6'-0 3/4"	2 3/4"	5'-10 1/2"
EXPT. END SPAN	15'-0"	RA2	15'-4 3/8"	[illegible]	0	0	0	0	0	5'-0 5/8"	0	0	0	4'-7 11/16"
	17'-0"	"	17'-4 3/8"	[illegible]	0	0	0	0	0	5'-8 5/8"	0	0	0	5'-3 [illegible]
	19'-0"	"	19'-4 3/8"	[illegible]	0	0	0	0	0	6'-4 5/8"	0	0	0	5'-11 1/16"
	21'-0"	"	21'-4 3/8"	4'-10 1/2"	0	0	0	5'-0 3/4"	2 3/4"	5'-3 1/2"	0	0	0	4'-10 1/2"
	23'-0"	"	23'-4 3/8"	[illegible]	0	0	0	5'-6 3/4"	2 3/4"	5'-9 [illegible]	0	0	0	5'-4 [illegible]
	25'-0"	"	25'-4 3/8"	[illegible]	0	0	0	6'-0 3/4"	2 3/4"	[illegible]	0	0	0	[illegible]
	27'-0"	"	27'-4 3/8"	5'-0 [illegible]	0	0	0	5'-2 7/16"	2 3/4"	5'-5 [illegible]	2 3/4"	[illegible]	0	5'-0 3/16"
	29'-0"	"	29'-4 3/8"	5'-5"	0	0	0	[illegible]	2 3/4"	[illegible]	2 3/4"	[illegible]	0	5'-5"
	31'-0"	"	31'-4 3/8"	5'-9 13/16"	0	0	0	6'-0 1/16"	2 3/4"	6'-2 3/4"	2 3/4"	6'-0 1/16"	0	5'-9 13/16"
	33'-0"	"	33'-4 3/8"	[illegible]	5'-3 9/16"	2 3/4"	0	0	0	0	2 3/4"	5'-6 5/16"	2 3/4"	[illegible]
	35'-0"	"	35'-4 3/8"	5'-5 3/8"	[illegible]	2 3/4"	0	0	0	0	2 3/4"	[illegible]	2 3/4"	[illegible]
	37'-0"	"	37'-4 3/8"	5'-9 3/8"	[illegible]	2 3/4"	0	0	[illegible]	0	2 3/4"	[illegible]	2 3/4"	5'-9 3/8"
	39'-0"	"	39'-4 3/8"	[illegible]	[illegible]	2 3/4"	0	0	2 3/4"	[illegible]	2 3/4"	[illegible]	2 3/4"	[illegible]
	41'-0"	"	[illegible]	[illegible]	[illegible]	2 3/4"	0	0	2 3/4"	5'-0 5/8"	2 3/4"	[illegible]	2 3/4"	[illegible]
	43'-0"	"	43'-4 3/8"	5'-9"	[illegible]	2 3/4"	0	[illegible]	2 3/4"	[illegible]	2 3/4"	[illegible]	2 3/4"	5'-9"
	45'-0"	"	[illegible]	[illegible]	[illegible]	2 3/4"	2 3/4"	[illegible]	[illegible]	[illegible]	2 3/4"	5'-5"	2 3/4"	[illegible]
	47'-0"	"	[illegible]	[illegible]	[illegible]	2 3/4"	2 3/4"	[illegible]	2 3/4"	[illegible]	[illegible]	5'-8"	2 3/4"	[illegible]
	49'-0"	"	[illegible]	[illegible]	[illegible]	2 3/4"	2 3/4"	[illegible]	2 3/4"	[illegible]	[illegible]	[illegible]	2 3/4"	[illegible]
	15'-0"	RA3	[illegible]	[illegible]	[illegible]	0	0	[illegible]	0	4'-9 [illegible]	0	0	0	[illegible]
	17'-0"	"	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	[illegible]
	[illegible]	"	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	21'-0"	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	23'-0"	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



SKETCHES SHOWING LOCATION OF HANDRAIL POSTS



HANDRAIL POST RP1



METALLIC EDGE MOULDING

TABLE OF BEARING PLATES

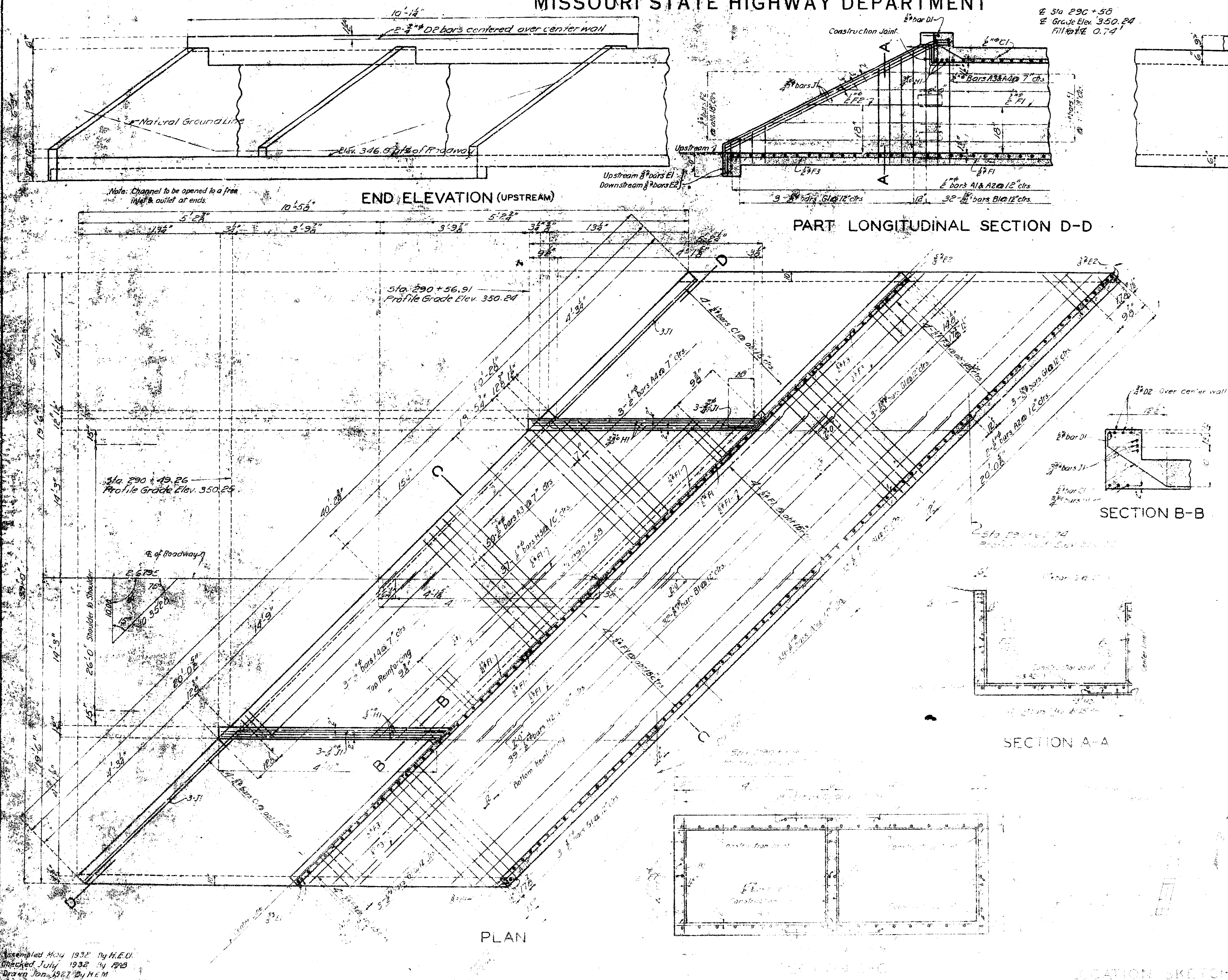
SPAN "S"	NO. PLATES	STRINGER	AT END BENTS				AT INT. BENTS			"K"
15'-0"	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23'-0"	4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25'-0"	[illegible]	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27'-0"	[illegible]	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29'-0"	4	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
31'-0"	[illegible]	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
33'-0"	[illegible]	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
35'-0"	[illegible]	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
37'-0"	[illegible]	"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
39'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
41'-0"	4	"	3/4"	11 1/2"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
43'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
45'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
47'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
49'-0"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

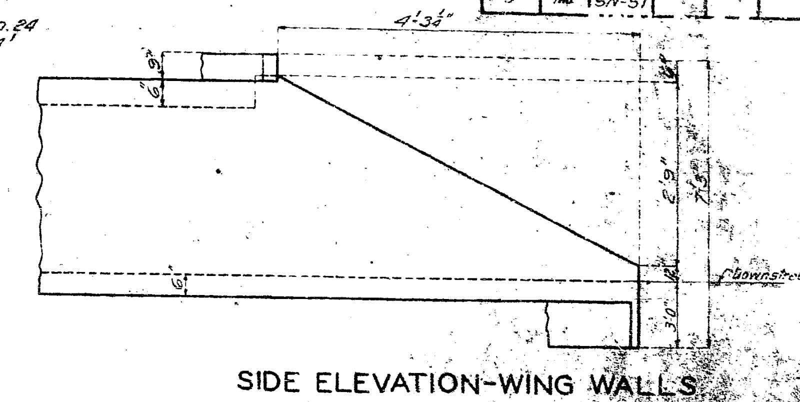
BRIDGE OVER SMALL CREEK

CAPE GIRARDEAU COUNTY

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	SN-51			





BILL OF REINFORCING STEEL

No	Size	Length	Mark
38	½"φ	9'3"	A1
2	½"φ	9'6"	A2
50	½"φ	9'3"	A3
3	½"φ	10'6"	A4
186	⅝"φ	3'0"	B1
16	⅝"φ	17'0"	C1
[illegible]	[illegible]	9'9"	D1
4	⅜"	6'6"	D2
9	⅜"	2'9"	E1
9	⅜"	3'9"	E2
36	[illegible]	16'9"	F1
9	[illegible]	5'6"	F2
22	[illegible]	6'3"	F3
18	⅜"φ	5'9"	G1
6	¾"φ	9'6"	H1
39	½"φ	4'6"	H2
37	½"φ	4'6"	H3
12	¾"φ	12'6"	J1

Cutting Diagrams

Note: Reinforcing bars ¾" or over in diameter, which are bent to an angle greater than 90°, shall be of structural grade.

