Public Services and Procurement Canada

Requisition No: EZ899-210470/A

DRAWINGS & SPECIFICATIONS
for
Strengthening Design, Lower Liard River Bridge, km 763.3

Alaska Highway, British Columbia

Project No. R.017173.355 **May 15, 2020**

APPROVED BY:

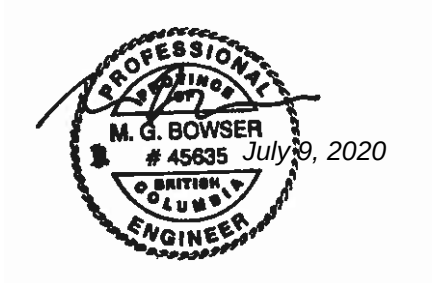
Regional Manager	**Date**
Construction Safety Coordinator	**Date**

TENDER:

Project Manager	**Date**

Real Property Services Branch, Professional and Technical Services, Pacific Region
Room 219 - 800 Burrard Street, Vancouver, B.C., V6Z 0B9

Specification



July 9, 2020

LIST OF DRAWINGS

Drawing Number	Drawing Title
01 of 14	General Layout and Notes
02 to 14 of 14	Section Details for Strengthening

LIST OF APPENDICES

A. Bridge Strengthening Drawings Dated Feb. 1974
B. Original Drawings Dated Jan. 1943
C. Preliminary Hazard Assessment Form
D. Confirmation of Prime Contractor's Main Responsibilities Under Worksafe BC
E. Environmental Protection Plan (EPP) Checklist

END OF SECTION

PART 1 - GENERAL

1.1 Codes, Bylaws, Standards

.1 Perform work to current Codes, Construction Standards and Bylaws, including Amendments up to the TENDER closing date.

.2 Perform work in accordance with the National Building Code of Canada (NBC) 2015, the Canadian Highway Bridge Design Code CAN/CSA S6-14, and other indicated Codes, Construction Standards, and/or any other Code or Bylaw of local application.

.3 Comply with applicable local bylaws, rules and regulations enforced at the location concerned.

.4 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.

.5 In any case of conflict or discrepancy, the most stringent requirements shall apply.

1.2 Contract Documents

.1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of Work.

.2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.

1.3 Other Contracts

.1 Further Contracts may be awarded while this contract is in progress. It is recommended that the Bidder visit the site prior to submission of tender to satisfy himself/herself of the nature of site conditions and the extent of work required.

.2 The Contractor shall confirm onsite all dimensions required for fabrication and dimensions shown on the Contract Drawings prior to the preparation of shop and fabrication.

.3 Cooperate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative.

.4 Coordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to the Departmental Representative, in writing, any defects which may interfere with proper execution of this Work.

1.4 Division of Specifications

.1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.

.2 A division may consist of the work of more than 1 subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.

.3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

1.5 Time of Completion

.1 All work under this Contract shall be complete within 18 weeks after award.

.2 All work under this Contract must be completed in accordance with the requirements specified in Section 1.9 Work Schedule.

1.6 Summary of work

.1 The work should be represented as:
Strengthening Design, Lower Liard River Bridge, km 763.3, Alaska Highway, British Columbia

.2 Work under this contract consists of:

.1 Strengthening Design, Lower Liard River Bridge, km 763.3.

.3 Other requirements:

.1 Traffic accommodation.

.2 Environment management.

.4 Unless specifically stated otherwise, the Work is to include the furnishing of all labour, materials, equipment, and services necessary to complete the Work. The intent is that the Contractor provides a complete Job.

1.7 Contractor's Responsibility

.1 Give all required Notices and comply with all local, provincial, and federal laws, bylaws, ordinances, rules, regulations, codes, and orders relating to the Work which are or come in force during the Performance of the Work.

.2 Coordinate all the Work and provide all labour, materials, equipment, and services necessary for delivery, storage, handling, protection, installation, removal, inspection, and replacement or maintenance as required to provide a complete Project.

1.8 Hours of Work

.1 Restrictive as follows:

.1 Notify Departmental Representative of all after hours work, including weekends and holidays

1.9 Work Schedule

.1 Carry on work as follows:

.1 Within 10 working days after Contract award, provide a "phasing bar chart" and a schedule showing anticipated progress stages and final completion of the Work within the time period required by the Contract documents. Indicate the following:

.1 Submission of shop drawings, product data, MSDS sheets, and samples.

.2 Commencement and completion of Work of each section of the specifications or drawings as outlined.

.3 Final completion date within the time period required by the Contract documents.

.2 No changes shall be made to the approved Schedule without prior authorization from the Departmental Representative.

.3 Interim reviews of work based on the schedule will be conducted as decided by Departmental Representative and the schedule shall be updated by the Contractor throughout the duration of the Contract to reflect actual progress of the work

1.10 Cost Breakdown

.1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail as directed by the Departmental Representative and aggregating the total Contract price.

1.11 Documents Required

.1 Maintain 1 copy each of the following at the job site:

.1 Contract drawings.
.2 Contract specifications.
.3 Addenda to Contract documents.
.4 Copy of approved work schedule.
.5 Change orders.
.6 Other modifications to Contract.
.7 Field test reports.
.8 Reviewed/approved samples.
.9 Manufacturers' installation and application instructions.
.10 One set of record drawings and specifications for "as-built" purposes.
.11 Current construction standards of workmanship listed in technical Sections.

.12 Project Safety Plan / Traffic Control Plan.

1.12 Regulatory Requirements

.1 Obtain and pay for Building Permit, Certificates, Licenses, and other permits required by regulatory municipal, provincial or federal authorities to complete the work.

.2 Provide inspection authorities with plans and information required for issue of acceptance certificates.

.3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

1.13 Contractor's Use of Site

.1 Use of site:

.1 Exclusive and complete for execution of work.

.2 Assume responsibility for assigned premises for performance of this work.

.3 Be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative.

.2 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.

.3 Do not unreasonably encumber site with material or equipment

1.14 Examination

.1 Examine site and be familiar and conversant with existing conditions likely to affect work.

.2 Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.

1.15 Existing Services

.1 Where work involves breaking into or connecting to existing services, carry out work at times directed by the authorities having jurisdiction.

1.16 Location of Equipment and Fixtures

.1 Location of equipment, fixtures, and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures, and distribution systems to provide minimum interference and maximum usable space, and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain his approval for actual location.

.4 Submit field drawings or shop drawings to indicate the relative position of various services and equipment when required by the Departmental Representative and/or as specified.

1.17 Cutting and Patching

.1 Cut existing surfaces only as required to accommodate new work and as directed by the Departmental Representative.

.2 Remove items so shown or specified.

.3 Do not cut, bore, or sleeve load-bearing members unless instructed to do so by the drawings and/or specifications.

.4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

.5 Fit work airtight to pipes, sleeves, ducts and conduits.

.6 Patch and make good surfaces cut, damaged or disturbed, to Departmental Representative's approval. Match existing material, color, finish and texture.

.7 Making good is defined as matching construction and finishing materials and the adjacent surfaces such that there is no visible difference between existing and new surfaces when viewed from 1.5 metres in ambient light, and includes painting the whole surface to the next change in plane.

1.18 Setting Out Work

.1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.2 Assume full responsibility for dimensions, spacings, overall fit with field components, and exact locations of bolt holes and their spacings.

.3 Provide devices needed to lay out and construct work.

.4 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.

1.19 Quality of Work

.1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.

.2 The workmanship, erection methods, and procedures to meet minimum standards set out in the applicable codes and standards.

.3 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative, whose decision is final.

1.20 Works Coordination

.1 Coordinate work of subtrades:

.1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.

.2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.

.1 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.

.2 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.

.1 Identify on coordination drawings, structural elements, services lines, rough-in points, and indicate location of services entrance to site.

.3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.

.4 Record and distribute minutes of each meeting.

.5 Plan and coordinate work in such a way to minimize quantity of service line offsets.

.6 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.

.7 Coordinate and plan for all necessary road/lane closures ahead of time.

.3 Submit shop drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.

.4 Work cooperation:

.1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial

interference.

.2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching, and removal or replacement of completed work.

.3 Ensure disputes between subcontractors are resolved.

.5 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.

.6 Maintain efficient and continuous supervision.

1.21 Approval of Product Data and Samples

.1 In accordance with Section 01 33 00 – Submittal Procedures, submit the requested product data, MSDS sheets, and samples indicated in each of the technical Sections.

.2 Allow sufficient time for the following:

.1 Review of product data.
.2 Review of re-submission.
.3 Ordering of approved material and/or products.

1.22 Project Meetings

.1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

1.23 Testing and Inspections

.1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative are specified in Section 01 45 00 – Quality Control.

.2 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified, and where required for the following:

.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

.2 Inspection and testing performed exclusively for Contractor's convenience.

.3 Tests specified to be carried out by the Contractor under the Departmental Representative's supervision.

.3 Where tests or inspections by a designated testing laboratory

reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Departmental Representative may require to verify acceptability of corrected work.

.4 Contractor shall notify Departmental Representative in advance of planned testing.

.5 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.6 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.

.7 The Departmental Representative may require, and pay for, additional inspection and testing services not included here (Clause 1.23).

.8 Provide Departmental Representative with 2 copies of testing laboratory reports and mill tests and certificates of compliance as soon as they are available.

1.24 As-Built Documents

.1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications, and 2 copies of the original AutoCAD files for use by the Contractor in order for the Contractor to prepare the "as-built" drawings.

.2 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings, and shop drawings as changes occur.

1.25 Cleaning

.1 Conduct daily cleaning and disposal operations. Comply with local ordinances and anti-pollution laws.

1.26 Environmental Protection

.1 Refer to section 01 35 43 – Environmental Protection for additional requirements.

.2 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.

.3 Ensure proper disposal procedures in accordance with all applicable territorial regulations.

1.27 Additional Drawings

.1 The Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.

.2 Upon request, Departmental Representative may furnish up to a maximum of 6 sets of Contract documents for use by the Contractor at no additional cost. Should more than 6 sets of documents be required the Departmental Representative will provide them at additional cost.

1.28 System of Measurement

.1 The metric system of measurement (SI) will be employed on this Contract.

1.29 Familiarization with Site

.1 Before submitting tender, visit the Project site to become familiar with all conditions likely to affect the cost of the Work.

1.30 Submission of Tender

.1 Submission of a tender is deemed to be confirmation of the fact that the Tenderer has analyzed the Contract documents and inspected the site and is fully conversant with all conditions.

END OF SECTION

PART 1.0 - GENERAL

1.1 Mobilization and Demobilization

.1 Payment of 25% of the Lump Sum shall be authorized when the Contractor has provided a Construction Schedule and Work onsite has commenced to the satisfaction of the Departmental Representative. Payment of 60% of the Lump Sum shall be made as a series of monthly payments, calculated on the basis of the expected schedule. If the Work falls behind or gets ahead of schedule, these payments will be adjusted accordingly. Payment of the remaining 15% shall be authorized when the Work is completed, and the site is cleaned-up to the satisfaction of the Departmental Representative.

.2 Payment of only 10% of the total tender price shall be scheduled as outlined above if the amount bid for mobilization and demobilization is greater than 10%. Payment of the remainder of the amount shall be authorized when the site is cleaned to the satisfaction of the Departmental Representative.

1.2 Traffic Control

.1 Payment for Traffic Control shall be considered incidental to the Work and no additional or separate payment will be made.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Coordination of Work with work by others under administration of Departmental Representative.

.2 Scheduled preconstruction and progress meetings.

1.2 Description

.1 Coordination of progress schedules, submittals, use of sites, temporary utilities, construction facilities, and construction Work, with progress of work by others under instructions of Departmental Representative.

1.3 Construction Progress Meetings and Project Meetings

.1 The Departmental Representative will schedule and administer project meetings as deemed necessary throughout progress of the Work.

.2 Agenda to include, but not limited to, the following:

- .1 Review and approval of minutes of previous meeting.
- .2 Review of Work progress since previous meeting.
- .3 Field observations, problems, conflicts.
- .4 Problems that impede construction schedule.
- .5 Review of off-site fabrication delivery schedules.
- .6 Corrective measures and procedures to regain projected schedule.
- .7 Revision to construction schedule.
- .8 Progress schedule, during succeeding work period.
- .9 Review submittal schedules: expedite as required.
- .10 Maintenance of quality standards.
- .11 Review proposed changes for affect on construction schedule and on completion date.
- .12 Other business.

.3 The Contractor shall provide physical space and make arrangements for meetings.

.4 The Departmental Representative will record minutes, including significant proceedings and decisions, identify action by parties, and set time and date for next progress meeting.

.5 The Departmental Representative will reproduce and distribute copies of minutes within three (3) working days after each meeting and transmit to meeting participants, affected parties not in attendance, and Contractor.

1.4 Construction Organization and Start-up

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representatives and senior representatives of the Contractor, major Subcontractors (if applicable), field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Agenda to include, but not limited to, the following:

- .1 Site specific health and safety requirements
- .2 Appointment of official representative of participants in Work.
- .3 Schedule of Work, progress scheduling in accordance with Section 01 32 17 - Construction Progress and Reporting.
- .4 Schedule of submission of shop drawings, samples, colour chips, etc. in accordance with Section 01 33 00 - Submittal Procedures.
- .5 Requirements for temporary facilities, storage sheds, utilities, etc. in accordance with Section 01 51 00 - Temporary Utilities.
- .6 Delivery schedule of specified equipment in accordance with Section 01 32 17 - Construction Progress and Reporting.
- .7 Site security in accordance with Section 01 52 00 - Construction Facilities.
- .8 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
- .9 Take-over procedures, acceptance, and warranties in accordance with Section 01 77 00 - Closeout Procedures.
- .10 Monthly progress claims, administrative procedures, photographs, and holdbacks.
- .11 Appointment of inspection and testing agencies or firms in accordance with Section 01 45 00 - Quality Control.
- .12 Insurances and transcript of policies.
- .13 Other business.

.5 Comply with Departmental Representative's allocation of mobilization areas of sites; for field offices and sheds, construction camp(s) and camp utilities, access, traffic, and parking facilities.

.6 During construction, coordinate use of sites and facilities with Departmental Representative.

.7 Comply with instructions of Departmental Representative for use of temporary utilities and construction facilities.

1.5 Schedules

.1 Submit preliminary construction progress schedule in accordance with Section 01 32 17 - Construction Progress and Reporting to Departmental Representative coordinated with Departmental Representative's project schedule.

.2 After review, revise and resubmit schedule to comply with revised project schedule.

.3 During progress of Work revise and resubmit as directed by Departmental Representative.

1.6 Submittals

.1 Submit requests for payment for review, and for transmittal to Departmental Representative.

.2 Submit requests for interpretation of Contract Documents, and obtain instructions through Departmental Representative.

.3 Process substitutions through Departmental Representative.

.4 Process change orders through Departmental Representative.

.5 Deliver closeout submittals for review and preliminary inspections, for transmittal to Departmental Representative.

1.7 Closeout Procedures

.1 Notify Departmental Representative when Work is considered ready for Substantial Performance, in accordance with Section 01 77 00 – Closeout Procedures.

.2 Accompany Departmental Representative on preliminary inspection to determine items listed for completion or correction.

.3 Comply with Departmental Representative's instructions for correction of items of Work listed in executed certificate of Substantial Performance.

.4 Notify Departmental Representative of instructions for completion of items of Work determined in Departmental Representative's final inspection.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Schedule, form, and content.

.2 Staged construction.

.3 Scheduled revisions.

.4 Critical path scheduling.

1.2 Definitions

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Actual Finish Date (AF): point in time that Work actually ended on activity.

.3 Actual Start Date (AS): point in time that Work actually started on activity.

.4 Bar Chart (Gantt chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars.

.5 Baseline: original approved plan (for Project, work package, or activity), plus or minus approved scope changes.

.6 Completion Milestones: they are firstly Substantial Completion and secondly Final Certificate.

.7 Constraint: applicable restriction that will affect performance of Project. Factors that affect activities can be scheduled.

.8 Control: process of comparing actual performance with planned performance, analyzing variances, evaluating possible alternatives, and taking appropriate corrective action as needed.

.9 Critical Activity: any activity on a critical path. Most commonly determined by using critical path method.

.10 Critical Path: series of activities that determines duration of Project. In deterministic model, critical path is usually defined as those activities with float less than or equal to specified value, often zero. It is longest path through Project.

.11 Critical Path Method (CPM): network analysis technique used to

predict Project duration by analyzing which sequence of activities (which path) has least amount of scheduling flexibility (least amount of float).

.12 Data Date (DD): date at which, or up to which, Project's reporting system has provided actual status and accomplishments.