ESTIMATED QUANTITIES

Concrete 1:2:4 mix "B"	Cu. Yds.	20.6
Reinforcing Steel	Lbs.	2300
Culvert Excavation	Cu. Yds.	20

GENERAL NOTES

Concrete to be 1:2:4 mix, Class "B"

Excavation to be paid for as culvert excavation

DOUBLE 4'-0"X3'-0" BOX CULVERT

ROAD FROM DRUM TO DELTA

MILES WEST OF DELTA

STA 290+58

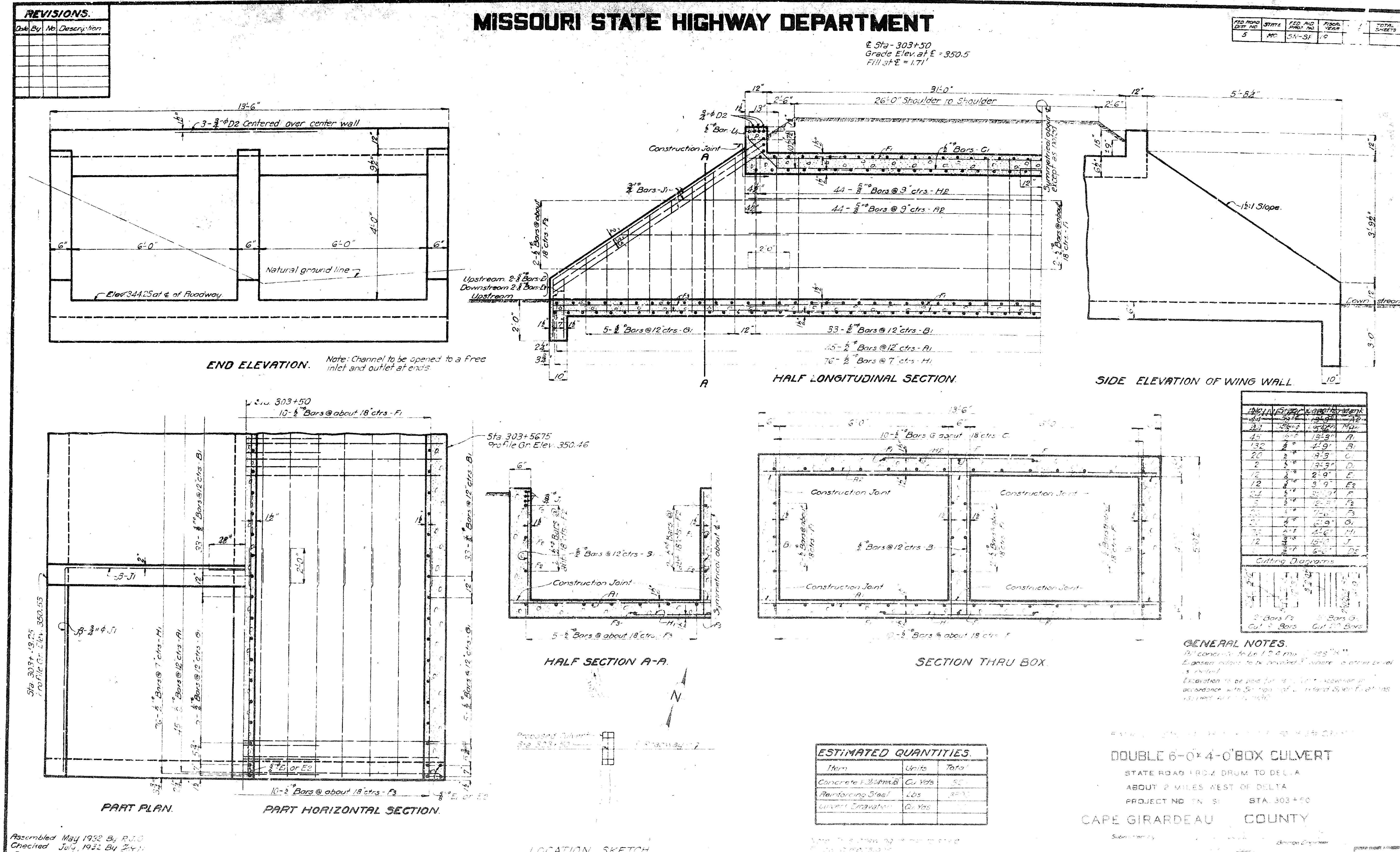
CAPE GIRARDEAU COUNTY

Assembled May 1932 By H.E.U.
Checked July 1932 By [illegible]
Drawn Jan. 1927 By H.E.M.
Checked Jan. 1927 By J.L.P.

LOCATION SKETCH

S-575

MISSOURI STATE HIGHWAY DEPARTMENT



GENERAL NOTES.

All concrete to be 1:2:4 mix Class "B".
Exposed edges to be beveled ¾" where no other bevel is noted.
Excavation to be paid for as culvert excavation in accordance with Section of Standard Specifications.

ESTIMATED QUANTITIES.		
Item	Units	Total
Concrete Class B	Cu. Yds.	[illegible]
Reinforcing Steel	Lbs.	[illegible]
Culvert Excavation	Cu. Yds.	

DOUBLE 6'-0" x 4'-0" BOX CULVERT

STATE ROAD FROM DRUM TO DELTA

ABOUT 2 MILES WEST OF DELTA

PROJECT NO. SN-SI STA. 303+50

CAPE GIRARDEAU COUNTY

Submitted by ______ Bridge Engineer

Approved by ______ Chief Engineer

S-576

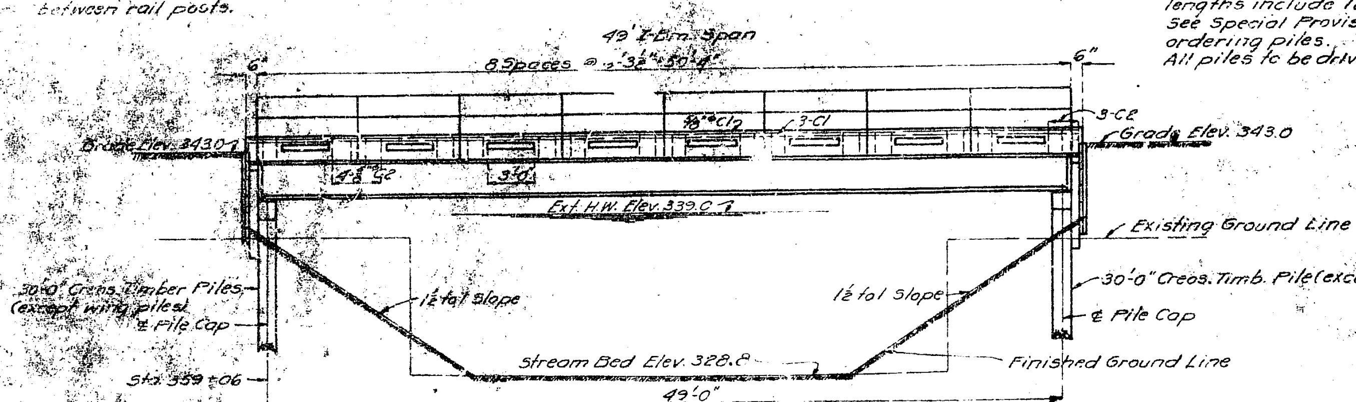
Assembled May 1932 By R.J.C.
Checked July 1932 By
Drawn Feb. 1925 By J.I.
Checked Feb. 1925 By

C 23

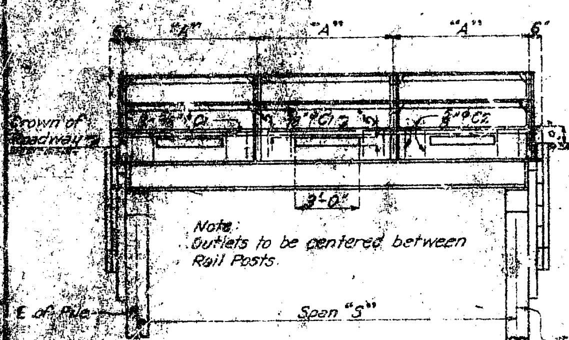
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET [illegible]	[illegible] SHEETS
5	MO.	SN-31	19		

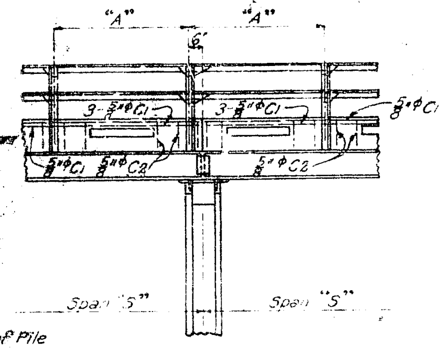
Note: All piling to be creosoted timber piles. Required: 8 Piles 30'-0" long and 4 Piles 15'-0" long (wing piles). Pile lengths include 12" cut-offs. See Special Provisions in regard to ordering piles. All piles to be driven to full penetration.