.13 Duration (DU): number of work periods (not including holidays or other non-working periods) required to complete activity or other Project element. Usually expressed as workdays or work weeks.

.14 Early Finish Date (EF): in critical path method, earliest possible point in time on which uncompleted portions of activity (or Project) can finish, based on network logic and schedule constraints. Early finish dates can change as Project progresses and changes are made to Project plan.

.15 Early Start Date (ES): in critical path method, earliest possible point in time on which uncompleted portions of activity (or Project) can start, based on network logic and schedule constraints. Early start dates can change as Project progresses and changes are made to Project Plan.

.16 Finish Date: point in time associated with activity's completion. Usually qualified by one of following: actual, planned, estimated, scheduled, early, late, baseline, target, or current.

.17 Float: amount of time that activity may be delayed from its early start without delaying Project finish date. Float is mathematical calculation, and can change as Project progresses and changes are made to Project plan. This resource is available to both PSPC and Contractor.

.18 Lag: modification of logical relationship that directs delay in successor task.

.19 Late Finish Date (LF): in critical path method, latest possible point in time that activity may be completed without delaying specified milestone (usually Project finish date).

.20 Late Start Date (LS): in critical path method, latest possible point in time that activity may begin without delaying specified milestone (usually Project finish date).

.21 Lead: modification of logical relationship that allows acceleration of successor task.

.22 Logic Diagram: see Project network diagram.

.23 Master Plan: summary-level schedule that identifies major activities and key milestones.

.24 Milestone: significant event in Project, usually completion of major deliverable.

.25 Monitoring: capture, analysis, and reporting of Project performance, usually as compared to plan.

.26 Near-Critical Activity: activity that has low total float.

.27 Non-Critical Activities: activities which when delayed, do not affect specified Contract duration.

.28 Project Control System: fully computerized system utilizing commercially available software packages.

.29 Project Network Diagram: schematic display of logical relationships of Project activities. Always drawn from left to right to reflect Project chronology.

.30 Project Plan: formal, approved document used to guide both Project execution and Project control. Primary uses of Project plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved scope, cost, and schedule baselines. Project plan may be summary or detailed.

.31 Project Planning: development and maintenance of Project Plan.

.32 Project Planning, Monitoring, and Control System: overall system operated by Departmental Representative to enable monitoring of Project Work in relation to established milestones.

.33 Project Schedule: planned dates for performing activities and planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy project objectives. Monitoring and control process involves using project schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.34 Quantified Days Duration: working days based on 5 day work week, discounting statutory holidays.

.35 Risk: uncertain event or condition that, if it occurs, has positive or negative effect on Project's objectives.

.36 Scheduled Finish Date (SF): point in time that Work was scheduled to finish on activity. Scheduled finish date is normally within range of dates delimited by early finish date and late finish date.

.37 Scheduled Start Date (SS): point in time that Work was scheduled to start on activity. Scheduled start date is normally within range of dates delimited by early start date and late start date.

.38 Start Date: point in time associated with activity's start, usually qualified by one of following: actual, planned, estimated, scheduled, early, late, target, baseline, or current.

.39 Work Breakdown Structure (WBS): deliverable-oriented grouping of project elements that organizes and defines total Work scope of Project. Each descending level represents increasingly detailed definition of Project Work.

1.3 System Description

.1 Construction Progress Schedule (Project Time Management): describes processes required to ensure timely completion of Project. These processes ensure that various elements of Project are properly coordinated. It consists of planning, time estimating, scheduling, progress monitoring, and control.

.2 Planning: this is most basic function of management, that of determining presentation of action, and is essential.

.1 It involves focusing on objective consideration of future, and integrating forward thinking with analysis; therefore, in planning, implicit assumptions are made about future so that action can be taken today.

.2 Planning and scheduling facilitates accomplishment of objectives and should be considered continuous interactive process involving planning, review, scheduling, analysis, monitoring and reporting.

.3 Ensure that planning process is iterative and results in generally top-down processing with more detail being developed as planning progresses, and decisions concerning options and alternatives are made. This implies progressively more reliability of scheduling data. Detail Project schedule is used for analysis and progress monitoring.

.4 Ensure project schedule efficiencies through monitoring.

.1 When activities begin on time and are performed according to estimated durations without interruptions, original Critical Path will remain accurate. Changes and delays will

however, create an essential need for continual monitoring of Project activities.

.2 Monitor progress of Project in detail to ensure integrity of Critical Path, by comparing actual completions of individual activities with their scheduled completions, and review progress of activities that has started but are not yet completed.

.3 Monitoring should be done sufficiently often so that causes of delays are immediately identified and removed if possible.

.5 Project monitoring and reporting: as Project progresses, keep team aware of changes to schedule, and possible consequences. In addition to Bar Charts and CPM networks, use narrative reports to provide advice on seriousness of difficulties and measures to overcome them.

.6 Narrative reporting begins with statement on general status of Project followed by summarization of delays, potential problems, corrective measures and Project status criticality.

1.4 CPM Requirements

.1 Ensure Master Plan and Detail Schedule are practical and remain within specified Contract duration.

.2 Master Plan and Detail Schedule deemed impractical by Departmental Representative are revised and resubmitted for approval.

.3 Acceptance of Master Plan and Detail Schedule showing scheduled Contract duration shorter than specified Contract duration does not constitute change to Contract. Duration of Contract may only be changed through bilateral Agreement.

.4 Consider Master Plan and Detail Schedule deemed practical by Departmental Representative, showing Work completed in less than specified Contract duration, to have float.

.5 First Milestone on Master Plan and Detail Schedule will identify start Milestone with an "ES" constraint date equal to Award of Contract date.

.6 Calculate dates for completion milestones from Plan and Schedule using specified time periods for Contract.

.7 Substantial Completion with "LF" constraint equal to calculated date.

.8 Calculations on updates to be such that if early finish of Interim Certificate falls later than specified Contract duration then float calculation to reflect negative float.

.9 Delays to non-critical activities, those with float may not be basis for time extension.

.10 Do not use float suppression techniques such as software constraints, preferential sequencing, special lead/lag logic restraints, extended activity times or imposed dates other than required by Contract.

.11 Allow for and show Master Plan and Detail Schedule adverse weather conditions normally anticipated. Specified Contract duration has been predicated assuming normal amount of adverse weather conditions.

.12 Provide necessary crews and manpower to meet schedule requirements for performing Work within specified Contract duration. Simultaneous use of multiple crews on multiple fronts on multiple critical paths may be required.

.13 Arrange participation on and off site of subcontractors and suppliers, as required by Departmental Representative, for purpose of network planning, scheduling, updating and progress monitoring. Approvals by Departmental Representative of original networks and revisions do not relieve Contractor from duties and responsibilities required by Contract.

.14 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this Contract.

1.5 Submittals

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit to Departmental Representative Project Control System for planning, scheduling, monitoring, and reporting of project progress.

.3 Submit Project Control System to Departmental Representative for approval; failure to comply with each required submission, may result in progress payment being withheld.

.4 Include costs for execution, preparation, and reproduction of schedule submittals in bid documents.

.5 Submit letter ensuring that schedule has been prepared in

coordination with major Subcontractors, if applicable.

.6 Submit Project planning, monitoring, and control system data as required by Departmental Representative in following form:

.1 CD files in original scheduling software and PDF formats containing schedule and cash flow information, labelled with data date, specific update, and person responsible for update.

.2 Master Plan Bar Chart.

.3 Construction Detail schedule Bar Chart.

.4 Listing of project activities including milestones and logical connectors, networks (sub-networks) from Project start to end. Sort activities by activity identification number and accompany with descriptions. List early and late start and finish dates together with durations, codes and float.

.5 Criticality report listing activities and milestones with up to 5 days total float used as first sort for ready identification of critical or near critical paths through entire project. List early and late starts and finishes dates, together with durations, codes and float for critical activities.

.6 Progress report in early start sequence, listing for each trade, activities due to start, underway, or finished. List activity identification number, description and duration. Provide columns for entry of actual start and finish dates, duration remaining and remarks concerning action required.

.7 Within ten working days after each March 31 and September 30 occurring between commencement of Work and final completion, and within ten working days after final completion, provide to Departmental Representative:

.1 Statement of total person days of labour used on site in performance of Contract, including labour provided under subcontracts.

.2 Estimate of total value in dollars of material delivered to site and installed, including material provided and installed under sub-contracts.

1.6 Quality Assurance

.1 Use experienced personnel, fully qualified in planning and scheduling, to provide services from start of construction to Final Certificate, including Commissioning.

1.7 Project Meeting

.1 Meet with Departmental Representative within 5 working days of Award of Contract date, to establish Work requirements and approach to project construction operations.

1.8 Work Breakdown Structure

.1 Prepare construction WBS within 15 working days of Award of Contract date. Develop WBS through at least five levels: project, stage, element, sub-element and work package.

1.9 Project Milestones

.1 Project milestones form targets for both Master Plan and Detail Schedule of CPM construction network system. Include:

.1 Setup of sites.

.2 Longitudinal steel plates installation for each culvert.

.3 Final Certificate completion.

1.10 Master Plan

.1 Structure and base CPM construction networks system on WBS coding in order to ensure consistency throughout Project.

.2 Prepare comprehensive construction Master Plan (CPM logic diagram) and dependent Cash Flow Projection within 15 working days of finalizing Agreement to confirm validity or alternates of identified milestones.

.1 Master Plan will be used as baseline.

.1 Revise baseline as conditions dictate and as required by Departmental Representative.

.2 Departmental Representative will review and return revised baseline within 10 work days.

.3 Reconcile revisions to Master Plan and Cash Flow Projections with previous baseline to provide continuous audit trail.

.4 Initial and subsequent Master Plans will include:

.1 CD containing schedule and cash flow information, clearly labelled with data date, specific update, and person responsible for update.

.2 Bar chart identifying coding, activity durations, early/late and start/finish dates, total float, completion as percentile,

current status and budget amounts.

.3 Network diagram showing coding, activity sequencing (logic), total float, early/late dates, current status and durations.

.4 Actual/projected monthly cash flow: expressed monthly and shown in both graphical and numerical form.

1.11 Detail Schedule

.1 Structure and base CPM construction networks system on WBS coding in order to ensure consistency throughout Project.

.2 Prepare comprehensive construction Master Plan (CPM logic diagram) and dependent Cash Flow Projection within 15 working days of finalizing Agreement to confirm validity or alternates of identified milestones.

.1 Master Plan will be used as baseline.

.1 Revise baseline as conditions dictate and as required by Departmental Representative.

.2 Departmental Representative will review and return revised baseline within 10 work days.

.3 Reconcile revisions to Master Plan and Cash Flow Projections with previous baseline to provide continuous audit trail.

.4 Initial and subsequent Master Plans will include:

.1 CD containing schedule and cash flow information, clearly labelled with data date, specific update, and person responsible for update.

.2 Bar chart identifying coding, activity durations, early/late and start/finish dates, total float, completion as percentile, current status and budget amounts.

.3 Network diagram showing coding, activity sequencing (logic), total float, early/late dates, current status and durations.

.4 Actual/projected cash flow: expressed monthly and shown in both graphical and numerical form.

.5 Provide detailed project schedule (CPM logic diagram) within 15 working days of Award of Contract date showing activity sequencing, interdependencies and duration estimates. Include listed

activities as follows:

.1 Shop drawings.
.2 Samples.
.3 Approvals.
.4 Procurement.
.5 Construction.
.6 Installation.
.7 Site works.
.8 Testing.
.9 Shutdown or closure activity.
.10 Commissioning and acceptance.

.6 Detail CPM schedule to cover in detail minimum period of 6 months beginning from Award of Contract date with each activity duration approximately 3 to 15 days.

.1 Show remaining activities for CPM construction network system up to Final Certificate and develop complete detail as project progresses.

.2 Detail activities completely and comprehensively throughout duration of project.

.7 Relate Detail Schedule activities to basic activities and milestones developed and approved in Master Plan.

.8 Clearly show sequence and interdependence of construction activities and indicate:

.1 Start and completion of all items of Work, their major components, and interim milestone completion dates.

.2 Activities for procurement, delivery, installation and completion of each major piece of equipment, materials and other supplies, including:

.1 Time for submittals, resubmittals and review.

.2 Time for fabrication and delivery of manufactured products for Work.

.3 Interdependence of procurement and construction activities.

.3 Include sufficient detail to assure adequate planning and execution of Work. Activities should generally range in duration from 3 to 15 workdays each.

.9 Provide level of detail for project activities such that sequence and interdependency of Contract tasks are demonstrated and allow co-ordination and control of project activities. Show continuous flow from left to right.

.10 Ensure activities with no float are calculated and clearly indicated on logical CPM construction network system as being, whenever possible, continuous series of activities throughout length of Project to form "Critical Path". Increased number of critical activities is seen as indication of increased risk.

.11 Insert Change Orders in appropriate and logical location of Detail Schedule. After analysis, clearly state and report to Departmental Representative for review effects created by insertion of new Change Order.

1.12 Review of the Construction Detail Schedule

.1 Allow 10 work days for review by Departmental Representative of proposed construction Detail Schedule.

.2 Upon receipt of reviewed Detail Schedule make necessary revisions and resubmit to Departmental Representative for review within 5 work days.

.3 Promptly provide additional information to validate practicability of Detail Schedule as required by Departmental Representative.

.4 Submittal of Detail Schedule indicates that it meets Contract requirements and will be executed generally in sequence.

1.13 Compliance with Detail Schedule

.1 Comply with reviewed Detail Schedule.

.2 Proceed with significant changes and deviations from scheduled sequence of activities that cause delay, only after receipt of approval by Departmental Representative.

.3 Identify activities that are behind schedule and causing delay. Provide measures to regain slippage.

.1 Corrective measures may include:

.1 Increase of personnel on site for effected activities or work package.

.2 Increase in materials and equipment.

.3 Overtime work and additional work shifts.

.4 Submit to Departmental Representative, justification, project schedule data, and supporting evidence for approval of extension to Contract completion date or interim milestone date when required. Include as part of supporting evidence:

.1 Written submission of proof of delay based on revised activity logic, duration and costs, showing time impact analysis illustrating influence of each change or delay relative to approved contract schedule.

.2 Prepared schedule indicating how change will be incorporated into the overall logic diagram. Demonstrate perceived impact based on date of occurrence of change and include status of construction at that time.

.3 Other supporting evidence requested by Departmental Representative.

.4 Do not assume approval of Contract extension prior to receipt of written approval from Departmental Representative.

.5 In event of Contract extension, display in Detail Schedule that scheduled float time available for work involved has been used in full without jeopardizing earned float.

.1 Departmental Representative will determine and advise Contractor number of allowable days for extension of Contract based on project schedule updates for period in question, and other factual information.

.2 Construction delays affecting project schedule will not constitute justification for extension of contract completion date.

1.14 Process Monitoring and Reporting

.1 On ongoing basis, Detail Schedule on job site must show "Progress to Date". Arrange participation on and off site of subcontractors and suppliers, as, and when necessary, for purpose of network planning, scheduling, updating, and progress monitoring. Inspect Work with Departmental Representative at least once per Project to establish progress on each current activity shown on applicable networks.

.2 Update and reissue project Work Breakdown Structure and relevant coding structures as project develops and changes.

.3 Perform Detail Schedule update at least once per Project with status dated (Data Date). Update to reflect activities completed to date,

activities in progress, logic and duration changes.

.4 Do not automatically update actual start and finish dates by using default mechanisms found in project management software.

.5 Submit to Departmental Representative copies of updated Detail Schedule.

.6 Requirements for progress monitoring and reporting are basis for progress payment request.

.7 Submit written report at least once per Project based on Detail Schedule, showing Work to date performed, comparing Work progress to planned, and presenting current forecasts. Report must summarize progress, defining problem areas and anticipated delays with respect to Work schedule, and critical paths. Explain alternatives for possible schedule recovery to mitigate any potential delay. Include in report:

.1 Description of progress made.

.2 Pending items and status of: permits, shop drawings, Change Orders, possible time extensions.

.3 Status of Contract completion date and milestones.

.4 Current and anticipated problem areas, potential delays and corrective measures.

.5 Review of progress and status of Critical Path activities.

1.15 Progress Photographs

.1 Provide digital photographs with dates and descriptions on CD disk with progress reports. Relate dates and descriptions to photo file names in a separate text file on disk.

.2 Number of photographs: minimum of 20 photos per Longitudinal steel plates installed.

.3 Viewpoints: determined by Departmental Representative.

.4 Frequency: with progress statement, at completion of each construction stage, and as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 This section includes but is not limited to the following:

.1 Product data.
.2 Samples.
.3 Waste Management Work Plan.
.4 Environmental Protection Plan (EPP).
.5 Traffic Management Plan.
.6 Health and Safety Plan.
.7 Certificates and transcripts.
.8 Quality Testing Reports.
.9 Quality Control Plan.

1.2 Administrative

.1 Submit to Departmental Representative submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Work affected by submittal shall not proceed until review is complete.

.3 Present product data, samples, and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated, and identified as to specific project will be returned without being examined and shall be considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are coordinated. Contractor to become familiar with all conditions likely to affect the cost of the Work before submission of their Tender documents.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

1.3 Product Data

.1 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.2 Delete information not applicable to project.

.3 Supplement standard information to provide details applicable to project.

.4 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If product data sheets are rejected, noted copy will be returned and resubmission of corrected data sheets, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.5 The review of product data sheets by Departmental Representative is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Departmental Representative approves detail design inherent in product data sheets, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in product data sheets or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for co-ordination of Work of all sub-trades.

1.4 Progress Photographs

.1 Submit progress photographs in accordance with Section 01 32 17 - Construction Progress and Reporting.

1.5 Survey and Quality Testing Reports

.1 Submit certified survey and quality testing reports with progress reports.

1.6 Quality Control Plan

.1 Prepare and submit to Departmental Representative for review and approval a Quality Control Plan including but not limited to:

.1 Quality control processes and procedures.

.2 Quality control reporting and frequency.

.3 Testing agencies employed to provide materials testing.

.4 Frequency and types of testing.

.5 Verification of materials and installation procedures, including but not limited to structural steel, bolts, welds, paint.

.6 Dimension checks of pre-fabricated and site-fabricated elements.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Informational and Warning Devices.

.2 Protection and Control of Public Traffic.

.3 Operational Requirements.

1.2 Basis of Payment

.1 No separate payment will be made for traffic control. Include traffic control in other Work as outlined in Section 01 29 01 Method of Measurement and Payment.

1.3 References

.1 "Traffic Control Manual for Work on Roadways" (distributed by Province of British Columbia, Ministry of Transportation and Highways).

1.4 Protection of Public Traffic

.1 Comply with current requirements of Acts, Regulations, and By-Laws for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 When working on traveled way:

.1 Position equipment to present minimum of interference and hazard to traveling public.

.2 Keep equipment units as close together as working conditions permit and preferably on same side of traveled way.

.3 Do not leave equipment on traveled way overnight.

.3 Do not close any lanes of road or highway without consulting Departmental Representative. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in "Traffic Control Manual for Work on Roadways".

.4 Keep traveled way graded, free of pot-holes, and of sufficient width for required number of lanes of traffic.

.5 Provide well-graded, signed, and maintained detours or temporary roads to facilitate passage of traffic around restricted construction areas.

.6 Provide and maintain reasonable access to property in vicinity of Work and in other areas as indicated.

1.5 Informational and Warning Devices

.1 Provide, erect, and maintain signs, flashing warning lights, and other devices required to indicate construction activities and other temporary and unusual conditions resulting from Project Work that requires road user response as specified in "Traffic Control Manual for Work on Roadways".

.2 Supply signs, delineators, barricades, traffic cones, and miscellaneous warning devices, except those shown on plans as supplied by others, as specified in "Traffic Control Manual for Work on Roadways".

.3 Place signs and other devices in locations recommended in "Traffic Control Manual for Work on Roadways".

.4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list and review with Departmental Representative.

.5 Continually maintain traffic control devices in use by:

.1 Checking signs daily for legibility, damage, suitability, and location. Clean, repair, or replace to ensure clarity and reflectance.

.2 Removing or covering signs which do not apply to conditions existing from day to day.

.6 Provide traffic cones as specified in "Traffic Control Manual for Work on Roadways".

.7 Ensure that necessary traffic cones and signs are in place prior to interference with traffic on existing roadways.

1.6 Control of Public Traffic

.1 Provide traffic control in accordance with "Traffic Control Manual for Work on Roadways". Ensure that current copy of manual is available on site at all times.

.2 Flagpersons:

.1 Provide trained, competent flagpersons with proof of certification from recognized training program on traffic control procedures through construction zones.

.2 Provide flagpersons with proper equipment and clothing as specified in "Traffic Control Manual for Work on Roadways".

.3 Flagpersons are required in the following (but not limited to) situations:

.1 When public traffic is required to pass working vehicles or equipment that block all or part of traveled roadway.

.2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high, and traffic signal system is not in use.

.3 When workmen or equipment are employed on traveled way over brow of hills, around sharp curves, or at other locations where oncoming traffic would not otherwise have adequate warning.

.4 When temporary protection is required while other traffic control devices are being erected or taken down.

.5 For emergency protection when other traffic control devices are not readily available.

.6 In situations where complete protection for workers, working equipment, and public traffic is not provided by other traffic control devices.

.7 At each end of restricted sections where pilot cars are required.

.8 When construction traffic is crossing a roadway.

.3 Maximum delays to public traffic due to Contractor's operators: 15 minutes at any one time.

.4 Provide temporary lane control system where roadway carrying two-way traffic is to be restricted to one lane for 24 hours per day. Adjust, as necessary, and regularly maintain system during period of restriction. Signal system to meet requirements of “Traffic Control Manual for Work on Roadways”.

.5 Changes to traffic control operation are to be reviewed by Departmental Representative.

.6 Safely control traffic through unique or varied construction situations.

1.7 Operational Requirements

.1 Maintain existing conditions for traffic throughout period of contract except when required for construction under contract and when measures have been taken as specified herein and reviewed by Departmental Representative to protect and control public traffic.

.2 Maintain existing conditions for traffic crossing right-of-way.

END OF SECTION

1 GENERAL

PWGSC Update on Asbestos Use
Effective April 1, 2016, all Public Works and Government Services of Canada (PWGSC) contracts for new construction and major rehabilitation will prohibit use of asbestos-containing materials.

COVID 19
All contractors shall follow Canadian Construction Association COVID-19 - Standardized Protocols for All Canadian Construction Sites, Provincial Regulations and Federal Site Specific Guidelines.

1.1 REFERENCES

.1 Government of Canada.

.1 Canada Labour Code - Part II (as amended)

.2 Canada Occupational Health and Safety Regulations. (as amended)

.2 National Building Code of Canada (NBC): (as amended)

.1 Part 8, Safety Measures at Construction and Demolition Sites.

.3 The Canadian Electrical Code (as amended)

.4 Canadian Standards Association (CSA) as amended:

.1 CSA Z797-2018 Code of Practice for Access Scaffold.

.2 CSA S269.1-2016 Falsework for Construction Purposes.

.3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.

.4 CSA Z1006-10 Management of Work in Confined Spaces.

.5 CSA Z462-18 Workplace Electrical Safety Standard

.5 National Fire Code of Canada 2015 (as amended)

.1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.

.6 American National Standards Institute (ANSI): (as amended)

.1 ANSI/ASSP A10.3-2013, Operations – Safety Requirements for Powder-Actuated
Fastening Systems.

.7 Province of British Columbia:

.1 Workers Compensation Act Part 3-Occupational Health and Safety. (as amended)

.2 Occupational Health and Safety Regulation (as amended)

1.2 RELATED SECTIONS

.1 Refer to the following current NMS sections as required:

.1 Section 01 01 50 - General Instructions

1.3 WORKERS' COMPENSATION BOARD COVERAGE

.1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.4 COMPLIANCE WITH REGULATIONS

.1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

.2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers'

Compensation Act or the Occupational Health and Safety Regulations.

1.5 SUBMITTALS

.1 Submit to Departmental Representative submittals listed for review in accordance with Section 01 01 50.

.2 Work affected by submittal shall not proceed until review is complete.

.3 Submit the following:

.1 Organizations Health and Safety Plan.

.2 Site Specific Safety Plan or Health and Safety Plan (SSSP or HASP)

.2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.3 Copies of incident and accident reports.

.4 Complete set of Material Safety Data Sheets (SDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.

.5 Emergency Response Procedures.

.4 The Departmental Representative will review the Contractor's Site Specific Safety Plan or Health and Safety Plan (SSSP/HASP) and emergency response procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.

.5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.

.6 Submission of the Site Specific Safety Plan or Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:

.1 Be construed to imply approval by the Departmental Representative.

.2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

.3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.6 RESPONSIBILITY

.1 Assume responsibility as the Prime Contractor for work under this contract.

.2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 HEALTH AND SAFETY COORDINATOR

.1 Assign a competent and qualified Health and Safety Coordinator who shall:

.1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.

.2 Be responsible for implementing, daily enforcing, and monitoring the Site Specific
Safety Plan (SSSP) or Health and Safety Plan (HASP)

.3 Be on site during execution of work.

.4 Have minimum two (2) years' site-related working experience

.5 Have working knowledge of the applicable occupational safety and health regulations.

1.8 GENERAL CONDITIONS

.1 Provide safety barricades and lights around work site as required to provide a

safe working environment for workers and protection for pedestrian and vehicular traffic.

.2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.

.1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.

.2 Secure site at night time or provide security guard as deemed necessary to protect site against entry.

1.9 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Multi-employer work site.

.2 Federal employees and general public.

.3 Energized electrical services.

.4 Working from heights.

.5 Hazards - PWGSC Preliminary Hazard Assessment included as an Appendix to Specifications

1.10 UTILITY CLEARANCES

.1 The Contractor is solely responsible for all utility detection and clearances prior to starting the work.

.2 The Contractor will not rely solely upon the Reference Drawings or other information provided for Utility locations.

1.11 REGULATORY REQUIREMENTS

.1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.

.2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most

stringent requirement, the Departmental Representative will advise on the course of action to be followed.

1.12 WORK PERMITS

.1 Obtain specialty permit(s) related to project before start of work.

1.13 FILING OF NOTICE

.1 The General Contractor is to file Notice of Project with Provincial authorities prior to commencement of work. (All construction projects require a Notice of Work)

.2 Provide copies of all notices to the Departmental Representative.

1.14 SITE SPECIFIC HEALTH AND SAFETY PLAN

.1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

.2 Prepare and comply with the Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP) based on the required hazard assessment, including, but not limited to, the following:

.1 Primary requirements:

.1 Contractor's safety policy.

.2 Identification of applicable compliance obligations.

.3 Definition of responsibilities for project safety/organization chart for project.

.4 General safety rules for project.

.5 Job-specific safe work, procedures.

.6 Inspection policy and procedures.

.7 Incident reporting and investigation policy and procedures.

.8 Occupational Health and Safety Committee/Representative procedures.

.9 Occupational Health and Safety meetings.

.10 Occupational Health and Safety communications and record keeping procedures.

.11 COVID 19 Protocols and Procedures

.2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.

.3 List hazardous materials to be brought on site as required by work. SDS required for all products.

.4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.

.5 Identify personal protective equipment (PPE) to be used by workers.

.6 Identify personnel and alternates responsible for site safety and health.

.7 Identify personnel training requirements and training plan, including site orientation for new workers.

.3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.

.4 Revise and update Site Specifc Safety Plan (SSSP) and/or Health and Safety Plan (HASP) as required, and re-submit to the Departmental Representative.

.5 Departmental Representative's review: the review of Site Specific Safety Plan and/or Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Safety Plan and/or Health and Safety Plan of responsibility for meeting all requirements of construction and Contract documents and legislated requirements.

1.15 EMERGENCY PROCEDURES

.1 List standard operating procedures and measures to be taken in emergency situations. Include an emergency response and emergency evacuation plan and emergency contacts (i.e.names/telephone numbers) of:

.1 Designated personnel from own company.

.2 Regulatory agencies applicable to work and as per legislated regulations.

.3 Local emergency resources.

.4 Departmental Representative.

.5 A route map with written directions to the nearest hospital or medical clinic.

.2 Include the following provisions in the emergency procedures:

.1 Notify workers and the first-aid attendant, of the nature and location of the emergency.

.2 Evacuate all workers safely.

.3 Check and confirm the safe evacuation of all workers.

.4 Notify the fire department or other emergency responders.

.5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.

.6 Notify Departmental Representative.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:

.1 Work at high angles.

.2 Work in confined spaces or where there is a risk of entrapment.

.3 Work with hazardous substances.

.4 Underground work.

.5 Work on, over, under and adjacent to water.

.6 Workplaces where there are persons who require physical assistance to be moved.

.4 Design and mark emergency exit routes to provide quick and unimpeded exit.

.5 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

.6 Contractors must not rely solely upon 911 for emergency rescue in a confined space, working at heights, etc.

1.16 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS 2015) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Safety Data Sheets (SDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

.1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable SDS and WHMIS 2015 documents as per Section 01 01 50.

.2 In conjunction with Departmental Representative schedule to carry out work during "off hours" when tenants have left the building.

.3 Provide adequate means of ventilation in accordance with Section 01 51 00.

.4 The contractor shall ensure that the product is applied as per manufacturers recommendations.

.5 The contractor shall ensure that only pre-approved products are bought onto the work site in an adequate quantity to complete the work.

1.17 ASBESTOS HAZARD

.1 Carry out any activities involving asbestos in accordance with current applicable Federal and Provincial Regulations.

.2 Removal and handling of asbestos will be in accordance with current applicable Provincial / Federal Regulations.

1.18 PCB REMOVALS

.1 Mercury-containing fluorescent tubes and ballasts which contain polychlorinated biphenyls (PCBs) are classified as hazardous waste.

.2 Remove, handle, transport and dispose of as indicated in Division 2 specifications.

1.19 REMOVAL OF LEAD-CONTAINING PAINT

.1 All paint containing TCLP lead concentrations above 5 ppm are classified as hazardous.

.2 Carry out demolition and/or remediation activities involving lead-containing paints in accordance with current applicable Provincial / Territorial Regulations.

.3 Work with lead-containing paint shall be completed as per Provincial and Federal regulations.

.4 Dry Scraping/Sanding of any materials containing lead is strictly prohibited.

.5 The use of Methylene Chloride based paint removal products is strictly prohibited.

1.20 ELECTRICAL SAFETY REQUIREMENTS (Reference: Worksafe BC OHS Reguation Part 19 – Electrical Safety)

.1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

.1 Before undertaking any work, coordinate arc flash protection, required energizing and de-energizing of new and existing circuits with Departmental Representative.

.2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

1.21 ELECTRICAL LOCKOUT

.1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

.2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.

.3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

1.22 OVERLOADING

.1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

1.23 FALSEWORK

.1 Design and construct falsework in accordance with CSA S269.1-1975 (R2003) (as amended)

1.24 SCAFFOLDING

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 (as amended) and B.C. Occupational Health and Safety Regulations. (as amended)

1.25 CONFINED SPACES

.1 Carry out work in compliance with current Provincial / Territorial regulations.

1.26 POWDER-ACTUATED DEVICES

.1 Use powder-actuated devices in accordance with ANSI A10.3 (as amended) only after receipt of written permission from the Departmental Representative.

1.27 FIRE SAFETY AND HOT WORK

.1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.

.2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

.3 Hot Work permits are a mandatory requirement for any hot work activities.

1.28 FIRE SAFETY REQUIREMENTS

.1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada. (as amended)

.3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from the Departmental Representative is required prior to any gas or diesel tank being brought onto the work site.

1.29 FIRE PROTECTION AND ALARM SYSTEM

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut off.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.

.3 Be responsible/liable for costs incurred from the fire department, the building

owner and the tenants, resulting from false alarms.

1.30 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and immediately advise the Departmental Representative verbally and in writing.

1.31 POSTED DOCUMENTS

.1 Post legible versions of the following documents on site:

.1 Site Specific Safety Plan (SSSP) or Health and Safety Plan (HASP)

.2 Sequence of work.

.3 Emergency procedures.

.4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.

.5 Notice of Project.

.6 Floor plans or site plans. Must be posted in a non-inmate access area and locked up when not being used.

.7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.

.8 Workplace Hazardous Materials Information System (WHMIS 2015) documents.

.9 Material Safety Data Sheets (SDS).

.10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

.11 All Hazardous Material and Substance Reports including Lab Analysis

.2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

.3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

1.32 MEETINGS

.1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

1.33 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.

.3 The Departmental Representative may issue a "stop work order" if noncompliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

2 PRODUCTS

.1 Not used.

3 EXECUTION

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 Section Included

.1 Related Sections
.2 Definitions
.3 Measurement Procedures
.4 Regulatory Overview
.5 Submittals
.6 Environmental Effects Evaluation
.7 Site Access and Parking
.8 Protection Work Limits
.9 Erosion Control
.10 Pollution Control
.11 Equipment Maintenance, Fueling and Operation
.12 Operation and Equipment
.13 Managing Invasive Plant Vegetation
.14 Fire Prevention and Control
.15 Wildlife
.16 Relics and Antiquities
.17 Waste Materials Storage and Removal
.18 Wastewater Discharge Criteria
.19 Camp Wastewater Discharge Criteria
.20 Drainage
.21 Site Cleaning and Plant Protection
.22 Blasting
.23 Environmental Protection Supplies
.24 Notification
.25 Environmental Monitoring

1.2 Related Sections

.1 Section 01 33 00 – Submittal Procedures
.2 Section 02 61 33 – Hazardous Waste Materials

1.3 Definition

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

.1 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

.2 Environmental Protection Plan: is prepared by Contractor and describes in writing all the environmental protection and mitigation measures that will be applied throughout the life of the Project by the Contractor to avoid or minimize the potential

effects on the environment associated with the Project.