GENERAL ELEVATION



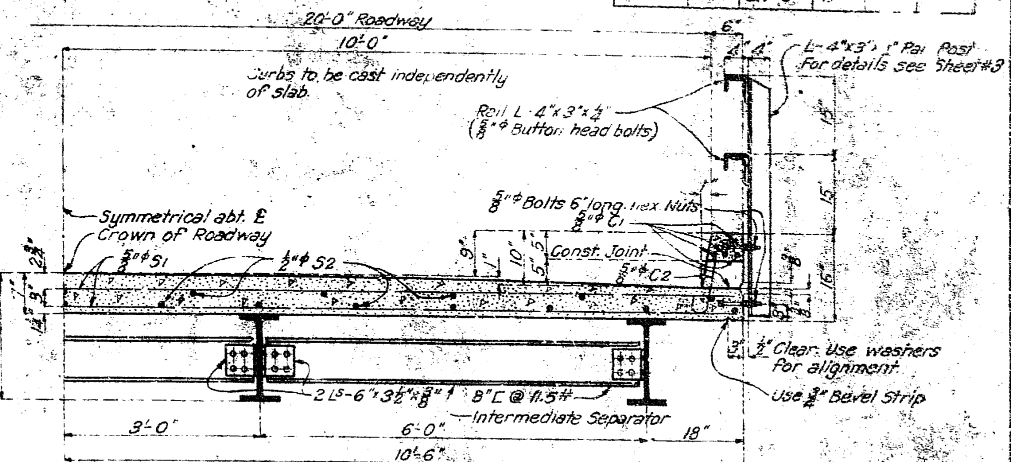
ELEVATION



PART ELEVATION AT INT. BENT

DIMENSION "B"	
SPAN "S"	"B"
15'-0"	20 7/8"
17'-0"	21"
19'-0"	22 7/8"
21'-0"	23"
23'-0"	23 5/8"
25'-0"	2'-1"
27'-0"	2'-1 5/8"
29'-0"	2'-3"
31'-0"	2'-4"
33'-0"	2'-4 5/8"
35'-0"	2'-4 1/4"
37'-0"	2'-6 7/8"
39'-0"	2'-7"
41'-0"	2'-7 5/8"
43'-0"	2'-7 5/8"
45'-0"	2'-10"
47'-0"	2'-10 5/8"
49'-0"	2'-10 5/8"

Note: Top of channel separators at ends of each I-Beam Span to be flush with bottom of floor slab as shown in section thru end bent at ℄.

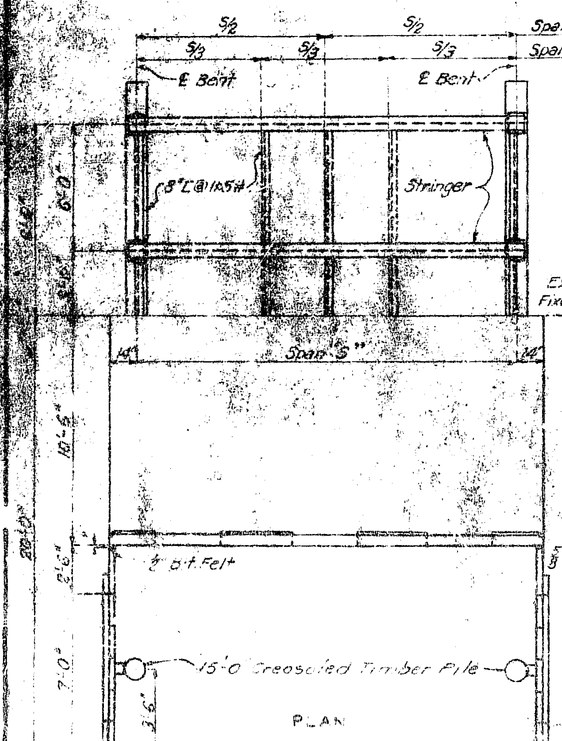


Note: Depth of outside stringers will in some cases be a fraction of an inch less than that of inside stringers and in order to keep bottom of slab horizontal it will be necessary to haunch slab down to top of outside stringers.

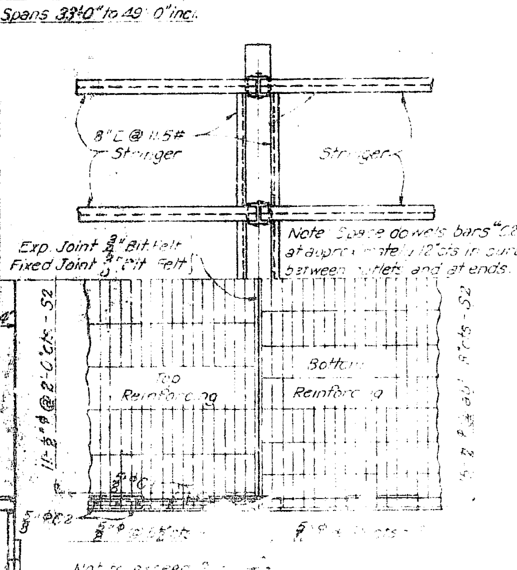
HALF SECTION THRU SPAN

HANDRAIL SPACING					
		"A" DIMENSIONS			
SPAN "S"	NO. PANELS	SINGLE SPAN	1ST END SPAN	ALL INT. SPANS	LAST END SPAN
15'-0"	3	5'-5 5/16" abt.	5'-0 11/16" abt.	5'-0"	5'-4 11/16" abt.
17'-0"	3	6'-1 5/16" abt.	5'-8 11/16" abt.	5'-8"	6'-0 11/16" abt.
19'-0"	3	6'-9 5/16" abt.	6'-4 11/16" abt.	6'-4"	6'-8 11/16" abt.
21'-0"	4	5'-7"	5'-3½"	5'-3"	5'-6½"
23'-0"	4	6'-1"	5'-9½"	5'-9"	6'-0½"
25'-0"	4	6'-7"	6'-3½"	6'-3"	6'-6½"
27'-0"	5	5'-8"	5'-5 3/16" abt.	5'-4 13/16" abt.	5'-7 5/8" abt.
29'-0"	5	6'-0 13/16" abt.	5'-10"	5'-9 5/8" abt.	6'-0 3/8" abt.
31'-0"	5	6'-5 5/8" abt.	6'-2 13/16" abt.	6'-2 3/8" abt.	6'-5 3/16" abt.
33'-0"	6	5'-8 11/16" abt.	5'-6 3/16" abt.	5'-6"	5'-8 5/16" abt.
35'-0"	6	6'-0 11/16" abt.	5'-10 5/16" abt.	5'-10"	6'-0 5/16" abt.
37'-0"	6	6'-4 11/16" abt.	6'-2 5/16" abt.	6'-2"	6'-4 5/16" abt.
39'-0"	7	5'-9 3/8" abt.	5'-7 1/8" abt.	5'-6 7/8" abt.	5'-8 7/8" abt.
41'-0"	7	6'-0 9/16" abt.	5'-10 3/16" abt.	5'-10 5/16" abt.	6'-0 5/16" abt.
43'-0"	7	6'-4"	6'-2"	6'-1 11/16" abt.	6'-3 11/16" abt.
45'-0"	8	5'-9½"	5'-7 3/8"	5'-7½"	5'-9¼"
47'-0"	8	6'-0½"	5'-10 3/8"	5'-10½"	6'-0¼"
49'-0"	8	6'-3½"	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~

TABLE OF STRINGERS						
	PER PLANS		PERMISSIBLE SUBSTITUTIONS			
SPAN "S"	CARNEGIE BEAMS		STANDARD I-BEAMS		BETHLEHEM BEAMS	
	Inside	Outside	Inside	Outside	Inside	Outside
15'-0"	14"@30#	14"@30#	12"@40.8#	12"@35#	14"@30#	14"@30#
17'-0"	14"@33#	14"@33#	15"@42.9#	15"@42.9#	14"@33#	14"@33#
19'-0"	16"@37#	16"@37#	15"@42.9#	15"@42.9#	16"@37#	16"@37#
21'-0"	16"@40#	16"@37#	15"@50#	15"@45#	16"@40#	16"@37#
23'-0"	16"@45#	16"@40#	18"@54.7#	18"@54.7#	16"@45#	16"@40#
25'-0"	18"@47#	18"@47#	18"@54.7#	18"@54.7#	18"@47#	18"@47#
27'-0"	18"@52#	18"@47#	18"@60#	18"@54.7#	18"@52#	18"@47#
29'-0"	20"@55#	20"@55#	20"@65.4#	20"@65.4#	20"@55#	20"@55#
31'-0"	21"@58#	21"@58#	20"@70#	20"@65.4#	22"@58#	22"@55#
33'-0"	21"@62#	21"@58#	20"@75#	20"@70#	22"@62#	22"@58#
35'-0"	21"@67#	21"@62#	20"@81.4#	20"@75#	22"@67#	22"@62#
37'-0"	24"@70#	24"@70#	24"@79.9#	24"@79.9#	24"@70#	24"@70#
39'-0"	24"@74#	24"@70#	24"@79.9#	24"@79.9#	24"@74#	24"@70#
41'-0"	24"@81#	24"@74#	24"@85#	24"@79.9#	24"@81#	24"@74#
43'-0"	24"@85#	24"@81#	24"@100#	24"@90#	26"@85#	26"@81#
45'-0"	27"@85#	27"@85#	24"@105.9#	24"@100#	26"@85#	26"@85#
47'-0"	27"@91#	27"@85#	24"@105.9#	24"@105.9#	28"@91#	28"@85#
49'-0"	27"@91#	27"@91#	24"@115#	24"@105.9#	28"@91#	28"@[illegible]#



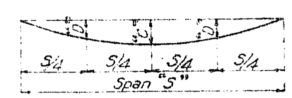
PLAN



PART PLAN AT INT. BENT SHOWING REINFORCING

DEFLECTION		
SPANS	"C"	"D"
15'-0"	[illegible]	[illegible]
17'-0"	[illegible]	[illegible]
19'-0"	[illegible]	[illegible]
21'-0"	[illegible]	[illegible]
23'-0"	[illegible]	[illegible]
25'-0"	[illegible]	[illegible]
27'-0"	[illegible]	[illegible]
29'-0"	[illegible]	[illegible]
31'-0"	[illegible]	[illegible]
33'-0"	[illegible]	[illegible]
35'-0"	[illegible]	[illegible]
37'-0"	[illegible]	[illegible]
39'-0"	[illegible]	[illegible]

Note: Floor slab to be brought to grade and dead load deflection taken care of by increasing slab thickness. Depth of slab at outside face of curb to be kept uniform and bottom surface of slab warped between curb and outside beam to obtain required thickness at beam. Payment will be allowed for additional concrete required for thickening slab. This additional concrete is included in "Estimated Quantities".