.3 Wetted Perimeter: area of stream where water is currently running or pooled.

.4 In-stream Work: any work performed below the high-water mark, either within or above the Wetted Perimeter of any Fisheries Sensitive Zone.

.5 Fisheries Sensitive Zone: in-stream aquatic habitats and out of stream habitat features such as side channels, wetlands, and riparian areas.

.6 Invasive plants: are any alien plant species that have the potential to pose undesirable or detrimental impacts on humans, animals or ecosystems. Invasive plants have the capacity to establish quickly and easily on both disturbed and un-disturbed sites, and can cause widespread negative economic, social and environmental impacts.

.7 Noxious weeds: are invasive plants that have been designated under the *BC Weed Control Act*. This legislation imposes a duty on all land occupiers to control a set list of identified invasive plants. See www.agf.gov.bc.ca/cropprot/noxious.htm.

.8 Riparian area – for a steam, the 30m strip on both sides of the stream, measured from the high water mark, (b) for a ravine less than 60 m wide, a strip on both sides of the steam measured from the high water mark to a point that is 30 m beyond the top of the ravine bank, and for a ravine 60 m wide or greater, a strip on both sides of the stream measured from the high water mark to a point that is 10 m beyond the top of the ravine bank (Riparian Areas Regulation).

.9 Species at risk: a species that has been defined as "at risk" [of extirpation] by either the federal or provincial government.

.10 Timing windows: periods when human activities are least likely to cause damage to species and ecosystems.

.11 Culturally Modified Trees (CMTs): a CMT is a tree that has been altered by aboriginal people as part of their traditional use of the forest. For more information please see *the Handbook for the Identification and Recording of Culturally Modified Trees* prepared by the Archaeology Branch B.C. Ministry of Business, Tourism and Culture

1.4 Measurement Procedures

.1 Preparation and implementation of the Environmental Protection Plan (EPP) in accordance with this Section 01 35 43 – Environmental Procedures will not be measured separately for payment and will be considered incidental to work.

1.5 Regulatory Overview

.1 Comply with all applicable environmental laws, regulations and requirements of Federal, Provincial, and other regional authorities, and acquire and comply with such permits, approvals and authorizations as may be required.

.2 Comply with and be subject to those permits and approvals obtained from Departmental Representative to conduct the Work.

.3 Pay specific attention to the provincial BC Land Use Permit,

Water License and Quarry Permit.

.4 Pay specific attention to the most current version of the Migratory Birds Convention Act.

.5 Pay specific attention to the most current version of the provincial BC guidelines under Peace Region Least Risk Timing Windows: Biological Rational.

.6 Pay specific attention to most current version of the provincial BC MOE guidelines in Standards and Best Practices for Instream Works.

.7 Pay specific attention to most current version of the MOE Develop With Care NE Region.

.8 Where in-water work is conducted, pay specific attention to the most current version of the B.C. Water Quality Guidelines.

1.6 Submittals

.1 The Contractor is required to prepare an Environmental Protection Plan (EPP) in accordance with Section 01 33 00 – Submittal Procedures. The EPP should include all relevant environmental impacts/issues at the site as indicated by the completion of the EPP Checklist. Review of the PSPC Environmental Effects Evaluation (EEE) will assist in completing this document. Prior to commencing construction activities or delivery of materials to site, submit the EPP (See Appendices for Checklist) for review and approval by the Departmental Representative. The EPP will require the Contractor to carefully think through the entire project, including identifying what activities as works will be occurring, both generally and at specific sites, and by what methods. The Environmental Protection Plan shall be completed by a P.Biol or RPBio, or other qualified professional, and shall, at a minimum include the following:

1. The specifics of a detailed monitoring program. This includes details and rational concerning sampling locations, timing, duration, and methods, and identification of the person(s) who will be carrying out the monitoring program.
2. The process and protocol for ensuring that supervisors and individual staff employed by the Contractor are very clear on which environmental standards need to be achieved, how they will be achieved, and establishing how the Contractor will ensure that this is successfully occurring.
3. Erosion, drainage, and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with the requirements of the applicable MOE Approval or Notification for instream

work or under MOE guidelines, and all other applicable regulations including the requirements of these specifications.

4. Drawings should show locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of any excess or spoil materials including methods to control runoff and to contain materials on-site.
5. Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.
6. Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
7. Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
8. Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
9. Outline the avoidance and mitigate measures which the Contractor will undertake and implement to ensure compliance with the environmental regulations applicable to the project (which may include requirements provided in MOE Approval or Notifications for Instream Work, NWPA Approval for Instream Work etc.) and these contract specifications.
10. The procedures for stopping the work and implementing changes to the construction methods should the Contractor not be achieving the environmental requirements as outlined in these specifications.
11. The procedures for stopping work should the Contractor encounter archaeological anomalies or human remains.

.2 All submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.7 Environmental Effects Evaluation

.1 Execution of the work is subject to the provisions within the Environmental Effects Evaluation (EEE) completed by a PSPC Environmental Services Representative for the project. See appendices for a copy of the EEE. NOTE: not all projects are subject to an EEE.

.2 Pursuant to the expectations of the EEE, EPPs are the next step to achieve the desired results of minimal adverse environmental effect, as the project is constructed.

.3 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the work being suspended by the Departmental Representative pending rectification of the problems.

1.8 Site Access and Parking

.1 The Contractor shall review both short and long-term access requirements with the Departmental Representative, both at the start-up and on an on-going basis. In consultation with the Departmental Representative, the contractor shall formulate an agreement for worker transportation to and from the work site and where workers shall park their private vehicles. Generally, personal vehicles shall be parked at least 10 meters distance from any watercourse.

.2 The Contractor shall ensure that the environment beyond the work limits is not negatively impacted or damaged by workers' vehicles or construction machinery and shall instruct workers so that the "footprint" of the project is kept within defined boundaries.

1.9 Protection of Work Limits

.1 The Contractor shall include in the Environmental Protection Plan (EPP) details on the work limits, how these shall be marked and what procedures will be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative.

1.10 Erosion Control

.1 Erosion control measures that prevent sediment from entering any waterway, water body or wetland in the vicinity of the construction site are a critical element of the project and shall be implemented by the Contractor.

.2 All applicable on-site sediment control measures shall be constructed and functional prior to initiating activities associated with the construction activities. The Contractor shall prepare an Erosion Control Plan, to be part of the EPP, to the satisfaction of the Departmental Representative.

.3 The regular monitoring and maintenance of all erosion control measures shall be the responsibility of the Contractor. If the design of the control measures is not functioning effectively they are to be replaced. The Departmental Representative will monitor the Contractor's erosion control performance.

.4 Erosion control measures must be in compliance with both Federal and Provincial legislation. Contractors should be referencing the provincial MOE Standards and Best Practices for Instream Works (2004).

1.11 Pollution Control

.1 The Contractor shall prevent any deleterious and objectionable

materials from entering streams, rivers, wetlands, water bodies or watercourses that would result in damage to aquatic and riparian habitat. Hazardous or toxic products shall be stored no closer than 100 meters to any surface water.

.2 A Spill Response Plan will be prepared as part of the EPP and shall detail the containment and storage, security, handling, use and disposal of empty containers, surplus product or waste generated in the application of these products, to the satisfaction of the Departmental Representative, and in accordance with all applicable federal and provincial legislation. The EPP shall include a list of products and materials to be used or brought to the construction site that are considered or defined as hazardous or toxic to the environment. Such products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot poured rubber membrane materials, asphalt cement and sand blasting agents.

.3 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation. Hazardous products shall be stored no closer than 100 meters from any surface water.

.4 An impervious berm shall be constructed around fuel tanks and any other potential spill area. The berms shall be capable of holding 110% of tank storage volumes and shall be to the satisfaction of the Departmental Representative. Measures such as collection/drip trays and berms lined with occlusive material such as plastic and a layer of sand, and double lined fuel tanks can prevent spills into the environment.

.5 The Contractor shall prevent blowing dust and debris by covering and/or providing dust control for temporary roads and on-site work such as rock drilling and blasting by methods that are approved by the Departmental Representative.

.6 The Contractor shall provide spill kits, to the satisfaction of the Departmental Representative, at re-fuelling, lubrication and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.

.7 Timely and effective actions shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The Departmental Representative shall be notified immediately of any spill as well as the provincial authorities. Basic instructions and phone numbers shall be part of the Contractor's EPP.

.8 In the event of a major spill, the Contractor shall prioritize the cleanup and all other work shall be stopped, where appropriate,

and personnel devoted to spill containment and clean up.

.9 The costs involved in a major spill incident (control, clean up, disposal of contaminants, and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the pre-spill condition to the satisfaction of the Departmental Representative and all relevant inspection agencies (MOE/DFO authorities).

1.12 Equipment Maintenance, Fueling and Operation

.1 The Contractor shall ensure that all soil, seeds and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing) before delivery to the work site.

.2 Equipment fuelling sites will be identified by the Contractor to the satisfaction of the Departmental Representative. Except for chain saws, any fuelling closer than 100 meters to any surface water (streams, wetlands, water bodies or watercourses) shall require discussion and prior agreement with the Departmental Representative.

.3 Diesel and gasoline delivery vehicles, including bulk tankers shall be parked more than 30 meters from any surface water. Gravity fed fuel systems are not allowed. Manual or electric pump delivery systems shall be used. Fuelling personnel shall maintain a presence at with immediate attention to the fuelling operations.

.4 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage sites is addressed in 1.11.4 of Pollution Control.

.5 Equipment use on the project shall be fuelled with E10, and low sulphur diesel fuels where available, and shall conform to local emission requirements. The Contractor is to ensure that unnecessary idling of the vehicles is avoided.

.6 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations satisfactory to the Departmental Representative. Waste lubrication product (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility, No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc. or anywhere within the work area.

.7 The Contractor shall ensure that all equipments are inspected daily for fluid/fuel leaks and maintained in good working condition.

.8 Fuel containers and lubricant products shall be stored only in secure locations to the satisfaction of the Departmental Representative. Fuel tanks or other potential deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight. Alternatively,

the Contractor may hire a security person employed to prevent vandalism.

1.13 Operation of Equipment

.1 Equipment movements shall be restricted to the "footprint" of the construction area. The work limits shall be identified by stake and ribbon or other methods to the satisfaction of the Departmental Representative. No machinery will enter, work in or cross over streams, rivers, wetlands, water bodies or watercourse, nor damage aquatic and riparian habitat or trees and plant communities. Where construction activities require working close to surface water, the Contractor is required to describe measures to be employed to ensure fugitive materials (e.g. rocks, soil, branches) and especially deleterious substances (e.g. chemicals) does not enter any surface water areas.

.2 The Contractor shall instruct workers to prevent pushing, placement, raveling, storage or stockpiling of any materials (e.g. slash, rock, fill or top soils) in the trees bordering the right-of-way or into surface water.

.3 When, in the opinion of PSPC, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Departmental Representative.

.4 Restrict vehicle movements to the work limits.

.5 Workers vehicles are to remain within the construction footprint.

1.14 Managing Invasive Plant Vegetation

.1 Keep equipment clean and avoid parking, turning around or staging equipment in known invasive species infested areas, or mow prior to use.

.2 Wash equipment prior to mobilization to site.

.3 Minimize unnecessary disturbance of roadside aggregates or soil, and retain desirable roadside vegetation whenever possible.

.4 Where possible, begin mowing or brushing in "invasive plant free" areas and end in infested areas.

.5 Where possible, use only clean fill material from an "invasive plant free" source.

.6 Whenever possible, re-seed with grass mixtures that are free of weeds, locally adapted, non-invasive, and quick to establish. Spread seed in the early spring or late fall to ensure successful establishment

1.15 Fire Prevention and Control

.1 A fire extinguisher shall be carried and available for use on each machine and at locations within the quarry in the event of fire. Basic firefighting equipment recommended (e.g. a water truck; minimum 2276 litres with 150m of fire hose and a pump capable

of producing 172.3 kPa water pressure at the nozzle, three shovels, two Pulaski's, and two five gallon backpack pumps) shall be maintained at the construction site at a location known and easily accessible to all Contractors' staff. Contactor's staff shall receive basic training in early response to wildfire events during the "environmental briefing".

.2 Construction equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.

.3 Care shall be taken while smoking on the construction site to ensure that the accidental ignition of any flammable material is prevented.

.4 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The Departmental Representative shall be notified of any fire immediately as well as the applicable Provincial Authorities. Basic instruction and phone numbers will be provided on-site by the Contractor and will be discussed in the project start-up meeting.

.5 Fires or burning of waste materials is not permitted.

.6 Where fires or burning is permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved. Restore, clean and return to new condition stained or damaged Work.

.7 Provide supervision, attendance and fire protection measures as directed.

Obtain all required permits from the province

1.16 Wildlife

.1 Avoid or terminate activities on site that attract or disturb wildlife and vacate the area and stay away from bears, cougars, wolves, elk, buffalo or moose that display aggressive behavior or persistent intrusion. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times.

.2 Notify the Departmental Representative immediately about dens, litters, nests. Carcasses (road kills), bear activity or encounters on or around the site or crew accommodations. Other wildlife related encounters are to be reported within 24 hours

1.17 Relics and Antiquities

.1 Artifacts, relics, antiquities, and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and any objects found on the work site that may be considered artifacts shall be reported to the Departmental Representative immediately. The Contractor and workers shall wait for instruction before proceeding with their work.

.2 All historical or archaeological objects found on the Project site are protected under Federal and Provincial Acts and regulations. The Contractor and workers shall protect any articles found and request direction from the Departmental Representative

1.18 Waste Materials Storage and Removal

.1 The Contractor and workers shall dispose of hazardous wastes in conformance with the applicable federal and provincial regulations and should be part of the EPP.

.2 All wastes originating from construction, trade, hazardous and domestic sources, shall not be mixed, but will be kept separate.

.3 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried, or discarded at the construction site. These wastes shall be contained and removed in a timely and approved manner by the Contractor and workers, and disposed of at an appropriate waste landfill site located outside the work area.

.4 A concerted effort shall be made by the Contractor and workers to reduce, reuse and recycle materials where possible.

.5 Sanitary facilities, such as portable container toilets, shall be provided by the Contractor and maintained in a clean condition

1.19 Wastewater Discharge Criteria

.1 Wash water, melt water collection, rinse water resulting from the cleaning of fuel tanks and pipelines, contaminated groundwater, and/or any other liquid effluent stream will be released onto the ground at a location that is a minimum of 30 meters from natural drainage courses and 100 meters from fish bearing waters, and will conform to the discharge requirements set out in the provincial Water Act Permit.

.2 Contractor must obtain approval from the provincial Water Act Officer prior to discharging any treated wastewater.

1.20 Camp Wastewater Discharge Criteria

.1 Camp wastewater will be released onto the ground at a location that is a minimum of 30 meters from natural drainage courses and 100 meters from fish bearing waters and conform to the discharge requirements set out in the provincial Water Act Permit.

.2 If unable to meet the discharge criteria, provide additional storage and/or treatment necessary to meet criteria prior to discharge.

.3 Treat all camp wastewater to conform to the discharge requirements set out in the Water Act Permit.

.4 If unable to meet the discharge criteria, provide additional storage and/or treatment necessary to meet criteria prior to discharge.

.5 No direct discharge is allowed to wetland or surface waters.

.6 Contractor must obtain approval from the Water Act Officer prior to discharging treated wastewater.

1.21 Drainage

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water. Management of drainage should be part of the EPP.

.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.3 Control disposal or runoff of water containing suspended

materials or other harmful substances in accordance with local authority requirements such as the provincial Water Act.

.4 Where required, water quality should be tested for potential contaminants (turbidity) and the results compared to the B.C. Water quality Guidelines for aquatic life.

.5 Provide an erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.6 Submit an Erosion, Sediment and Drainage Control Plan to Departmental Representative for review and approval prior to commencing Work in fisheries sensitive areas or in areas that may affect fisheries sensitive areas and specifically address the protection of water bodies, water courses, and the following:

- .1 Details of grading Work to prevent surface drainage into or out of Work areas.
- .2 Details of erosion control works and materials to be used, including the deployment of silt fencing, floating silt curtains and containment booms during construction and excavation activities.
- .3 Work Schedule including the sequence and duration of all related Work activities.
- .4 The treatment of site runoff to prevent siltation of watercourses.
- .5 Dewatering procedures for excavated materials including silt removal procedures prior to discharge.
- .6 Stabilizing procedures during excavation.
- .7 Maintenance of filters and sedimentation traps.

.7 Any dewatering activities will be released onto the ground at a location that is a minimum of 30 meters from natural drainage courses and 100 meters from fish bearing waters.

.8 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.

1.22 Site Clearing and Plant Protection

.1 Protect trees and plants on site and adjacent properties where indicated.

.2 Wrap in burlap, trees and shrubs adjacent to construction Work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by Departmental Representative.

.6 The Contractor should be aware that B.C. has culturally modified trees (CMTs) that are protected under the Heritage Act. If a CMT is encountered, stop work immediately and contact the Departmental Representative

1.23 Blasting

.1 The Departmental Representative will identify a magazine location for explosives should a factory site or `ready to use` explosive site be required.

.2 The sweep of the blast area shall include looking for wildlife that may be in the area. If any are found, they shall be hazed out of the area by the Environmental Monitoring personnel.

.3 The Contractor shall ensure that all work activities meet or exceed the standards outlined in DFO`s ``Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters``; Canadian Technical Report of Fisheries and Aquatic Sciences 2107, 1998.

.4 The Contractor shall, whenever explosives are used, use the Provincial and Workers`` Compensation Laws and Regulations, and all respective Agencies Having Jurisdiction over them, such as DFO.

.5 Steps shall be taken to minimize fly-rock and dust. Vegetation outside of the designated area shall not be damaged or destroyed.

.6 In order to stabilize slopes of the cut, these shall be scaled of all loose material. Ditches shall be formed and cleaned upon the completion of the blasting, and the natural drainage shall be restored as specified by the Contract or as directed by the Departmental Representative.

.7 The Contractor shall describe the proposed type and quantities of explosives to be used on the project, to the satisfaction of the Departmental Representative. Some blasting products – such as those very high in nitrogen, may have some limitations imposed for environmental protection purposes

1.24 Environmental Protection Supplies

.1 Comply with federal and provincial fisheries and environmental protection legislation, including preventing the loss or destruction of fish habitat, and minimizing the impact of sedimentation, siltation or otherwise causing a degradation in water quality.

.2 Provide a minimum of 30 m or more and as required of polypropylene silt fence (typical height of 0.9 m) and the necessary stakes for installation. This will be used as necessary to prevent sediment transport into water bodies.

.3 Provide a minimum of 50 lineal meters or more and as required of 200 mm diameter hydrophobic, sorbent booms. This will be used as necessary to prevent the migration of hydrocarbons.

.4 Supply, transport, install and maintain erosion, sediment and drainage controls necessary to complete the Work in accordance with the requirements of Departmental Representative.

.5 At the completion of construction, dispose of used silt fence off-site as non-Hazardous Waste. Dispose of used absorbent boom in accordance with Section 02 61 33 - Hazardous Waste Material.

.6 Unused Erosion, Sediment and Drainage Control supplies will remain the property of Departmental Representative until the completion of the Contract.

.7 Provide inventory of environmental protection supplies prior to mobilization

1.25 Notification

.1 Departmental Representative will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, etc.

.2 Contractor: after receipt of such notice, shall inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.3 Departmental Representative will issue stop order of Work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions

1.27 Environmental Monitoring

.1 At a minimum the environmental monitoring shall be completed by P.Biol, RPBio, or Qualified Environmental Professional (QEP). If a QEP completes the monitoring, the QEP must work under the direction of the P.Biol or RPBio who completes the Environmental Protection Plan.

.2 The monitoring program must be anticipatory and responsive to construction practices or environmental changes, reflecting the site-specific conditions, level of sensitivity of the receiving environment, potential adverse effects, and level of environmental risk. Submitted documents regarding the proposed monitoring program should clearly identify how monitoring will adhere to this approach.

.3 The monitoring program shall satisfy all regulatory requirements and terms of these specifications. The onus is on the Contractor to monitor and ensure compliance, to identify arising problems, and to subsequently take responsibility and all necessary measures in response

PART 2 - PRODUCTS

2.1 Not Used

.1 Not used.

PART 3 - EXECUTION

3.1 Not Used

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 Quality Control Plan

.1 Prepare and submit to Departmental Representative for review and approval a Quality Control Plan in accordance with Section 01 33 00 – Submittal Procedures, prior to project startup.

1.2 Basis of Payment

.1 No separate payment will be made for quality assurance and testing. Include quality assurance and testing in all work as part of total contract amount.

1.3 Inspection

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.4 Independent Inspection Agencies

.1 Appoint and pay for services of third-party Independent Quality Assurance testing laboratory and field staff including as follows:

.1 Where specified in the text of these specifications, including but not limited to:

.1 Onsite and laboratory testing.

.2 Inspection and testing required by laws, ordinances, rules, regulations, or orders of public authorities.

.3 Inspection and testing performed exclusively for Contractor's convenience.

.4 Mill tests and certificates of compliance.

.5 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.

.6 Additional tests specified in the following paragraph.

.2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

.3 Provide equipment required for executing inspection and testing by appointed agencies.

.4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

1.5 Access to Work

.1 Allow inspection/testing agencies access to Work and off-site manufacturing and fabrication plants.

.2 Cooperate to provide reasonable facilities for such access.

1.6 Procedures

.1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.3 Provide labour and facilities to obtain and handle samples and materials onsite. Provide sufficient space to store test samples.

1.7 Rejected Work

.1 Remove defective Work, whether result of poor workmanship, use of defective products, or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

1.8 Reports

.1 Submit 4 copies of inspection and test reports to Departmental Representative with all progress reports or, generally, as reports become available.

.2 Provide copies to Subcontractor of Work being inspected or tested and to manufacturer or fabricator of material being inspected or tested.

1.9 Test Certificates

.1 Submit all test certificates as required of specification Sections.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Temporary utilities.

1.2 Installation and Removal

.1 Provide temporary utilities in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.3 Water Supply

.1 Provide continuous temporary supply of potable water for construction use, if applicable.

.2 Remove or decommission temporary water supply facilities upon completion of project.

1.4 Sanitary Facilities

.1 Provide sanitary facilities for construction use.

.2 Remove or decommission temporary sanitary facilities upon completion of project.

1.5 Heating and Ventilation of Work Area and Enclosures

.1 Provide temporary heating required during construction period, including attendance, maintenance, and fuel.

.2 Construction heaters used inside enclosures must be vented to outside or be flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

- .1 Facilitate progress of Work.
- .2 Protect Work and products against dampness and cold.
- .3 Prevent moisture condensation on prepared surfaces.
- .4 Provide ambient temperatures and humidity levels for storage and installation of materials.
- .5 Provide adequate ventilation to meet health regulations for safe working environments.
- .6 Provide ambient temperatures and humidity levels for all stages of coating application.

.4 Ventilating:

- .1 Prevent accumulations of dust, fumes, mists, vapours, or gases in areas occupied during construction.
- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied area.
- .3 Dispose of exhaust materials in manner that will not result

in harmful exposure to persons or the environment.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of Work process to assure removal of harmful contaminants.

.5 Payment:

.1 Heating and ventilation of work area and enclosures is incidental to the Work and no separate payment will be made.

.6 Be responsible for damage to Work due to failure in providing adequate heat, ventilation, and protection during construction.

1.6 Temporary Power and Light

.1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools and for construction use.

.2 Arrange for connection with appropriate utility company. Pay all costs for installation maintenance and removal.

.3 Provide and maintain temporary lighting throughout project, if applicable.

1.7 Temporary Communication Facilities

.1 Provide and pay for temporary telephone necessary for own use.

1.8 Fire Protection

.1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations, and bylaws.

.2 Burning rubbish and construction waste materials is not permitted onsite.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes	.1	Construction aids.
	.2	Office and sheds.
	.3	Parking.
	.4	Project Identification.
1.2 Installation and Removal	.1	Provide construction facilities in order to execute work expeditiously.
	.2	Remove from all sites all such facilities after use.
1.3 Scaffolding	.1	Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, and temporary stairs as necessary to carry out Work.
1.4 Hoisting	.1	Provide, operate, and maintain hoists and cranes required for moving of workers, materials, and equipment. Make financial arrangements with Subcontractors for use thereof.
	.2	Hoists and cranes shall be operated by qualified operators.
1.5 Site Storage/Loading	.1	Confine Work and operations of employees to only that which is required by the Contract Documents.
	.2	Do not unreasonably encumber premises with products.
	.3	Do not load or permit to load any part of Work with a weight or force that will endanger the Work.
1.6 Construction Access and Parking	.1	Parking will be permitted onsite provided it does not disrupt performance of Work.
	.2	Provide and maintain adequate access to project site.
	.3	Build and maintain temporary roads where indicated or directed by Departmental Representative and provide snow removal during period of Work.
	.4	If authorized to use existing roads for access to project sites, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.
1.7 Sanitary Facilities	.1	Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.8 Construction Signage

.1 Locate project identification signs if and when directed by Departmental Representative.

.2 Direct requests for approval to erect a Consultant/Contractor signboard to Departmental Representative. Wording shall be in both official languages.

.3 Signs and notices for health, safety, traffic control, instruction, etc. shall be in both official languages. See Sections 01 35 33- Health and Safety, and 01 35 00 - Special Procedures for Traffic Control, of these Specifications for more information.

.4 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Barriers.

.2 Environmental Controls.

.3 Traffic Controls.

1.2 Installation and Removal

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from all sites all such work after use.

1.3 Protection for Trees

.1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

.2 Replace any trees designated for saving in kind that are damaged during construction.

1.4 Guard Rails and Barricades

.1 Provide as required by governing authorities.

1.5 Dust Tight Screens

.1 Provide dust tight screens partitions to localize dust generating activities, and for protection of workers, finished areas of Work, and public.

.2 Maintain and relocate protection until such work is complete.

1.6 Access to Site

.1 Provide and maintain access roads as may be required for access to Work.

1.7 Public Traffic Flow

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.8 Fire Routes

.1 Maintain access to property for use by emergency response vehicles.

1.9 Protection for Off-Site and Public Property

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.10 Protection of Structure Finishes

.1 Provide protection for finished and partially finished structure finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and

installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

END OF SECTION

PART 1 - GENERAL

1.1 Products/Material and Equipment

.1 Use NEW products/material and equipment unless otherwise specified.

.2 Use products of one manufacturer for material and equipment of the same type or classification unless otherwise specified.

.3 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.

.4 Remove and replace damage caused to any existing product or part of infrastructure at own expense and to satisfaction of Departmental Representative.

.5 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed.

.6 Metal fastenings:

.1 Prevent electrolytic action between dissimilar metals.
.2 Use non-corrosive fasteners, anchors, and spacers for securing exterior work.

.7 Fastenings which cause spalling or cracking are not acceptable.

.8 Bolts may not project more than 1 diameter beyond nuts.

.9 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact. Do not remove from packaging or bundling until required in Work.

.10 Prevent damage, adulteration, and soiling of products during delivery, handling, and storage. Immediately remove rejected products from site.

.11 Store products in accordance with suppliers' instructions.

.12 Store products subject to damage from weather in weatherproof enclosures.

.13 Touch-up damaged finished surfaces to Departmental Representative's satisfaction.

.14 Remove and replace damaged products during installation at own expense and to satisfaction of Departmental Representative.

1.2 Quality of Products

.1 Products, materials, equipment, and articles (referred to as products throughout Specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source, and quality of Products provided.

.2 Defective products will be rejected regardless of previous inspections.

.1 Inspection does not relieve responsibility, but is precaution against oversight or error.
.2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Retain purchase orders, invoices, and other documents to prove that all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Departmental Representative.

.4 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.5 Unless otherwise indicated in the Specifications, maintain uniformity of manufacture for any particular or like item throughout the site.

1.3 Availability of Products

.1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 If delays in supply of products are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the work.

.3 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 Manufacturer's Instructions

.1 Unless otherwise indicated in Specifications, install or erect products in accordance with manufacturer's instructions.

.1 Do not rely on labels or enclosures provided with products.
.2 Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between Specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.5 Contractor's Options for Selection of Products for Tendering

.1 Products are specified by "Prescriptive" specifications: select any product meeting or exceeding specifications.

.2 Products specified under "Acceptable Products": select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.

.3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.

.4 Products specified to meet particular design requirements or to match existing materials: use only material specified Approved Products. Alternative products may be considered provided full technical data is received in writing by Departmental Representative.

.5 When products are specified by a referenced standard or by Performance specifications, upon request of Departmental Representative obtain from manufacturer an independent laboratory report showing that the product meets or exceeds the specified requirements.

1.6 Substitution After Contract Award

.1 No substitutions are permitted without prior written approval of the Departmental Representative.

.2 Proposals for substitution may only be submitted after Contract award. Such request must include statements of respective costs of items originally specified and the proposed substitution.

.3 Proposals will be considered by the Departmental Representative if:

.1 products selected by tenderer from those specified are not available;

.2 delivery date of products selected from those specified would unduly delay completion of Contract, or

.3 alternative product to that specified, which is brought to the attention of and considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.

.4 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the Project. Pay for design or drawing changes required as result of substitution.

.5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.

1.7 Transportation

.1 Pay costs of transportation of products required in performance of Work.

1.8 Quality of Work

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.9 Coordination

.1 Ensure cooperation of workers during Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves, and accessories.

1.10 Remedial Work

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

PART 2 - PRODUCTS

2.1 Acceptable Products

.1 Submit product data sheets for all manufactured products used in the Work to Departmental Representative for review in accordance with Section 01 33 00 - Submittal Procedures.

.2 Use best quality products.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Progressive cleaning.

.2 Final cleaning.

1.2 Project Cleanliness

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris.

.2 Remove waste materials from sites at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials onsite.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

1.3 Final Cleaning

.1 When Work is Substantially Performed, remove surplus products, tools, construction machinery, and equipment not required for performance of remaining Work.

.2 Remove all waste products and debris.

.3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Waste Management Workplan including Waste Audit, Waste Reduction Workplan and Demolition Waste Audit.

1.2 Definitions

.1 Waste Management Coordinator (WMC): Designate individual who is in attendance onsite full-time. Designate, or have designated individuals from each Subcontractor to be responsible for waste management related to their trade and for coordinating activities with WMC.

.2 Waste Audit (WA): Relates to projected waste generation. Involves measuring and estimating quantity and composition of waste, reasons for waste generation, and operational factors that contribute to waste.

.3 Waste Reduction Workplan (WRW): Written report that addresses opportunities for reduction, reuse, or recycling of materials.

.4 Materials Source Separation Program (MSSP): consists of a series of ongoing activities to separate reusable and recyclable waste materials into material categories from other types of waste at point of generation.

1.3 Documents

.1 Maintain at the job site one copy of following documents:

.1 Waste Management Workplan.

1.4 Use of Site and Facilities

.1 Locate waste, refuse, recycling, etc. containers in locations to facilitate deposit of materials without hindering daily operations.

.2 Locate separated materials in areas which minimize material damage.

1.5 Submittal

.1 Submit requested submittals in accordance with Section 01 33 00, Submittal Procedures.

.2 Prepare and submit the following submittals within 14 days of the Award of Contract:

.1 Submit 3 copies of completed Waste Management Workplan (WMW).

.3 Provide Departmental Representative with receipts indicating quantity of material delivered to landfill.

.4 Provide Departmental Representative with receipts indicating quantity and type of materials sent for recycling.

1.6 Waste Management Workplan

.1 Structure WMW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.2 Describe management of waste.

.3 Identify opportunities for reduction, reuse, and/or recycling (3Rs) of materials.

.4 Post workplan or summary where workers at site are able to review its content.

1.7 Waste Processing Sites

.1 Provide waste processing sites as applicable within the Province of British Columbia to Departmental Representative within 14 days of the Award of Contract.

1.8 Disposal of Wastes

.1 Burying of rubbish and waste materials is prohibited unless approved by Departmental Representative at off-site locations obtained by the Contractor.

.2 Burning of rubbish and waste materials is prohibited unless permitted by British Columbia Ministry of Forests. Permit to be obtained by the Contractor.

.3 Disposal of waste volatile materials, mineral spirits, oil, paint thinner, etc. into waterways or by dumping onsite is prohibited.

1.9 Storage and Handling

.1 Store, materials to be reused, recycled, and salvaged in locations obtained by the Contractor and accepted by Departmental Representative.

.2 Unless specified otherwise, materials for removal become Contractor's property.

1.10 Scheduling

.1 Coordinate work with other activities at site to ensure timely and orderly progress of the Work.

PART 2 – EXECUTION

2.1 Application

.1 Do work in compliance with the WMW.