DEFLECTION DIAGRAM

ESTIMATED QUANTITIES				
ITEM		SUPERSTR.	SUBSTR.	TOTAL
Bridge Excavation Class 1	Cu. Yds.		[illegible]	
Bridge Excavation Class 2	Cu. Yds.		[illegible]	
Concrete 1:2:4 mix "B"	Cu. Yds.			
Concrete 1:2:3½ mix "X"	Cu. Yds.	[illegible]		
Fabricated Structural Steel	Lbs.			
Reinforcing Steel	Lbs.	[illegible]		
Creosoted Timber Piles	[illegible]			
Creosoted Timber Pile Cut-offs	[illegible]			
Timber [illegible]	[illegible]			

GENERAL NOTES:

Loading: One 10 Ton Truck, 80% of weight on rear axle, 30% impact, 14'-0" wheel base, 6'-0" gage, 10" tire.
All concrete to be 1:2:3½ mix "X".
Exposed edges to be beveled ¾" where no other bevel is noted.
All timber to be creosoted Douglas Fir of the West Coast Region, Close-grained Structural Grade; creosoted Southern Yellow Pine, Dense Structural Square Edge and Sound Grade; or untreated California Redwood, Prime Structural Grade. All timber rough full-sawn except as noted in timber bill for pile caps. Slight variations in sawing to be in accordance with grading rules. All treated timber to be cut to lengths, shaped and bored as shown before treating. Backing plank are all billed 6' long and are to be fitted and cut in the field.
Field holes for drift pins shall be field bored 13/32"φ. Unless otherwise noted all other field holes in timber shall be field bored ¾"φ.
When bolts with countersunk heads are indicated on plans cut washers shall be used under heads. O.G. washers shall be used under heads of all other bolts and under nuts of all bolts.
Number of bolts, drift pins, nails and washers given exact; no allowance made for excess. Cost of substructure hardware to be included in price bid for timber in place.
I-Beams with fastenings, spacers, handrail, handrail posts with fastenings, clip angles and cap plate on end bent with fastenings, will be paid for as structural steel. Cost of metallic edge moulding [illegible] included in unit bid price for concrete.
[illegible] holes 13/16"φ, except in handrail where rivets shall be 5/8"φ, [illegible] Machine bolts ¾"φ, holes 13/16" [illegible] and reamed [illegible]. Field connections, except handrail, shall be [illegible] bolts. Field connections for handrail shall be 5/8"φ button head [illegible].
[illegible] shall be submitted to the State Highway [illegible] approved before steel is [illegible]
[illegible] permissible substitution
[illegible] partition [illegible] one face of [illegible]

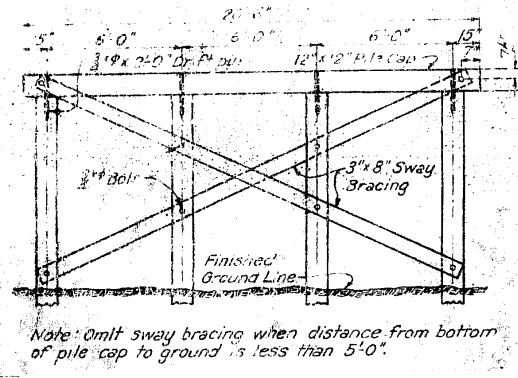
[illegible] WHITEWATER RIVER

Designed Nov. 1929 By F.W.H.
Drawn Mar. 1930 By P.J.C.
Traced Dec. 1931 By R.J.G.
Checked Dec. 1931 By J.H.
Approved June 1932 By H.E.U.
Checked July 1932 By [illegible]

S-291

MISSOURI STATE HIGHWAY DEPARTMENT

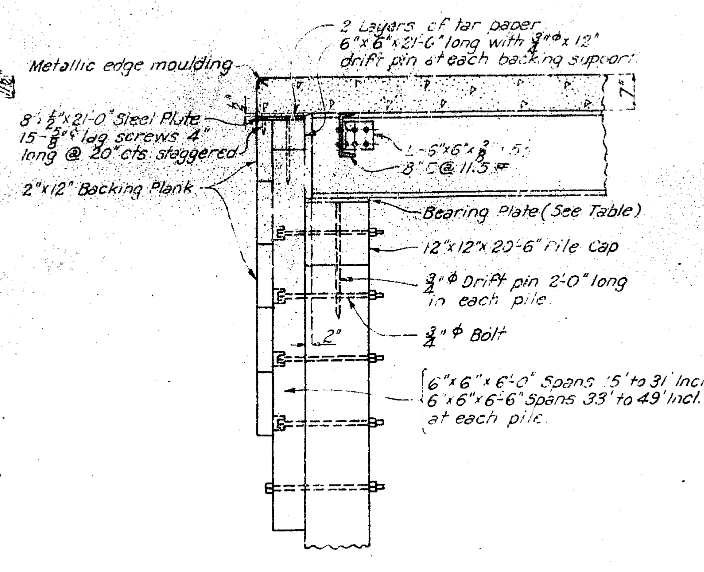
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	[illegible]	[illegible]
5	MO.	SN-51	19		



Note: Omit sway bracing when distance from bottom of pile cap to ground is less than 5'-0".

DETAIL OF INTERIOR BENTS

Note: Any irregularity in alignment of piling in end bents to be corrected by facing one surface of the 6"x6" backing support or by varying the thickness of the backing support such as to place the surface of the backing in a true plane and eliminate any strain on the backing plank. Splice in backing plank to be made at center of 6"x6" backing support and to be alternated on the two intermediate supports.



SECTION THRU END BENT AT ℄

NO.	SIZE	LENGTH	MARK	LOCATION	BENDING SKETCH
"A"	⅝"φ	"B"	C1	Curb	2" – 3" – 2" – 10½" – C2
"C"	⅜"φ	2'-0"	C2	"	
"D"	⅜"φ	20'-9"	S1	Slab	
"E"	½"φ	"F"	S2	"	

BILL OF REINFORCING STEEL

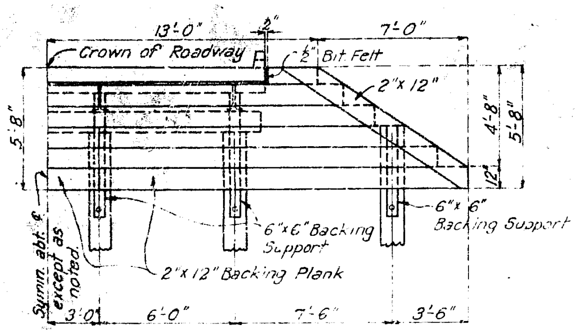
SPAN "S"	Single Span "A"	Single Span "B"	Single Span "C"	Single Span "D"	Single Span "E"	Single Span "F"	One End Span "A"	One End Span "B"	One End Span "C"	One End Span "D"	One End Span "E"	One End Span "F"	One Int. Span "A"	One Int. Span "B"	One Int. Span "C"	One Int. Span "D"	One Int. Span "E"	One Int. Span "F"
15'-0"	8	16'-9"	24	76	26	16'-9"	8	15'-9"	22	70	26	15'-9"	8	14'-9"	20	64	26	14'-9"
17'-0"	8	18'-9"	28	86	26	18'-9"	8	17'-9"	24	80	26	17'-9"	8	16'-9"	20	74	26	16'-3"
19'-0"	8	20'-9"	28	92	26	20'-9"	8	19'-9"	28	88	36	19'-9"	8	18'-9"	28	84	26	18'-9"
21'-0"	8	22'-9"	30	100	26	22'-9"	8	21'-9"	28	96	26	21'-9"	8	20'-9"	26	92	26	20'-9"
23'-0"	8	24'-9"	36	112	26	24'-9"	8	23'-9"	34	105	26	23'-9"	8	22'-9"	32	100	26	22'-9"
25'-0"	8	26'-9"	36	118	26	26'-9"	8	25'-9"	36	114	26	25'-9"	8	24'-9"	36	110	26	24'-9"
27'-0"	8	28'-9"	36	130	26	28'-9"	8	27'-9"	34	124	26	27'-9"	8	26'-9"	32	118	26	26'-9"
29'-0"	8	30'-9"	44	138	26	30'-9"	8	29'-9"	42	132	26	29'-9"	8	28'-9"	40	126	26	28'-9"
31'-0"	8	32'-9"	44	146	26	32'-9"	8	31'-9"	44	140	26	31'-9"	8	30'-9"	44	134	26	30'-9"
33'-0"	16	18'-6"	52	154	52	18'-6"	16	18'-0"	50	150	52	18'-0"	16	17'-6"	48	146	52	17'-6"
35'-0"	16	19'-6"	52	162	52	19'-6"	16	19'-0"	50	158	52	19'-0"	16	18'-6"	48	154	52	18'-6"
37'-0"	16	20'-6"	52	172	52	20'-6"	16	20'-0"	50	168	52	20'-0"	16	19'-6"	48	164	52	19'-6"
39'-0"	16	21'-6"	60	180	52	21'-6"	16	21'-0"	58	176	52	21'-0"	16	20'-6"	56	172	52	20'-6"
41'-0"	16	22'-6"	60	188	52	22'-6"	16	22'-0"	58	184	52	22'-0"	16	21'-6"	56	180	52	21'-6"
43'-0"	16	23'-6"	60	198	52	23'-6"	16	23'-0"	58	194	52	23'-0"	16	22'-6"	56	190	52	22'-6"
45'-0"	16	24'-6"	68	206	52	24'-6"	16	24'-0"	66	202	52	24'-0"	16	23'-6"	64	198	52	23'-6"
47'-0"	16	25'-6"	68	216	52	25'-6"	16	25'-0"	66	210	52	25'-0"	16	24'-6"	64	204	52	24'-6"
49'-0"	16	26'-6"	68	224	52	26'-6"	16	~~26'-0"~~	~~66~~	~~220~~	~~52~~	~~26'-0"~~	~~16~~	~~25'-6"~~	~~64~~	~~216~~	~~52~~	~~25'-6"~~

Note: Reinforcing bars in each span to be billed and tagged separately.

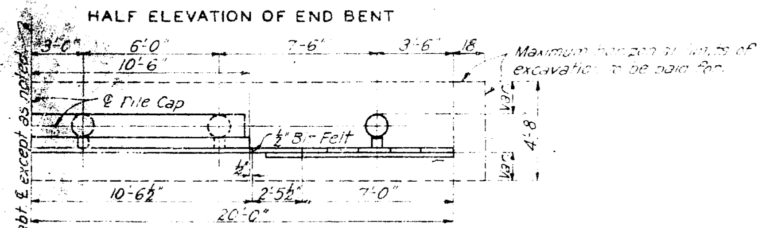
SUPERSTRUCTURE HARDWARE BILL

	PIECE	LOCATION	NO. PCS.	SIZE	LENGTH	REMARKS	
SINGLE SPAN	Cap Plate	Under Slab	2	8"x½"	21'-0"	See detail	
	⅝"φ Lag Screws	Cap Pl.	30	⅝"φ	4"	Flat csk. heads	
	Spacer Bolts	Spans 15' to 31' Incl.	48	¾"φ	Varies	Turn bolts, washer for nut	
	Spacer Bolts	Spans 33' to 49' Incl.	64	¾"φ	Varies	Turn bolts, washer for nut	
	Handrail Bolts	Spans 15'	16	⅝"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 19' Incl.	32	⅝"φ	1¼"	Button heads.	
	" "	Spans 21'	20	⅝"φ	6"	Sq. hds., washers, hex. nuts.	*
	" "	to 25' Incl.	40	⅝"φ	1¼"	Button heads.	
	" "	Spans 27'	24	⅝"φ	6"	Sq. hds., washers, hex. nuts.	*
	" "	to 31' Incl.	48	⅝"φ	1¼"	Button heads.	
	" "	Spans 33'	28	⅝"φ	6"	Sq. hds., washers, hex. nuts	*
	" "	to 37' Incl.	56	⅝"φ	1¼"	Button heads	
	" "	Spans 39'	32	⅝"φ	6"	Sq. hds., washers, hex. nuts.	*
	" "	to 43' Incl.	64	⅝"φ	1¼"	Button heads.	
	" "	Spans 45'	36	⅝"φ	6"	Sq. hds., washers, hex. nuts.	*
	" "	to 49' Incl.	72	⅝"φ	1¼"	Button heads.	
	Bolts	Bearing Pls.	16	¾"φ	12"	Sq. heads, no threads.	
	Flange Clamp	Bearings	16	See	Detail	Detailed on this sheet.	
EACH ADDITIONAL SPAN	Spacer Bolts	Spans 15' to 31' Incl.	48	¾"φ	Varies	Turn bolts, washer for nut.	
	Spacer Bolts	Spans 33' to 49' Incl.	64	¾"φ	Varies	Turn bolts, washer for nut.	
	Handrail Bolts	Spans 15'	12	⅝"φ	6"	Sq. hds., washers, hex. nuts.	*
	" "	to 19' Incl.	32	⅝"φ	1¼"	Button heads.	
	" "	Spans 21'	16	⅝"φ	6"	Sq. hds., washers, hex. nuts.	*
	" "	to 25' Incl.	40	⅝"φ	1¼"	Button heads.	
	" "	Spans 27'	20	⅝"φ	6"	Sq. hds., washers, hex. nuts.	*
	" "	to 31' Incl.	48	⅝"φ	1¼"	Button heads.	
	" "	Spans 33'	24	⅝"φ	6"	Sq. hds., washers, hex. nuts.	*
	" "	to 37' Incl.	56	⅝"φ	1¼"	Button heads.	
	" "	Spans 39'	28	⅝"φ	6"	Sq. hds., washers, hex. nuts.	*
	" "	to 43' Incl.	64	⅝"φ	1¼"	Button heads.	
	" "	Spans 45'	32	⅝"φ	6"	Sq. hds., washers, hex. nuts.	*
	" "	to 43' Incl.	72	⅝"φ	1¼"	Button heads	
	Bolts	Bearing Pls.	16	¾"φ	12"	Sq. heads, no threads.	
	Splice Pl. Bolts	Spans 15' to 31'	40	¾"φ	2"	Turn bolts, washer for nut.	
	" " "	Spans 33' to 43'	48	¾"φ	2"	" " " " "	
	Flange Clamp	Bearings	16	See	Detail	Detailed on this sheet.	
	Clip Ls	At Bent		"	"	" " Sheet #3 of 3	
	Bolts	Clip Ls		¾"φ	2"	Plain Bolts	

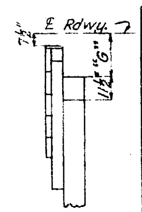
* 2 Washers plus washers for fi[illegible] required for alignment of railposts.



HALF ELEVATION OF END BENT

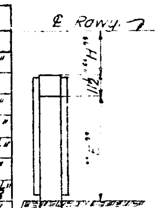


HALF PLAN OF END BENT



SPAN "S"	"G"	"H"
15'-0"	21½"	21¾"
17'-0"	21⅝"	22"
19'-0"	23⅝"	23⅞"
21'-0"	23¾"	2'-0"
23'-0"	23⅞"	2'-0⅛"
25'-0"	2'-1¾"	2'-2"
27'-0"	2'-1⅞"	2'-2⅛"
29'-0"	2'-3¾"	2'-4"
31'-0"	2'-4¾"	2'-5⅛"
33'-0"	2'-4⅞"	2'-5¼"
35'-0"	2'-5"	2'-5⅜"
37'-0"	2'-7⅝"	2'-8⅛"
39'-0"	2'-7¾"	2'-8¼"
41'-0"	2'-7⅞"	2'-8⅝"
43'-0"	2'-7⅞"	2'-8⅝"
45'-0"	2'-10¾"	2'-11½"
47'-0"	2'-11"	2'-11¾"
49'-0"	2'-11"	~~2'-11¾"~~

DIMENSIONS

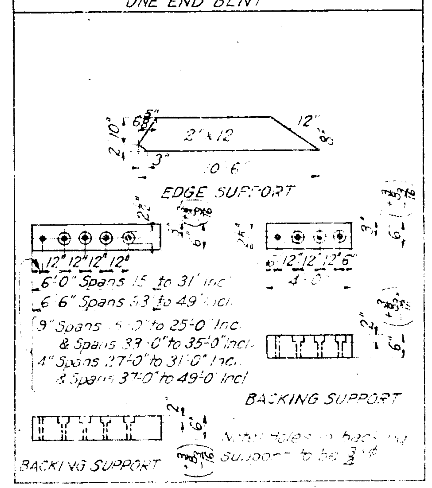


Note: Omit sway bracing when "E" is less than 5'-0".

NAILING SCHEDULE:
Backing plank to supports: 3-30d at each support at splices; 3-30d each side of splice.
Pieces at ends of backwall to backing plank: 4-[illegible]d to each backing plank.

TIMBER FRAMING DIAGRAMS

ONE END BENT



SUBSTRUCTURE TIMBER BILLS

	PIECE	NO. PCS.	SIZE	LENGTH	REMARKS
ONE END BENT	Backing Plank	1	2"x12"	23'-6"	Cut to length
	" "	1	2"x12"	17'-6"	" " "
	" "	1	2"x12"	22'-0"	Cut to length.
	" "	1	2"x12"	16'-0"	" " "
	" "	1	2"x12"	20'-6"	" " "
	" "	1	2"x12"	14'-6"	" " "
	" "	1	2"x12"	19'-0"	" " "
	" "	1	2"x12"	[illegible]	" " "
	" "	1	2"x12"	[illegible]	" " "
	" "	1	2"x12"	[illegible]	" " "
	Shoulder Plank	2	2"x8"	2'-5½"	" " "
	Edge Support	2	2"x12"	10'-6"	Cut to length & shape
	Backing Support Spans 15' to 31' Incl.	4	6"x6"	6'-0"	" " " " "
	Backing Support Spans 33' to 49' Incl.	4	6"x6"	6'-6"	" " " " "
	Backing Support	2	6"x6"	4'-0"	" " " " "
	Backing Support Cap	1	6"x6"	21'-0"	Cut to length
	Pile Cap	1	12"x12"	20'-6"	" " " **
INT. BENTS	Pile Cap		12"x12"	20'-6"	Cut to length **
	Bracing		3"x8"		" " "
	"		3"x8"		" " "
	"		3"x8"		" " "
	"		3"x8"		" " "

Note: Pile caps to be classified as beams and stringers. All other timber to be classified as [illegible] and plank.

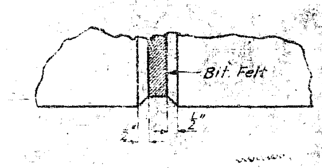
** S2S to exact depth of 11½"

SUBSTRUCTURE HARDWARE BILL

	PIECE	LOCATION	NO. PCS.	SIZE	LENGTH	[illegible] WASHERS	[illegible] WASHERS
[illegible]	Drift Pin	Backing Cap	4	¾"φ	2"		
	" "	[illegible]	4	[illegible]	[illegible]		
	Bolts	Backing Support	4	¾"φ	2[illegible]	[illegible]	[illegible]
	Nails	Backing	[illegible]	30d	4½"		
	Bolts	Backing Support	24	¾"φ	2'-0"	[illegible]	[illegible]
[illegible]	Drift Pin	Pile Cap		¾"φ	2'-[illegible]		
	Bolts §	Bracing		[illegible]	18		
	Bolts §	Bracing		¾"φ	22		

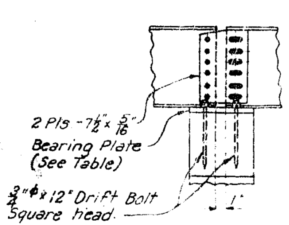
§ [illegible]

Note: [illegible]

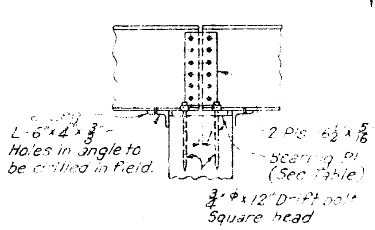


Note: Use bevel as shown for exposed faces of all joints consisting of bituminous felt except at top surface of roadway slab. Use [illegible] surface of [illegible] each side of felt [illegible].

DETAILS OF BEVEL FOR BIT. FELT JOINTS

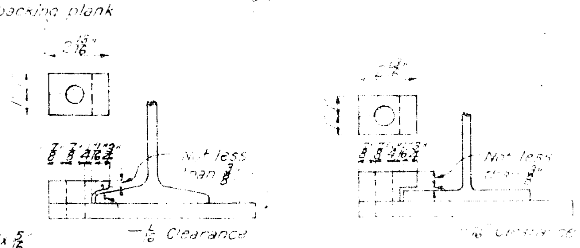


EXPANSION



FIXED

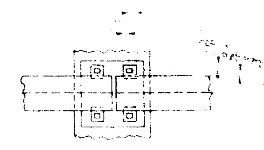
TYPICAL JOINTS OVER INT. BENT



FOR STD. & BETH. BEAMS

FOR CARNEGIE BEAMS

DETAILS OF FLANGE CLAMPS


PLAN OF BEARING PLS.