.2 Implement MSSP for waste generated on Project in compliance with approved methods and as approved by Departmental Representative.

.3 Materials must be immediately separated into required categories for reuse or recycling.

.4 Materials in separated condition: collect, handle, store onsite, and transport off-site to an approved and authorized recycling facility.

.5 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

2.2 Cleaning

.1 Remove tools and waste materials on completion of work, and leave work area in clean and orderly condition.

.2 Cleanup work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

2.3 Diversion of Materials

.1 Create a list of materials to be separated from the general waste stream and stockpiled in separate containers, to the approval of the Departmental Representative and consistent with applicable fire regulations.

.1 Mark containers.
.2 Provide instruction on disposal practices.

.2 Onsite sale of salvaged, recovered, reusable, recyclable, etc. materials is not permitted.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Administrative procedures preceding preliminary and final reviews of Work.

1.2 Inspection and Declaration

.1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request Departmental Representative's Inspection.

.2 Departmental Representative's Review: Departmental Representative and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.

.3 Completion: submit written certificate that the following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Work is complete and ready for Final Review.

.4 Final Review: when items noted above are completed, request final review of Work by Departmental Representative. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request another review.

.5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Certificate of Substantial Performance.

.6 Commencement of Warranty Periods: date of Departmental Representative's acceptance of submitted declaration of Substantial Performance shall be date of commencement for warranty period.

.7 Final Payment: When Departmental Representative considers final deficiencies and defects have been corrected and it appears

requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request final review.

.8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with General Conditions.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections
.1 Section 01 33 00 – Submittal Procedures
.2 Section 01 35 43 – Environmental Procedures

1.2 References
.1 Export and Import of Hazardous Waste Regulations (EIHW Regulations), SOR/92637.
.2 National Fire Code of Canada 1995
.3 Transportation of Dangerous Goods Act (TDG Act) 1992, (T19.01).
.4 Transportation of Dangerous Goods Regulations (TDGR), (SOR/8577, SOR/85585, SOR/85609, SOR/86526).

1.3 Definition
.1 Dangerous Goods: Products, , substance, or organism that specifically listed or meets the hazard criteria established in Transportation of Dangerous Goods Regulation.
.2 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
.3 Hazardous Waste: Any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.
.4 Workplace Hazardous Materials Information System (WHMIS): A Canada wide system designed to give employers and workers information about hazardous materials used in the workplace. Under WHMIS, information on hazardous materials is to be provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by a combination of federal and provincial laws.

1.4 Submittals
.1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.
.2 Submit to Departmental Representative current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.
.3 Submit hazardous materials management plan to Departmental Representative that identifies all hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements.

1.5 Storage and Handling
.1 Coordinate storage of hazardous materials with Departmental Representative and abide by internal requirements for labeling and storage of materials and wastes.
.2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
.3 Store and handle flammable and combustible materials in accordance with current National Fire Code of Canada requirements.

.4 Observe smoking regulations at all times. Smoking is prohibited in any area where hazardous materials are stored, used, or handled.

.5 Abide by the following storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:

1. Store hazardous materials and wastes in closed and sealed containers that are in good condition.
2. Label containers of hazardous materials and wastes in accordance with WHMIS.
3. Store hazardous materials and wastes in containers compatible with that material or waste.
4. Segregate incompatible materials and wastes.
5. Ensure that different hazardous materials or hazardous wastes are not mixed.
6. Store hazardous materials and wastes in a secure storage area with controlled access.
7. Maintain a clear egress form storage area.
8. Store hazardous materials and wastes in a manner and location that shall prevent them from spilling into the environment.
9. Have appropriate emergency spill response equipment available near the storage area, including personal protective equipment.
10. Maintain an inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.6 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.7 Report spills or accidents immediately to Departmental Representative and the ESO. Submit a written spill report to Departmental Representative within 24 hours of incident/

1.6 Transportation

.1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.2 If exporting hazardous waste to another country, ensure compliance with federal Export and Import of Hazardous Waste Regulations.

.3 If hazardous waste is generated on site:

1. Coordinate transportation and disposal with Departmental Representative.
2. Ensure compliance with applicable provincial laws and regulations for generators of hazardous waste.
3. Use only a licensed carrier authorized by provincial authorities to accept subject material.
4. Prior to shipping material, obtain written notice from intended hazardous waste treatment or disposal facility

that it will accept material and that it is licensed to accept this material.

5. Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
6. Ensure that only trained personnel handle, offer for transport, or transport dangerous goods.
7. Provide a photocopy of all shipping documents and waste manifests to Departmental Representative.
8. Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Departmental Representative.
9. Report any discharge, emission, or escape of hazardous materials immediately to the Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.

PART 2 - PRODUCTS

2.1 Materials

.1 only bring on site the quantity of hazardous materials required to perform work.

2 Maintain MSDSs in proximity to where the materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

PART 3 - EXECUTION

3.1 Disposal

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

.2 Recycle hazardous wastes for which there is an approved, cost effective recycling process available.

.3 Send hazardous wastes only to authorized hazardous waste disposal treatment facilities.

.4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

.5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

.6 Dispose of hazardous wastes in a timely fashion in accordance with applicable provincial regulations.

END OF SECTION

PART 1 - GENERAL

1.1 Basis of Payment

.1 All materials and work required under this Section shall be based on Section 01 29 01 Method of Measurement and Payment.

1.2 References

.1 American Association for State Highway and Transportation Officials (AASHTO).

.1 AASHTO Standard Specifications for Highway Bridges.

.2 American Society for Testing and Materials (ASTM).

.1 ASTM A 325M, Specification for Structural Bolts, Steel, Heat Treated 120/105ksi Minimum Tensile Strength.
.2 ASTM A490M, Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints.
.3 ASTM F959M-02, Standard Specifications for Compressible-Washer-Type Direct Tension Indicators (DTI) for Use with Structural Fasteners.
.4 ASTM A370, Standard Methods and Definitions for Mechanical Testing of Steel Products.
.5 ASTM F3125-15a, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions

.3 Canadian Standards Association (CSA).

.1 CAN/CSA-G40.20, General Requirements for Rolled or Welded Structural Quality Steel.
.2 CAN/CSA-G40.21, Structural Quality Steels.
.3 CAN/CSA S6-14, Canadian Highway Bridge Design Code.
.4 CAN/CSA-S16-14, Limit States Design of Steel Structures.
.5 CSA S269.1, Falsework for Construction Purposes.
.6 CSA W48, Series, Various Dates, Electrodes.
.7 CSA W59, Welded Steel Construction (Metal Arc Welding).
.8 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.

1.3 Shop Drawings

.1 Prepare and submit shop drawings in accordance with Section 01 33 00, Submittal Procedures.

.2 Indicate shop and erection details including but not limited to shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets, and welds. Indicate welds by CSA W59 welding symbols.

.3 Proposed welding procedures to be in accordance with Canadian Welding Bureau standards.

.4 Prepare and submit all drawings and documents necessary to describe the following:

.1 Access to work.

.2 Type and capacity of equipment to be used.

.3 Sequence of operation: position of cranes, snooper vehicles, and trucks with members.

.4 Position of cranes and snooper vehicles with details of load distribution of wheels and outriggers.

.5 Lifting devices and lifting points.

.6 Details of temporary works: complete falsework and/or shoring plans where required including proposed methods to be used to ensure the required connections and structure shape are maintained prior to bolt torquing, method of providing temporary supports for stability.

.7 Details of temporary works: method of providing temporary supports for stability.

.8 Bolt torquing sequence and method.

.9 Details of release of falsework and/or shoring.

.5 Shop Drawings showing partial details or details of some elements but not all will not be reviewed until all details have been submitted to the Departmental Representative.

.6 The Erection Proposal submission or its approval shall not relieve the Contractor of responsibility for providing proper methods, equipment, workmanship, and safety precautions.

1.4 Qualifications

.1 Notify the Departmental Representative of all Subcontractors and be responsible for all Subcontractors. All terms of the Contract shall apply to the Subcontractor(s) as well.

.2 The Fabricator shall operate a recognized steel fabricating shop approved by the Departmental Representative.

.3 The Fabricator shall be fully approved by the Canadian Welding

Bureau (CWB) as per CSA Standard W47.1.

.4 Only welders, welding operators, and tackers approved by the CWB in their particular category shall be permitted to perform weldments. Their qualifications shall be current and available for examination by the Departmental Representative.

1.5 Delivery, Storage, and Handling

.1 Deliver, store, and handle products in accordance with Section 01 61 10 - Product Requirements.

.2 Provide protective blocking for lifting, transportation, and storing. Exercise care during fabrication, transportation, and erection so as not to damage steel members. Do not notch edges of members. Do not cause excessive stresses.

.3 Mark mass on members weighing more than 3 tonnes.

.4 Ensure that no portion of steel comes into contact with the ground.

.5 Provide Departmental Representative with delivery schedules a minimum of 7 days prior to shipping.

PART 2 - PRODUCTS

2.1 General

.1 Conform to applicable ASTM standards in the absence of applicable CSA or CGSB standards.

.2 Integrate in the Works only new permanent materials, except when authorized in writing by the Departmental Representative.

.3 Do no modify materials or construction details without previous written approval by the Departmental Representative, even if these modifications are deemed necessary or desirable by the Contractor.

2.2 Materials

.1 Structural steel: to CAN/CSA-G40.21, grades and types 300W or as noted on drawings.

.2 High strength bolts, nuts, and washers: to ASTM F3125-15a or A325M. Bolts to ASTM A490M may be used if approved by Departmental Representative.

.3 Welding electrodes: to CSA W48 series.

.4 Direct tension indicator washer: to ASTM F959M.

2.3 Source Quality Control

.1 Provide Departmental Representative prior to fabrication, with

four copies of steel producer certificates, in accordance with CAN/CSA G40.20. Include in certificates all mill test reports related to chemical analysis and physical tests for each heat from which elements have been fabricated.

.2 Make available for inspection all mill samples used for physical tests.

.3 When steel elements are obtained from stock, prove quality of materials by providing Departmental Representative with fabricator stamps and certificates stating that steel conforms to prescribed requirements.

.4 When steel elements are obtained from stock, Departmental Representative reserves the right to select elements and pieces to test at Contractor's expense.

.5 In the absence of mill certificates, for all steel from stock, provide Departmental Representative with a certificate stating that all steel conforms to prescribed requirements.

.6 Provide suitable facilities and cooperate with inspection organization and Departmental Representative in carrying out inspections and tests required.

.1 Inspection of the coating will be carried out by Departmental Representative. Supply power, scaffolding, weather protection, and access for the required testing procedures. Pay for all costs, including the cost of re-inspection and re-testing, associated with the correction or repair of rejected defects.

.2 Give the Departmental Representative not less than seven (7) working days' notice of when work is ready for inspection. Include notice of the type and quantity of work to be inspected. Provide access to the Departmental Representative for all inspection procedures.

PART 3 - EXECUTION

3.1 Erection

.1 Do not commence steel erection until approval of the Erection Proposal has been obtained from the Departmental Representative.

.2 If staining or defacing occurs, clean steel surfaces to Departmental Representative's approval.

.3 Do not disturb river banks or embankments without prior written permission of Departmental Representative.

.4 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking, or sharply bending metal of any unit. Enlarge holes if necessary by reaming only after written approval is obtained from Departmental Representative. Reamed holes not to exceed size of bolt used by more than 2 mm.

.5 Check exact position, diameter, and number of existing bolt holes when these have to be used for connecting new members or elements. Immediately report any discrepancies to Departmental Representative.

.6 Straightening onsite of existing bent steel members/elements which are not specified on the Contract drawings to be replaced to be done by cold straightening. Any steel members/elements that are cracked due to cold straightening shall be replaced at the Contractor's cost and to the approval of Departmental Representative. Hot straightening not to be used unless approval is obtained from Departmental Representative.

.7 The Contractor shall confirm onsite all dimensions required for fabrication and dimensions shown on the Contract Drawings prior to any fabrication.

3.2 Installation

.1 Unless otherwise noted, carry out fabrication and erection of structural steel in accordance with CAN/CSA S6-14, Canadian Highway Bridge Design Code.

.2 Allowable tolerances for elements:

.1 Conform to Clause 28.9 of CAN/CSA S16.14 standard.

.2 Conform to prescriptions of CAN/CSA G40.20 standard.

.3 Conform to prescriptions of CAN/CSA W59 standard

.3 Falsework shall be in accordance with CSA S269.1, except where specified otherwise.

.4 Welding: do welding in accordance with CSA W59, except where specified otherwise.

.1 For CAN/CSA G40.21, grade 300W steel, deposited weld metal to have Charpy V-Notch value not lower than that of steel.

.2 Unless indicated otherwise on the drawings, no welding, of whatever nature and extent, is allowed without the written authorization of the Departmental Representative, and then, only in such a way and at locations designated in his/her authorization.

.3 Minimal fillet weld size: conform to the requirements prescribed in CAN/CSA S6-14 standard. Detail these in shop drawings.

.4 Appoint and pay for the services of an independent welding inspector certified to visually inspect all completed welds as per CSA W59-M standard.

.5 High strength bolting: install bolts in accordance with CAN/CSA S6-06 and CAN/CSA S16-14 standards. Tighten as per manufacturer's requirements. Use Direct Tension Indicator (DTI) spacing washers in all cases.

.6 Finish: members true to line, free from twists, bends, open joints, sharp corners, sharp edges, etc.

.7 Allowable tolerance for bolt holes:

.1 Matching holes for bolts to line up so that dowel 2 mm less in diameter than hole passes freely through assembled members at right angles to such members.

.2 Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by Departmental Representative.

.3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.

.4 Centre-to-centre distance between any two groups of holes to vary not more than following:

Centre-to-Centre Distance (m)	Tolerance Plus or Minus (mm)
Less Than 10	1
10 to 20	2
20 to 30	3

.5 Correct mispunched or misdrilled members only as directed

by Departmental Representative.

.8 Span length tolerances in accordance with CAN/CSA S6-14 and CAN/CSA S16-14 standards.

.9 Shop splices:

.1 Use complete joint penetration groove welds finished flush. Details of butt joints to CSA W59. Use only as approved by Departmental Representative.

.10 Field splices: to approval of Departmental Representative.

.11 Mark members in accordance with CAN/CSA G40.20. Do not use die stamping.

.12 Match marking: shop mark bearing assemblies and splices.

.13 Ensure that all participants in construction works comply with the requirements of CAN/CSA-Z94.4 standard regarding the use of respiratory apparatuses when working with paint or as required.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A269, Specification for Seamless and Welded Austenitic Stainless-Steel Tubing for General Service.

.3 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-1.40, Anti-corrosive Structural Steel Alkyd Primer.

.2 CAN/CGSB-1.181, Ready-Mixed, Organic Zinc-Rich Coating.

.3 Canadian Standards Association (CSA International).

.1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel.

.2 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CAN/CSA-S16.1-14, Limit States Design of Steel Structures.

.4 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau.

.5 CSA W59, Welded Steel Construction (Metal Arc Welding) (Imperial Version).

1.2 Submittals

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit three copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 -

Submittal Procedures. Indicate VOC's:

1. For finishes, coatings, primers and paints.

.3 Shop Drawings

1. Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
2. Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.3 Quality Assurance

.1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section.

1.4 Delivery, Storage and Handling

.1 Packing, Shipping, Handling and Unloading:

1. Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Storage and Protection:

1. Cover exposed stainless-steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
2. Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.5 Waste Management

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper plastic, polystyrene, and corrugated cardboard packaging material off site for recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 Material list

.1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.

.2 Steel end protection: fabricated from bent DN200 STD pipe.

.3 CSP pipe piece: to ASTM A53/A53M standard weight, galvanized finish.

.4 Welding materials: to CSA W59.

.5 Welding electrodes: to CSA W48 Series.

.6 Bolts and anchor bolts: to ASTM A307.

.7 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 Fabrication

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Where possible, fit and shop assemble work, ready for erection.

.3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 Isolation Coating

.1 Isolate aluminum from following components, by means of bituminous paint:

1. Dissimilar metals except stainless steel, zinc, or white bronze of small area.
2. Concrete, mortar and masonry.
3. Wood.

2.4 Steel Angles and Channels

.1 Steel angles: as shown on drawings.

.2 Steel channels: as shown on drawings.

PART 3 - EXECUTION

3.1 Erection

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Provide components for building by other sections in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CAN/CSA-S16.1, or weld.

.7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

.9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 Cleaning

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

1. GENERAL

1.1 REFERENCES

.1 British Columbia Ministry of Transportation and Infrastructure

.1 Approved Paint Systems shall be in accordance with the most recent edition of the Recognized Products List published by the British Columbia Ministry of Transportation and Infrastructure.