Note: [illegible] clearance at flange of beam [illegible] for expansion. [illegible] flange clamps [illegible] on each [illegible] beam [illegible] bents.

DETAILS OF BEARING ON PILE CAP

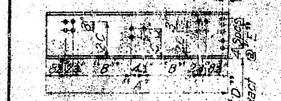
BRIDGE OVER OLD CHANNEL WHITEWATER RIVER
STATE ROAD FROM DRUM TO DELTA
ABOUT 0.7 MILE WEST OF DELTA
PROJECT NO. SN-51 STA. 359+06
CAPE GIRARDEAU COUNTY

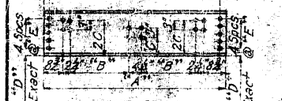
Designed Nov. 1929 By F.W.H.
Drawn Dec. 1930 By R.J.G.
Traced Dec. 1931 By R.J.G.
Checked Dec. 1931 By S.H.M.
Assembled June 1932 By H.E.U.
Checked [illegible] 1932 By [illegible]

S-291

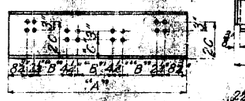
MISSOURI STATE HIGHWAY DEPARTMENT

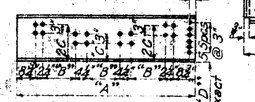
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR		TOTAL SHEETS
	MO	SN-51	19		

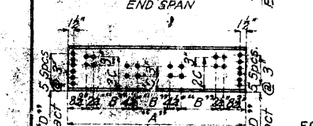




SPANS 15'-0" TO 31'-0" INCL.







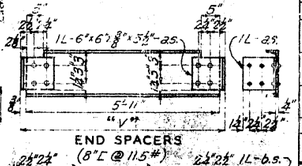
SPANS 33'-0" TO 49'-0" INCL.

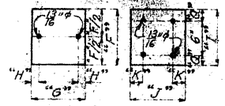
DETAILS OF STRINGERS

Note: Lower Flange of beams to be punched standard gage 8" from end of beams at all Int. Bents except at exp. joints as shown on General Elevation, Sheet No. 1.

TABLE OF SPACERS

SPAN "S"	END SPACERS NO.	END SPACERS "V"	INT. SPACERS NO.	INT. SPACERS "V"
15'-0"	6	5'-11 1/2"	3	5'-11 1/2"
17'-0"	6	5'-11 1/2"	3	5'-11 1/2"
19'-0"	6	5'-11 1/2"	3	5'-11 1/2"
21'-0"	6	5'-11 1/2"	3	5'-11 1/2"
23'-0"	6	5'-11 1/2"	3	5'-11 1/2"
25'-0"	6	5'-11 1/2"	3	5'-11 1/2"
27'-0"	6	5'-11 1/2"	3	5'-11 1/2"
29'-0"	6	5'-11 1/2"	3	5'-11 1/2"
31'-0"	6	5'-11 1/2"	3	5'-11 1/2"
33'-0"	6	5'-11 1/2"	6	5'-11 1/2"
35'-0"	6	5'-11 1/2"	6	5'-11 1/2"
37'-0"	6	5'-11 1/2"	6	5'-11 1/2"
39'-0"	6	5'-11 1/2"	6	5'-11 1/2"
41'-0"	6	5'-11 1/2"	6	5'-11 1/2"
43'-0"	6	5'-11 1/2"	6	5'-11 1/2"
45'-0"	6	5'-11 1/2"	6	5'-11 1/2"
47'-0"	6	5'-11 1/2"	6	5'-11 1/2"
49'-0"	6	5'-11 1/2"	6	5'-11 1/2"

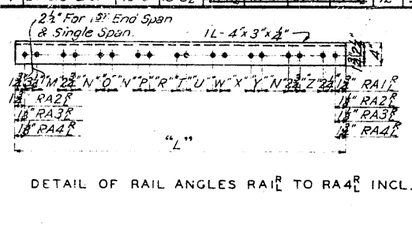




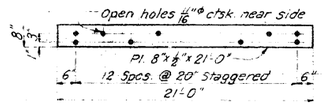
BEARING PLATES

TABLE OF STRINGERS

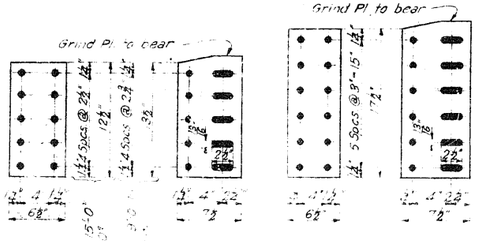
SPAN "S"	NO.	SIZE	SINGLE SPAN "A"	SINGLE SPAN "B"	END SPAN "A"	END SPAN "B"	INT. SPAN "A"	INT. SPAN "B"	"C"	"D"	"E"
15'-0"	4	14 ℄ C.B. @ 30#	15'-8"	6'-8 3/8"	15'-3 1/4"	6'-6 3/8"	14'-11"	6'-4 3/8"	5 1/4"	2"	2 1/2"
17'-0"	4	14 ℄ C.B. @ 33#	17'-3"	7'-8 3/8"	17'-3 1/4"	7'-6 3/8"	16'-11"	7'-4 3/8"	5 1/4"	2"	2 1/2"
19'-0"	—	16 ℄ C.B. @ 37#	19'-3"	8'-8 3/8"	19'-3 1/4"	8'-6 3/8"	18'-11"	8'-4 3/8"	6 1/4"	2 1/2"	2 3/4"
21'-0"	2	15 ℄ C.B. @ 37#	21'-8"	9'-8 3/8"	21'-3 1/4"	9'-6 3/8"	20'-11"	9'-4 3/8"	6 1/4"	2 1/2"	2 3/4"
	2	16 ℄ C.B. @ 40#									
23'-0"	2	16 ℄ C.B. @ 40#	23'-8"	10'-8 3/8"	23'-3 1/4"	10'-6 3/8"	22'-11"	10'-4 3/8"	6 1/4"	2 1/2"	2 3/4"
	2	16 ℄ C.B. @ 45#									
25'-0"	4	18 ℄ C.B. @ 47#	25'-8"	11'-8 3/8"	25'-3 1/4"	11'-6 3/8"	24'-11"	11'-4 3/8"	7 1/4"	3 1/2"	2 3/4"
27'-0"	2	18 ℄ C.B. @ 47#	27'-8"	12'-8 3/8"	27'-3 1/4"	12'-6 3/8"	26'-11"	12'-4 3/8"	7 1/4"	3 1/2"	2 3/4"
	2	18 ℄ C.B. @ 52#									
29'-0"	4	20 ℄ C.B. @ 55#	29'-8"	13'-8 3/8"	29'-3 1/4"	13'-6 3/8"	28'-11"	13'-4 3/8"	8 1/4"	4"	2 3/4"
31'-0"	4	21 ℄ C.B. @ 55#	31'-8"	14'-8 3/8"	31'-3 1/4"	14'-6 3/8"	30'-11"	14'-4 3/8"	9"	5"	2 3/4"
33'-0"	2	20 ℄ C.B. @ 58#	33'-8"	10'-4 5/8"	33'-3 1/4"	10'-3"	32'-11"	10'-1 5/8"	9"	3"	—
	2	21 ℄ C.B. @ 62#									
35'-0"	2	21 ℄ C.B. @ 62#	35'-8"	11'-0 5/8"	35'-3 1/4"	10'-11"	34'-11"	10'-9 5/8"	9"	3"	—
	2	21 ℄ C.B. @ 70#									
37'-0"	4	24 ℄ C.B. @ 70#	37'-8"	11'-9 5/8"	37'-3 1/4"	11'-7"	36'-11"	11'-5 5/8"	10 1/2"	4 1/2"	—
39'-0"	2	24 ℄ C.B. @ 70#	39'-8"	12'-4 5/8"	39'-3 1/4"	12'-3"	38'-11"	12'-1 5/8"	10 1/2"	4 1/2"	—
	2	24 ℄ C.B. @ 74#									
41'-0"	2	24 ℄ C.B. @ 74#	41'-8"	13'-0 5/8"	41'-3 1/4"	12'-11"	40'-11"	12'-9 5/8"	10 1/2"	4 1/2"	—
	2	24 ℄ C.B. @ 81#									
43'-0"	2	24 ℄ C.B. @ 81#	43'-8"	13'-8 5/8"	43'-3 1/4"	13'-7"	42'-11"	13'-5 5/8"	10 1/2"	4 1/2"	—
	2	24 ℄ C.B. @ 85#									
45'-0"	4	27 ℄ C.B. @ 85#	45'-8"	14'-4 5/8"	45'-3 1/4"	14'-3"	44'-11"	14'-1 5/8"	12"	6"	—
47'-0"	4	27 ℄ C.B. @ 85#	47'-8"	15'-0 5/8"	47'-3 1/4"	14'-11"	46'-11"	14'-9 5/8"	12'	6"	—
49'-0"	4	27 ℄ C.B. @ 91#	49'-8"	15'-8 5/8"	49'-3 1/4"	15'-7"	48'-11"	15'-5 5/8"	12'	6"	—



DETAIL OF RAIL ANGLES RAIL TO RA4L INCL.



END BENT CAP PLATE



SPANS 15'-0" TO 31'-0" INCL. SPANS 33'-0" TO 49'-0" INCL.

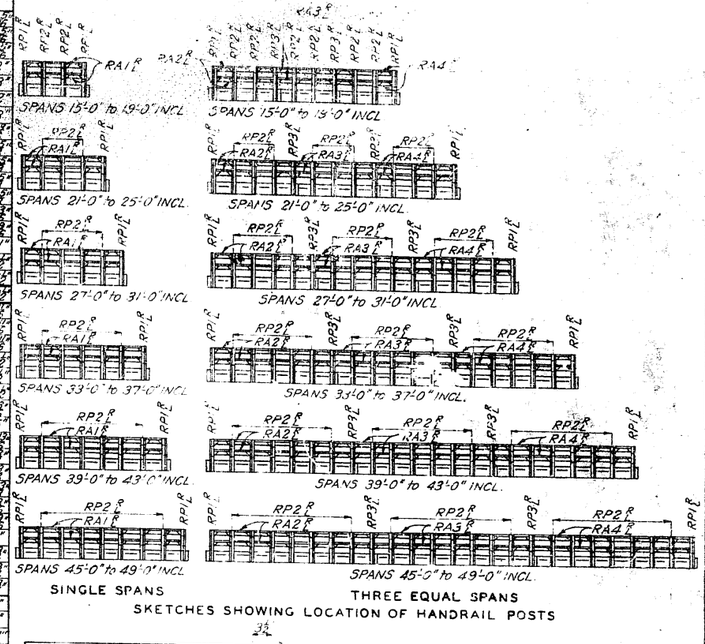
DETAILS OF SPLICE PLATES

TABLE OF BEARING PLATES

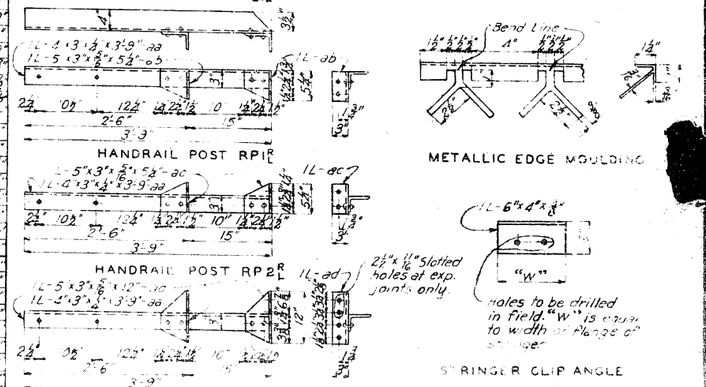
SPAN "S"	NO. PLATES	STRINGER	AT END BENTS THICK.	"E"	"G"	"H"	AT INT. BENTS THICK.	"J"	"K"	"Q"
15'-0"	4	All	3/4"	10"	11"	1 3/8"	3/4"	10"	11"	1 3/8" 2"
17'-0"	4	"	3/4"	10"	12"	1 3/8"	1"	10"	11"	1 3/8" 2"
19'-0"	4	"	3/4"	10"	12"	1 3/8"	1"	10"	12"	1 3/8" 2"
21'-0"	2	Inside	3/4"	10"	12"	1 3/8"	1"	10"	12"	1 3/8" 2"
	2	Outside	3/4"	10"	12"	1 3/8"	1"	10"	12"	1 3/8" 2"
23'-0"	4	All	3/4"	10"	12"	1 3/8"	1"	10"	12"	1 3/8" 2 3/4"
25'-0"	4	"	3/4"	10"	12"	1 3/8"	1"	10"	12"	1 3/8" 2 3/4"
27'-0"	4	"	3/4"	10"	12"	1 3/8"	1"	10"	12"	1 3/8" 2 3/4"
29'-0"	4	"	3/4"	10"	12"	1 3/8"	1"	10"	12"	1 3/8" 2 3/4"
31'-0"	4	"	3/4"	10"	13"	1 3/8"	1"	10"	13"	1 3/8" 2 3/4"
33'-0"	4	"	3/4"	11"	13"	1 3/8"	1"	11"	13"	1 3/8" 2 3/4"
35'-0"	2	"	3/4"	11"	13"	1 3/8"	1"	11"	13"	1 3/8" 2 3/4"
37'-0"	4	"	3/4"	11"	13"	1 3/8"	1"	11"	13"	1 3/8" 2 3/4"
39'-0"	4	"	3/4"	11"	13"	1 3/8"	1"	11"	13"	1 3/8" 2 3/4"
41'-0"	4	"	3/4"	11"	13"	1 3/8"	1"	11"	13"	1 3/8" 2 3/4"
43'-0"	2	Outside	3/4"	11"	14"	1 3/8"	1"	11"	15"	2" 2 3/4"
	2	Inside	3/4"	11"	14"	1 3/8"	1"	11"	15"	1 3/4" 2 3/4"
45'-0"	4	"	3/4"	11"	14"	1 3/8"	1"	11"	15"	1 3/4" 2 3/4"
47'-0"	4	"	3/4"	11"	14"	1 3/8"	1"	11"	16"	2" 2 3/4"
49'-0"	4	All	3/4"	11"	14"	1 3/8"	1"	11"	16"	2" 2 3/4"