.2 Federal Standard (FS).

.1 FS-595B-Current Edition, Paint Colors.

.3 Society for Protective Coatings (SSPC).

.1 SSPC-SP-1, Solvent Cleaning.

.2 SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning.

.3 SSPC-Vis-1, Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs) Editorial Changes September 1, 2000 (Steel Structures Painting Manual, Chapter 2 - Surface Preparation Specs.).

.4 SSPC-Guide 15, Field Methods for Retrieval and Analysis of Soluble Salts on Substrates.

.5 SSPC-PA2, Measurement of Dry Coat Thickness with Magnetic Gauges.

.6 SSPC Good Painting Practices, Volume 1, 4th Edition.

.7 SSPC-Guide 6, Guide for Containing Debris Generated During Paint Removal Operations

.4 Transportation of Dangerous Goods Act (TDG Act) 1992, (T-19.01).

.5 Transportation of Dangerous Goods Regulations (TDGR), (SOR/85-77, SOR/85-585, SOR/85-609, SOR/86-526).

.6 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.7 Province of British Columbia

.1 Workers Compensation Act, RSBC 1996 –Updated 2006.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 Lower Liard River Bridge, km 763.3

.1 Cleaning and preparation of structural steel and components, supply of paint, application of paint, erection and maintenance of containment structures and all incidental work will be measured a unit sum basis for square meters of

structural steel prepared and recoated and payment will be made on the basis of the unit rate price bid for "Surface Preparation and Painting", which shall include full compensation for the cost of furnishing all labor, materials, equipment, tools and incidentals necessary to complete the work including, but not limited to, permitting, project preparation, traffic control, installation and maintenance of all necessary scaffolding, enclosures, and blast media collection systems, heating and hording systems and other systems for maintenance of favourable coating application conditions within the enclosure, surface preparation of structural steel, lead abatement and disposal of lead contaminated material, quality control, supply and installation of coating systems, curing and correction of coating deficiencies, and site cleanup and for any other work not included in other sections of the specifications.

.2 Progress payments will be made monthly and will be based on the percentage of the total estimated area satisfactorily cleaned and coated as determined by the Departmental Representative.

.3 Payment will not be made for areas which do not have the specified number of coats for the paint system used nor for areas which are complete but have designated repairs outstanding.

1.3 SUBMITTALS

.1 Product Data.

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for paint.

.3 Paints that do not appear on the "British Columbia Ministry of Transportation and Infrastructure Recognized Product List" (available at: http://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/engineering-standards-and-guidelines/recognized-products-list/recognized_products_list.pdf), Type B for the Lower Liard River Bridge, System Application SF2, will not be accepted.

.4 Contractor shall not change to another approved system once the initial paint system has been applied to any portion of the structure.

.2 Test Reports.

.1 For each batch, the Contractor shall carry out the necessary testing prior to usage, to ensure the paint being supplied meets British Columbia Ministry of Transportation and Infrastructure requirements for:

.1 Colour

.2 Gloss

.3 Solids content

.4 IR (Infra-red analysis for comparison with the original approval testing).

.3 Samples.

.1 Enable Departmental Representative to take one (1) - 1 L samples of each batch of paint delivered to site from manufacturer's containers.

.2 Departmental Representative will test the samples to assure the paint complies with the original approval testing.

.4 Manufacturer's Instructions.

.1 Submit manufacturer's installation instructions.

.5 Scaffold and Enclosure Drawings.

.1 Submit drawings for scaffold and enclosure in accordance to Section 01 33 00 - Submittal Procedures. Drawings for scaffold and enclosure shall be sealed by a Professional Engineer registered in the Province of British Columbia.

1.4 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.1 Test reports shall be submitted in accordance with Section 01 33 00 –Submittal Procedures.

.2 Pre-Installation Meetings:

.1 Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.2 Site is to be examined to become completely familiar with every detail and intent of both this specification and the scope of work to be performed as detailed in the Contract.

.3 Site and surrounding area is to be examined to become familiar with all restrictions or possible restrictions, public traffic, and the property of others.

.4 Consultant may conduct pre-installation site testing to verify the blasting required and the lead content that may be expected in the blasting spoil. Any site testing must be pre-approved by Departmental Representative.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Protection and Section 02 81 01 - Hazardous Materials.

.2 Divert unused coating materials from landfill through disposal at a special wastes depot.

2. PRODUCTS

2.1 MATERIALS

.1 Blasting Media.

.1 Contractor may choose the type of abrasive intended for use, taking into consideration the abrasive disposal and worker's health implications of each type.

.2 Blasting grit shall be free of corrosion producing contaminants and shall be free of any moisture, oils, greases or other elements which will reduce the adhesion of paint coatings.

.3 The blast cleaning abrasive used shall produce the minimum surface profile required by the paint manufacturer.

.2 Paint.

.1 To British Columbia Ministry of Transportation and Infrastructure's "Recognized Products List" for coating systems Type B2 – deck truss for Lower Liard River

.2 If changes, additions or deletions are made to this Approved list prior to project initiation, current edition of the Approved list shall be used.

.3 Topcoat Colour in accordance with Section 3.6 –Special Procedures.

.4 The primer shall be tinted to a Colour that contrasts from the prepared steel and from the intermediate coat.

.5 The intermediate coat shall be tinted to be readily distinguished from the primer and the topcoat.

.6 Paint shall be safely stored by the Contractor in a location which keeps its temperature in the range of 10ºC to 25ºC.

3. Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 AREAS TO BE PAINTED

.1 The areas to be painted shall be in accordance with the Project Drawings.

.2 If decking and/or fencing or other appurtenances require removal to provide proper access to the structural steel, this shall be performed by the Contractor at the Contractor's expense. No measurement or additional payment will be made for this work.

.3 Galvanized steel shall not be prepared, damaged, or painted.

.4 There are no known areas that are inaccessible for painting on these bridges, however, if in the opinion of the Departmental Representative, an area is deemed to be truly inaccessible (e.g. back to back angle irons), the area shall be cleaned, primed, and painted to the best of the Contractor's ability and to the satisfaction of the Departmental Representative.

.5 Areas on the interior (enclosed) side of the built-up section comprising the top chord shall not be recoated.

3.3 PREPARATION

.1 Washing

.1 Before any blast cleaning operations commence, the Contractor shall carry out surface cleaning operations on all steel designated to receive a coating system.

.2 All organic materials such as bird droppings, nests and any other non-structural items or pollutants attached to the steel are to be removed by hand cleaning operations.

.3 All oil, grease and road tar shall be removed manually with solvent cleaning as per SSPC Specification SP1. Any area contaminated with oil or grease shall be cleaned with an approved biodegradable detergent. The detergent is to be environmentally friendly. The Contractor shall supply copies of the applicable MSDS sheets to the Departmental Representative prior to using the material.

.4 The entire area to be coated shall be washed clean of road spatter, chlorides and other surface contaminants using water of sufficient pressure and volume to flush the chlorides free of the structure.

.2 Surface Preparation.

.1 Clean all surfaces by removing paint, rust, mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with following.

.1 Commercial blast cleaning: SSPC-SP 6, free of all visible oil, grease, dirt, dust, mill scale, rust and paint.

.2 Compressed air to be free of water and oil before reaching nozzle. Prior to abrasive blast cleaning, the Contractor shall demonstrate to the Inspector that the air is moisture free.

.3 Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, by blowing with clean dry compressed air, or by vacuum cleaning.

.4 Contractor shall prepare only as much surface as can be coated with primer the same day. If unusual circumstances occur which prevent all prepared surfaces from being primed the same day, a light blast cleaning will be required over all unprimed surfaces prior to recommencement of painting.

.5 The surface profile (anchor pattern) in the blasted steel shall be as recommended by the Paint Manufacturer.

.3 Examination of Prepared Surfaces

.1 Do not apply paint until prepared surfaces have been accepted by the Departmental Representative.

.2 Prior to commencing paint application, the degree of cleanliness of surfaces to be in accordance with SSPC-Vis1 to the satisfaction of the Departmental Representative.

.3 Prepared surfaces shall be inspected by testing for chloride ion levels on the cleaned steel by Departmental Representative. Chloride ion contamination of the cleaned surface shall be less than 7 $\mu g/cm^2$ as measured by Kitigawa fast salinity test (Chlor-Test).

.4 Any prepared surfaces which do not meet the chloride ion limit criteria shall be re-washed using a chloride ion extractor such as Chlor-Rid or approved equivalent until these specifications are met.

.5 Prepared surfaces shall be inspected by testing for ferrous ions and sulfates on the cleaned steel by Departmental Representative. Ferrous ion contamination of the cleaned surface shall be less than 10 $\mu g/cm^2$ when tested by SSPC-Guide 15 swabbing extraction method. Sulfate contamination of the cleaned surface shall be less than 17 $\mu g/cm^2$ when tested by SSPC-Guide 15 swabbing extraction method.

.6 Any prepared surface that do not meet the ferrous ion and sulfate limit criteria shall be re-washed.

.7 Surface profile shall be approved by Inspector based on results obtained by testing with Testex tape or surface profilometer gauge.

.4 Protection of surfaces.

.1 Protect surfaces not to be painted and if damaged, clean and restore such surfaces as directed by Departmental Representative.

.2 Apply primer, paint, or pre-treatment after surface has been cleaned and before deterioration of surface occurs.

.3 Clean surfaces again to satisfaction of Inspector if flash rusting occurs after completion of surface preparation.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.

.5 Protect cleaned and freshly painted surfaces from dust and damage from ongoing Contractor operations to approval of Engineer.

.6 Contractor shall protect and maintain the painted surfaces until acceptance of the entire project.

.7 The Contractor shall take due precaution against damaging or disfiguring any portion of the bridge with:

.1 Spatter,

.2 Spray fog,

.3 Splashes,

.4 Smirches of paint or associated painting materials including the fuel and lubricants used with his equipment.

.5 Tarps, polyethylene or other covering material shall be used to protect deck, sidewalks, piers, abutments, slope protection and other portions of the structure adjacent to areas being painted and subject to paint or other damage.

.6 Any inadvertent damage or disfigurement which may occur by reason of the Contractor's operations shall immediately be repaired to the satisfaction of the Departmental Representative.

.5 Pack rust.

.1 Pack rust that forces plates or structural sections apart to form a gap of 2 mm or greater shall be cleaned to a depth of one half of the gap width, to a maximum depth of 6.0 mm, treated with an approved penetrant and caulked to form a water tight seal along the top edge and the two sides of plate involved. The bottom edge or the lowest edge of the plate or member shall not be caulked.

.2 The type of penetrant and caulking used must be compatible with the paint system used and shall be applied according to the Manufacturer's instructions. No penetrant or caulking shall be used which has not been accepted by the Departmental Representative. When caulking joints where only one plate edge is exposed, a fillet of caulking shall be formed which is not less than 3 mm or the width of the pack rust gap. The fillet is not required where there is no separation of the plates due to pack rust.

.3 Regardless of whether pack rust is evident or not, all connection plates within the areas to be painted shall be treated with an approved penetrant and caulked as described. All costs associated with the penetrant treatment and caulking will be considered incidental to the work and no separate or additional payment will be made.

.6 Mixing paint.

.1 Do not dilute or thin paint for brush application; use as received from manufacturer.

.2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.

.3 Do not mix or keep paint in suspension by means of air bubbling through paint.

.4 Thin paint for spraying according to manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

.5 Paint shall not remain in spray pots, painter's buckets etc. overnight.

.6 Multi-component paints that have been mixed and the Manufacturer's recommended pot-life has been exceeded shall be properly disposed of.

.7 Paint coats.

.1 As specified by Coating Manufacturer and as on Recognized Products List.

.2 Paint thickness shall be to the Manufacturer's specifications.

.3 Stripe painting of primer and intermediate coats is required for the following areas:

.1 Bolt heads

.2 Edges of plates

.3 90º corners on any steel (interior/exterior)

.4 Sharp corners of structural steel

.4 Stripe painting shall be performed with primer to full specified primer thickness and to Manufacturer's specifications for primer material prior to the application of the full primer coat to the satisfaction of the Departmental Representative.

.5 Stripe painting shall be performed with intermediate coat to full specified intermediate material thickness and to Manufacturer's specifications for intermediate material prior to the application of the full intermediate coat to the satisfaction of the Departmental Representative.

.6 Stripe painting of the top coat is not required.

.7 As a result of stripe painting, additional film thickness will be built up around edges, bolts, etc. Variation from Manufacturer's recommended thicknesses will be allowed in these areas provided that runs, sags, drips, excessive buildup or other defects are not rejected by the Departmental Representative.

3.4 APPLICATION

.1 Apply paint by spraying, brushing, or combination of both using application procedures and equipment in accordance with the Manufacturer's instructions. Use sheepskins or daubers when no other method is practical in places of difficult access.

.2 Where surface is to be painted, do not apply paint without special precautions and provisions including heating and hording when:

.1 Environmental conditions do not meet Manufacturer's recommendations.

.2 Air temperature is below 4 degrees C or when temperature is expected to drop to 0 degrees C before paint has dried.

.3 Temperature of surface is or will be over 50 degrees C before the paint has cured unless paint is specifically formulated for application at high temperatures.

.4 Painting shall not commence unless the ambient temperature exceeds the dew point temperature by more than 5ºC and the ambient temperature is rising.

.5 Fog or mist occur at site; it is raining or snowing; there is danger of rain or snow; relative humidity is above 85%.

.6 Surface to be painted is wet, damp or frosted.

.7 Previous coat is not fully cured to the satisfaction of the Departmental Representative.

.3 Provide cover when paint must be applied in damp or cold weather. Protect, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified in 3.4.2. Protect until paint is dry or until weather conditions are suitable.

.4 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

.5 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.6 Contractor shall use wet film thickness gauges frequently to verify full application of coatings.

.7 Brush application.

.1 Work paint into cracks, crevices and corners and paint surfaces not accessible to brushes by spray, daubers or sheepskins specifically designed for this purpose.

.2 Brush out runs and sags.

.3 Remove runs, sags and brush marks from finished work and repaint.

.8 Spray application.

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.

.3 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.4 Apply paint in uniform layer, with overlapping at edges of spray pattern.

.5 Brush out immediately runs and sags.

.6 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.

.7 Remove runs, sags and brush marks from finished work and repaint.

.9 Handling painted metal.

.1 Do not handle painted metal until paint has dried, except for necessary handling for painting or stacking for drying.

.2 Scrape off and touch up paint which is damaged in handling, with same number of coats and kinds of paint as were previously applied to metal.

3.5 FIELD QUALITY CONTROL

.1 Site Tests, Inspections.

.1 Upon completion of the each of the prime, intermediate and topcoats, test for dry film reading and evaluate the results as per SSPC PA2, to be verified in conjunction with Inspector.

.2 Any newly painted surfaces will be rejected if any of the following defects are apparent:

.1 Runs, sags, holidays or shadowing caused by inefficient application methods.

.2 Evidence of poor coverage at bolts, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.

.3 Surfaces which have been struck, scraped, spotted by rain or otherwise damaged.

.4 Surfaces which exhibit an objectionable texture such as orange peel, mud cracking, fish eyes, etc.

.5 Surfaces damaged by overspray.

.3 Repair areas, as determined by the Departmental Representative, shall be cleaned of all damaged paint and the system re-applied using all coats typical to the specified paint system. Each coat shall be thoroughly dry before applying subsequent coats.

.4 The Contractor shall carry out all repairs at no additional cost to PSPC.

3.6 SPECIAL PROCEDURES

.1 Lower Liard River Bridge Alaska Highway km 763.3.

.1 Paint.

.1 To British Columbia Ministry of Transportation and Infrastructure's "Recognized Products List" for coating systems Type B2 –deck truss.

.2 If changes, additions or deletions are made to this Recognized Products List prior to project initiation, current edition of the Recognized Products List shall be used.

.3 Topcoat Colour to match existing coating.

.2 Areas to be painted.

.1 Paint the structural steel elements as indicated in the Project Drawings.