TABLE OF RAIL ANGLE DIMENSIONS

	SPAN	MARK	"L"	"M"	"V"	"O"	"P"	"R"	"T"	"U"	"W"	"X"	"Y"	"Z"
FIRST END SPAN	15'-0"	RA1	16'-7 1/8"	5'-0 5/8"	0	0	0	0	0	5'-5 3/8"	0	0	0	5'-0 5/8"
	17'-0"	"	18'-7 1/8"	5'-5 5/8"	0	0	0	0	0	5'-10 3/8"	0	0	0	5'-5 5/8"
	19'-0"	"	20'-7 1/8"	5'-10 5/8"	0	0	0	0	0	6'-3 3/8"	0	0	0	5'-10 5/8"
	21'-0"	"	22'-7 1/8"	6'-3"	0	0	0	5'-5 3/8"	2 1/2"	6'-7 3/8"	0	0	0	6'-3"
	23'-0"	"	24'-7 1/8"	6'-7 3/8"	0	0	0	5'-10 1/8"	2 1/2"	6'-11 3/8"	0	0	0	6'-7 3/8"
	25'-0"	"	26'-7 1/8"	6'-11 3/8"	0	0	0	6'-2 5/8"	2 1/2"	7'-3 3/8"	0	0	0	6'-11 3/8"
	27'-0"	"	28'-7 1/8"	7'-3 3/8"	0	0	0	6'-7 1/8"	2 1/2"	7'-7 3/8"	0	0	0	7'-3 3/8"
	29'-0"	"	30'-7 1/8"	7'-7 3/8"	0	0	0	6'-11 5/8"	2 1/2"	8'-0 3/8"	0	0	0	7'-7 3/8"
	31'-0"	"	32'-7 1/8"	8'-0 3/8"	0	0	0	7'-4 1/8"	2 1/2"	8'-4 3/8"	0	0	0	8'-0 3/8"
	33'-0"	"	34'-7 1/8"	8'-4 3/8"	5'-5 1/8"	2 1/2"	0	0	0	0	2 1/2"	5'-0 1/8"	2 1/2"	8'-4 3/8"
	35'-0"	"	36'-7 1/8"	8'-7 3/8"	5'-9 1/8"	2 1/2"	0	0	0	0	2 1/2"	6'-0 1/8"	2 1/2"	8'-7 3/8"
	37'-0"	"	38'-7 1/8"	9'-1 3/8"	6'-1 1/8"	2 1/2"	0	0	0	0	2 1/2"	6'-4 1/8"	2 1/2"	9'-1 3/8"
	39'-0"	"	40'-7 1/8"	9'-4 3/8"	5'-6 3/8"	2 1/2"	0	0	2 1/2"	5'-9 1/8"	2 1/2"	5'-6 3/8"	2 1/2"	9'-4 3/8"
	41'-0"	"	42'-7 1/8"	9'-7 3/8"	5'-9 3/8"	2 1/2"	0	0	2 1/2"	6'-0 1/8"	2 1/2"	5'-9 3/8"	2 1/2"	9'-7 3/8"
	43'-0"	"	44'-7 1/8"	9'-11"	6'-1 3/8"	2 1/2"	0	0	2 1/2"	6'-4 1/8"	2 1/2"	6'-1 3/8"	2 1/2"	9'-11"
	45'-0"	"	46'-7 1/8"	9'-4 5/8"	5'-6 3/8"	2 1/2"	2 1/2"	5'-6 3/8"	2 1/2"	5'-9 1/8"	2 1/2"	5'-6 3/8"	2 1/2"	9'-4 5/8"
	47'-0"	"	48'-7 1/8"	9'-7 3/8"	5'-9 3/8"	2 1/2"	2 1/2"	5'-9 3/8"	2 1/2"	6'-0 1/8"	2 1/2"	5'-9 3/8"	2 1/2"	9'-7 3/8"
	49'-0"	"	50'-7 1/8"	9'-10 5/8"	6'-0 3/8"	2 1/2"	2 1/2"	6'-0 3/8"	2 1/2"	6'-3 5/8"	2 1/2"	6'-0 3/8"	2 1/2"	9'-10 5/8"
	15'-0"	RA2	15'-4 3/8"	4'-7 11/16"	0	0	0	0	0	5'-0 5/8"	0	0	0	4'-7 11/16"
	17'-0"	"	17'-4 3/8"	5'-3 11/16"	0	0	0	0	0	5'-8 5/8"	0	0	0	5'-3 11/16"
	19'-0"	"	19'-4 3/8"	5'-11 11/16"	0	0	0	0	0	6'-4 5/8"	0	0	0	5'-11 11/16"
	21'-0"	"	21'-4 3/8"	6'-4 11/16"	0	0	0	5'-0 3/8"	2 1/2"	5'-3 5/8"	0	0	0	6'-4 11/16"
	23'-0"	"	23'-4 3/8"	6'-8 11/16"	0	0	0	5'-5 3/8"	2 1/2"	5'-9 5/8"	0	0	0	6'-8 11/16"
	25'-0"	"	25'-4 3/8"	7'-0 11/16"	0	0	0	5'-10 1/8"	2 1/2"	6'-3 5/8"	0	0	0	7'-0 11/16"
	27'-0"	"	27'-4 3/8"	7'-4 11/16"	0	0	0	6'-2 7/8"	2 1/2"	6'-7 5/8"	0	0	0	7'-4 11/16"
	29'-0"	"	29'-4 3/8"	7'-8 11/16"	0	0	0	6'-7 3/8"	2 1/2"	7'-0 5/8"	0	0	0	7'-8 11/16"
	31'-0"	"	31'-4 3/8"	8'-0 11/16"	0	0	0	6'-10 1/16"	2 1/2"	6'-2 5/8"	2 1/2"	5'-6 3/8"	2 1/2"	8'-0 11/16"
	33'-0"	"	33'-4 3/8"	8'-4 11/16"	5'-5 3/8"	2 1/2"	0	0	0	0	2 1/2"	5'-0 1/8"	2 1/2"	8'-4 11/16"
	35'-0"	"	35'-4 3/8"	8'-7 11/16"	5'-9 3/8"	2 1/2"	0	0	0	0	2 1/2"	5'-10 1/8"	2 1/2"	8'-7 11/16"
	37'-0"	"	37'-4 3/8"	9'-1 11/16"	6'-1 3/8"	2 1/2"	0	0	0	0	2 1/2"	6'-4 1/8"	2 1/2"	9'-1 11/16"
	39'-0"	"	39'-4 3/8"	9'-4 11/16"	5'-6 3/8"	2 1/2"	0	0	2 1/2"	5'-9 1/8"	2 1/2"	5'-6 3/8"	2 1/2"	9'-4 11/16"
	41'-0"	"	41'-4 3/8"	9'-7 11/16"	5'-9 3/8"	2 1/2"	0	0	2 1/2"	6'-0 1/8"	2 1/2"	5'-9 3/8"	2 1/2"	9'-7 11/16"
	43'-0"	"	43'-4 3/8"	9'-11"	6'-1 3/8"	2 1/2"	0	0	2 1/2"	6'-4 1/8"	2 1/2"	6'-1 3/8"	2 1/2"	9'-11"
	45'-0"	"	45'-4 3/8"	9'-4 5/8"	5'-6 3/8"	2 1/2"	2 1/2"	5'-6 3/8"	2 1/2"	5'-9 1/8"	2 1/2"	5'-6 3/8"	2 1/2"	9'-4 5/8"
	47'-0"	"	47'-4 3/8"	9'-7 3/8"	5'-9 3/8"	2 1/2"	2 1/2"	5'-9 3/8"	2 1/2"	6'-0 1/8"	2 1/2"	5'-9 3/8"	2 1/2"	9'-7 3/8"
	49'-0"	"	49'-4 3/8"	9'-10 5/8"	6'-0 3/8"	2 1/2"	2 1/2"	6'-0 3/8"	2 1/2"	6'-3 5/8"	2 1/2"	6'-0 3/8"	2 1/2"	9'-10 5/8"
ALL INT. SPANS	15'-0"	RA3	14'-11"	4'-5 5/8"	0	0	0	0	0	4'-9 3/8"	0	0	0	4'-5 5/8"
	17'-0"	"	16'-11"	5'-1 5/8"	0	0	0	0	0	5'-5 3/8"	0	0	0	5'-1 5/8"
	19'-0"	"	18'-11"	5'-9 5/8"	0	0	0	0	0	6'-1 3/8"	0	0	0	5'-9 5/8"
	21'-0"	"	20'-11"	6'-1 5/8"	0	0	0	5'-0 3/8"	2 1/2"	5'-5 3/8"	0	0	0	6'-1 5/8"
	23'-0"	"	22'-11"	6'-5 5/8"	0	0	0	5'-5 3/8"	2 1/2"	5'-9 3/8"	0	0	0	6'-5 5/8"
	25'-0"	"	24'-11"	6'-9 5/8"	0	0	0	5'-9 3/8"	2 1/2"	6'-1 3/8"	0	0	0	6'-9 5/8"
	27'-0"	"	26'-11"	7'-1 5/8"	0	0	0	6'-1 3/8"	2 1/2"	6'-5 3/8"	0	0	0	7'-1 5/8"
	29'-0"	"	28'-11"	7'-5 5/8"	0	0	0	6'-5 3/8"	2 1/2"	6'-9 3/8"	0	0	0	7'-5 5/8"
	31'-0"	"	30'-11"	7'-9 5/8"	0	0	0	6'-9 3/8"	2 1/2"	7'-1 3/8"	0	0	0	7'-9 5/8"
	33'-0"	"	32'-11"	8'-1 5/8"	5'-5 3/8"	2 1/2"	0	0	0	0	2 1/2"	5'-0 1/8"	2 1/2"	8'-1 5/8"
	35'-0"	"	34'-11"	8'-5 5/8"	5'-9 3/8"	2 1/2"	0	0	0	0	2 1/2"	5'-10 1/8"	2 1/2"	8'-5 5/8"
	37'-0"	"	36'-11"	8'-9 5/8"	6'-1 3/8"	2 1/2"	0	0	0	0	2 1/2"	6'-4 1/8"	2 1/2"	8'-9 5/8"
	39'-0"	"	38'-11"	9'-0 5/8"	5'-6 3/8"	2 1/2"	0	0	2 1/2"	5'-9 1/8"	2 1/2"	5'-6 3/8"	2 1/2"	9'-0 5/8"
	41'-0"	"	40'-11"	9'-5 5/8"	5'-9 3/8"	2 1/2"	0	0	2 1/2"	6'-0 1/8"	2 1/2"	5'-9 3/8"	2 1/2"	9'-5 5/8"
	43'-0"	"	42'-11"	9'-9 5/8"	6'-1 3/8"	2 1/2"	0	0	2 1/2"	6'-4 1/8"	2 1/2"	6'-1 3/8"	2 1/2"	9'-9 5/8"
	45'-0"	"	44'-11"	9'-4 5/8"	5'-6 3/8"	2 1/2"	2 1/2"	5'-6 3/8"	2 1/2"	5'-9 1/8"	2 1/2"	5'-6 3/8"	2 1/2"	9'-4 5/8"
	47'-0"	"	46'-11"	9'-7 3/8"	5'-9 3/8"	2 1/2"	2 1/2"	5'-9 3/8"	2 1/2"	6'-0 1/8"	2 1/2"	5'-9 3/8"	2 1/2"	9'-7 3/8"
	49'-0"	"	48'-11"	9'-10 5/8"	6'-0 3/8"	2 1/2"	2 1/2"	6'-0 3/8"	2 1/2"	6'-3 5/8"	2 1/2"	6'-0 3/8"	2 1/2"	9'-10 5/8"
	15'-0"	RA4	16'-8 3/8"	4'-7 5/8"	0	0	0	0	0	5'-0 5/8"	0	0	0	4'-11 5/8"
	17'-0"	"	18'-8 3/8"	5'-3 5/8"	0	0	0	0	0	5'-8 5/8"	0	0	0	5'-7 5/8"
	19'-0"	"	20'-8 3/8"	5'-11 5/8"	0	0	0	0	0	6'-4 5/8"	0	0	0	6'-3 5/8"
	21'-0"	"	22'-8 3/8"	6'-4 5/8"	0	0	0	5'-3 3/8"	2 1/2"	5'-7 5/8"	0	0	0	5'-11 5/8"
	23'-0"	"	24'-8 3/8"	6'-8 5/8"	0	0	0	5'-7 3/8"	2 1/2"	6'-1 5/8"	0	0	0	6'-7 5/8"
	25'-0"	"	26'-8 3/8"	7'-0 5/8"	0	0	0	6'-3 3/8"	2 1/2"	6'-7 5/8"	0	0	0	7'-0 5/8"
	27'-0"	"	28'-8 3/8"	7'-4 5/8"	0	0	0	6'-7 1/8"	2 1/2"	7'-0 5/8"	0	0	0	7'-4 5/8"
	29'-0"	"	30'-8 3/8"	7'-8 5/8"	0	0	0	6'-11 5/8"	2 1/2"	7'-4 5/8"	0	0	0	7'-8 5/8"
	31'-0"	"	32'-8 3/8"	8'-0 5/8"	0	0	0	7'-4 1/8"	2 1/2"	7'-8 5/8"	0	0	0	8'-0 5/8"
	33'-0"	"	34'-8 3/8"	8'-4 5/8"	5'-5 3/8"	2 1/2"	0	0	0	0	2 1/2"	5'-0 1/8"	2 1/2"	8'-4 5/8"
	35'-0"	"	36'-8 3/8"	8'-7 5/8"	5'-9 3/8"	2 1/2"	0	0	0	0	2 1/2"	5'-10 1/8"	2 1/2"	8'-7 5/8"
	37'-0"	"	38'-8 3/8"	9'-1 5/8"	6'-1 3/8"	2 1/2"	0	0	0	0	2 1/2"	6'-4 1/8"	2 1/2"	9'-1 5/8"
	39'-0"	"	40'-8 3/8"	9'-4 5/8"	5'-6 3/8"	2 1/2"	0	0	2 1/2"	5'-9 1/8"	2 1/2"	5'-6 3/8"	2 1/2"	9'-4 5/8"
	41'-0"	"	42'-8 3/8"	9'-7 5/8"	5'-9 3/8"	2 1/2"	0	0	2 1/2"	6'-0 1/8"	2 1/2"	5'-9 3/8"	2 1/2"	9'-7 5/8"
	43'-0"	"	44'-8 3/8"	9'-11"	6'-1 3/8"	2 1/2"	0	0	2 1/2"	6'-4 1/8"	2 1/2"	6'-1 3/8"	2 1/2"	9'-11"
	45'-0"	"	46'-8 3/8"	9'-4 5/8"	5'-6 3/8"	2 1/2"	2 1/2"	5'-6 3/8"	2 1/2"	5'-9 1/8"	2 1/2"	5'-6 3/8"	2 1/2"	9'-4 5/8"
	47'-0"	"	48'-8 3/8"	9'-7 3/8"	5'-9 3/8"	2 1/2"	2 1/2"	5'-9 3/8"	2 1/2"	6'-0 1/8"	2 1/2"	5'-9 3/8"	2 1/2"	9'-7 3/8"
	49'-0"	"	50'-8 3/8"	9'-10 5/8"	6'-0 3/8"	2 1/2"	2 1/2"	6'-0 3/8"	2 1/2"	6'-3 5/8"	2 1/2"	6'-0 3/8"	2 1/2"	9'-10 5/8"



SKETCHES SHOWING LOCATION OF HANDRAIL POSTS



BRIDGE OVER OLD CHANNEL WHITEWATER RIVER

STATE ROAD FROM DRUM TO DELTA

ABOUT 0.7 MILE WEST OF DELTA

PROJECT NO. SN-51 STA. 359+06

CAPE GIRARDEAU, COUNTY

Designed Nov. 1929 By E.W.H
Drawn Dec. 1930 By R.J.G
Traced Dec. 1931 By R.J.G
Checked Dec. 1931 By JMM

Assembled June 1932 By H.E.U
Checked July 1932 By JMM

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