.3 Scaffolding and Enclosures

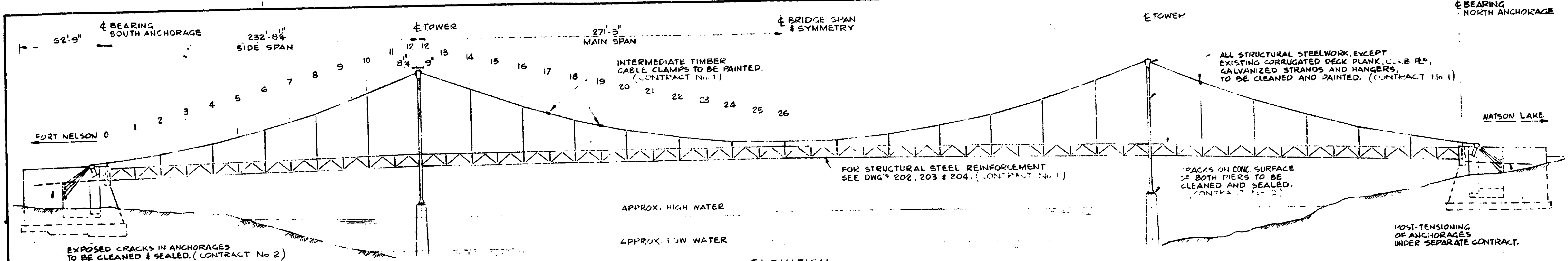
.1 Scaffolding and enclosure construction shall conform to the requirements of Z797-09 (R2014) - Code of Practice for Access Scaffold.

.2 Working Drawings for scaffold shall be submitted 30 days in advance of date of planned erection work.

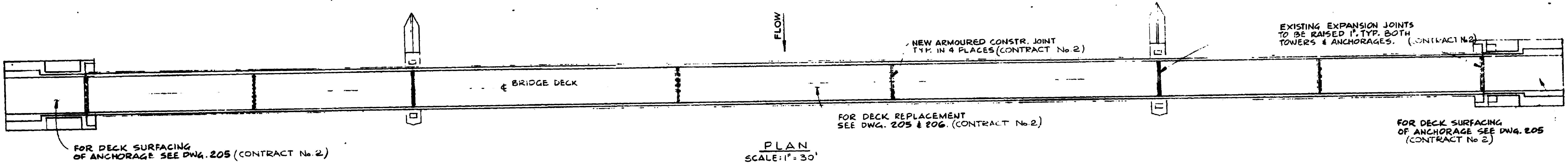
.3 Payment for Scaffolding and Enclosure will be included within the items for Surface Preparation and Painting and no separate or additional payment will be made.

END OF SECTION

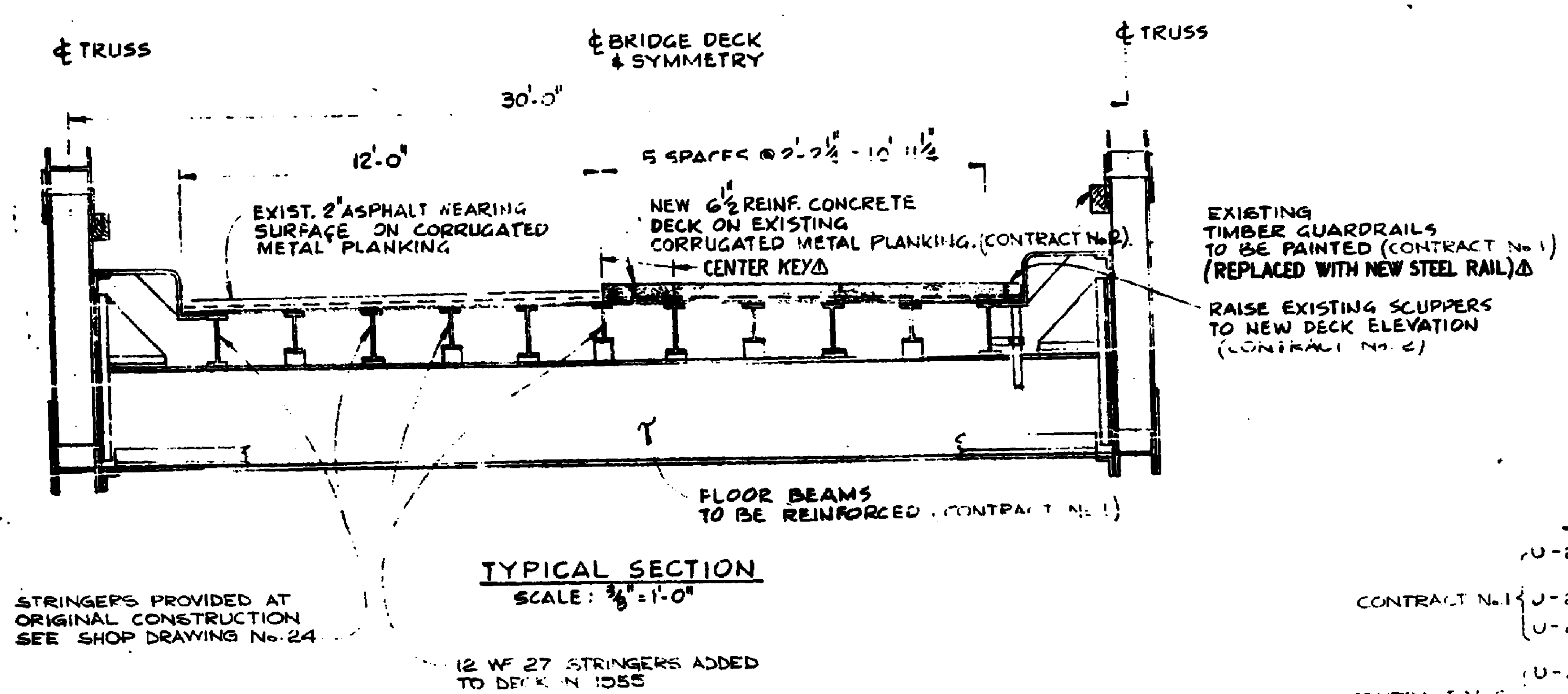
Appendix A - Bridge Strengthening Drawings Dated Feb. 1974



ELEVATION
SCALE: 1" = 30'



PLAN
SCALE: 1" = 30'



TYPICAL SECTION
SCALE: ⅜" = 1'-0"

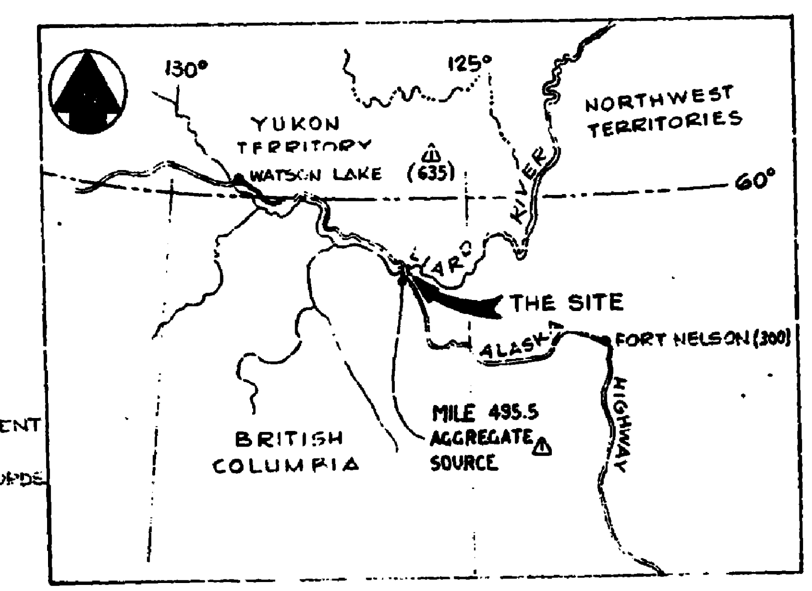
LIST OF DRAWINGS

CONTRACT No. 1
- U-2959-00-202. STRUCTURAL STEEL REINFORCEMENT GENERAL LAYOUT
- U-2959-00-203. STIFFENING TRUSS REINFORCEMENT CHORDS
- U-2959-00-204. STIFFENING TRUSS REINFORCEMENT DIAGONALS & FLOORBEAMS.

CONTRACT No. 2
- U-2959-00-205. REINFORCED CONCRETE DECK. GENERAL LAYOUT & DETAILS.
- U-2959-00-206. REINFORCED CONCRETE DECK SECTION
- U-2959-00-207 DECK POURING SEQUENCE.

REFERENCE DRAWINGS: SEE LISTING ON DRAWING No. 204 & 206

NOTE: COMPLETE SHOP DRAWINGS OF THE ORIGINAL CONSTRUCTION ARE AVAILABLE. THE CONTRACTOR WILL BE PROVIDED WITH TWO PRINTS OF EACH DRAWING REQUIRED.
DESIGN DRAWINGS OF THE MODIFICATIONS PERFORMED IN 1955 ARE AVAILABLE FOR INSPECTION.



KEY PLAN
50 0 50 100 150 200 MILES

NOTES
1. FOR GENERAL NOTES - STEEL SEE DWG. 202.
2. NEW DESIGN LOADING: TWO LANES OF HS 20 STANDARD LOADING OR TWO SINGLE HS 25 TRUCKS BOTH LOCATED IN ACCORDANCE WITH AASHTO SPECIFICATIONS.
3. ONE LANE OF BRIDGE TO BE OPENED TO TRAFFIC 20 MINUTES IN EACH HOUR DURING CONSTRUCTION EXCEPT WHERE EXTENDED DELAYS ARE SPECIFICALLY REQUESTED AND AUTHORIZED.
4. DESIGN IN ACCORDANCE WITH CSA CODE S6 - 1974
5. AS BUILT DRAWINGS CONTRACT N°1 SEPT. 10 1975

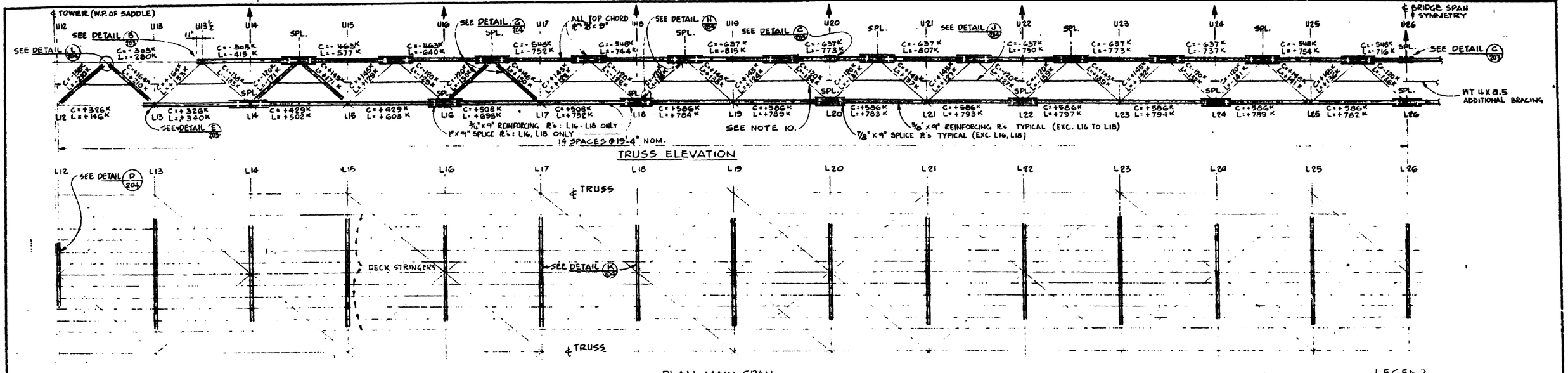
CONTRACT N°2
NEW CONCRETE DECK

REV.	DATE	REVISION	BY	CHD
1	30-12-75	MISC NOTES ADDED		

SWAN WOOSTER ENGINEERING CO. LTD.
TORONTO, PORTLAND, ORE., VANCOUVER, B.C., ST. CATHARINES, ONT., MONTREAL

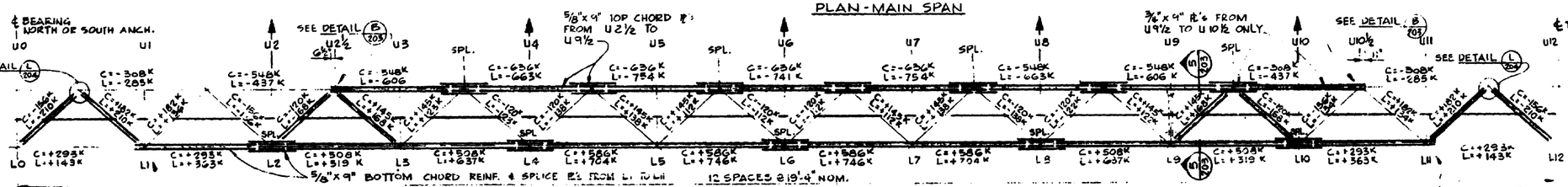
DEPARTMENT OF PUBLIC WORKS
LOWER LIARD BRIDGE
PROPOSED REINFORCEMENT OF EXISTING STRUCTURE
SCALE: AS SHOWN
U-2959-00-201 REV.

139-92-1

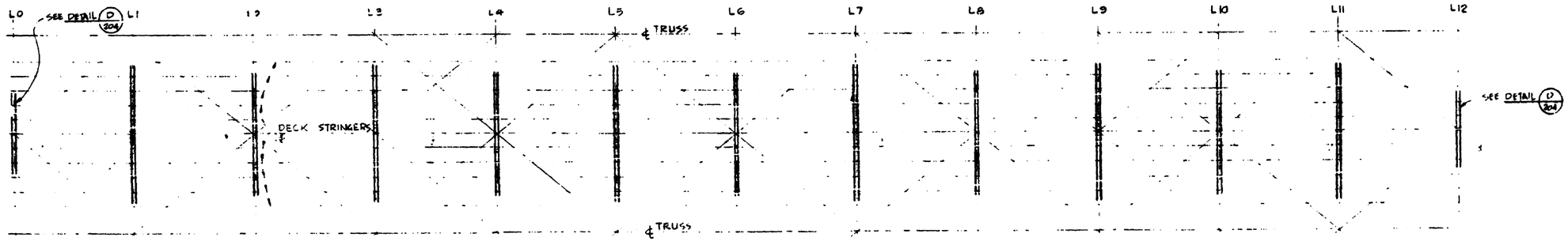


TRUSS ELEVATION

PLAN - MAIN SPAN



TRUSS ELEVATION



PLAN - SIDE SPAN

LEGEND

——— = NEW REINFORCEMENT MATERIALS TO BE INSTALLED UNDER THIS CONTRACT.

——— = EXISTING MEMBERS NOT REQUIRING REINFORCEMENT (OTHER THAN NEW BOLTS)

▲ = TRUSS HANGER LOCATION

SPL. = SPLICE IN EXISTING TRUSS CHORD

C = CAPACITY OF THE EXISTING UNREINFORCED, UNBRACED MEMBER.

L = TOTAL DESIGN LOAD FOR THE MEMBER

GENERAL NOTES - STRUCTURAL STEEL.

1. NEW DESIGN LOADING CONSISTS OF
   A) TWO LANES OF STANDARD H20-S16 LOADING OR
   B) TWO LANES OF STANDARD H15-S12 TRUCK LOADING,
   ALL IN ACCORDANCE WITH AASHTO SPECIFICATIONS.
2. FOR THE FINISHED STRUCTURE HAVING A CONCRETE DECK SLAB THE NEW DESIGN DEAD LOAD FOR EACH MAIN CABLE AVERAGES OUT AT 3.0 K/LIN FT.
3. DESIGN TEMPERATURE IS A RISE OR FALL OF 60°F FROM A "NORMAL" TEMPERATURE OF 30°F.
4. DESIGN WIND LOAD IS 0.31 K/LINEAR FOOT OF TRUSS
5. ALL NEW PLATE AND ROLLED SECTIONS SHALL CONFORM TO CSA STANDARD G40.21 GRADE 38W.
6. ALL BOLTS SHALL CONFORM TO ASTM SPECIFICATIONS A325 & A490 AS NOTED.
7. FOR DETAILS OF EXISTING MEMBERS IN THE TRUSS, REFER TO THE ORIGINAL ERECTION DRAWINGS E2 & E3, THE ACCOMPANYING SHOP DRAWINGS AND T6 STRUCTURAL ENGINEERING SERVICES LTD. DWG. 4850-1-3-1.
8. DURING THE TEMPORARY REMOVAL OF ANY EXISTING RIVETS, SPLICE PL's, GUSSETS OR ANY OTHER MATERIAL FROM AN EXISTING TRUSS, SEE SPECIFICATIONS REGARDING TRAFFIC RE-ROUTING.
9. DESIGN FORCES SHOWN FOR THE MEMBERS ARE THE RESULT OF THE VARIOUS LOADING COMBINATIONS, REDUCED BY THE APPROPRIATE LOAD FACTOR. ALTHOUGH FORCE REVERSAL OCCURS IN MOST MEMBERS, ONLY THAT FORCE GOVERNING MEMBER REINFORCEMENT IS SHOWN
10. CAPACITY OF ORIGINAL DIAGONAL REINFORCED BY NEW HORIZONTAL BRACE IS INCREASED TO 149 KIPS (TYPICAL)

REV.	DATE	REVISION	BY	CHD

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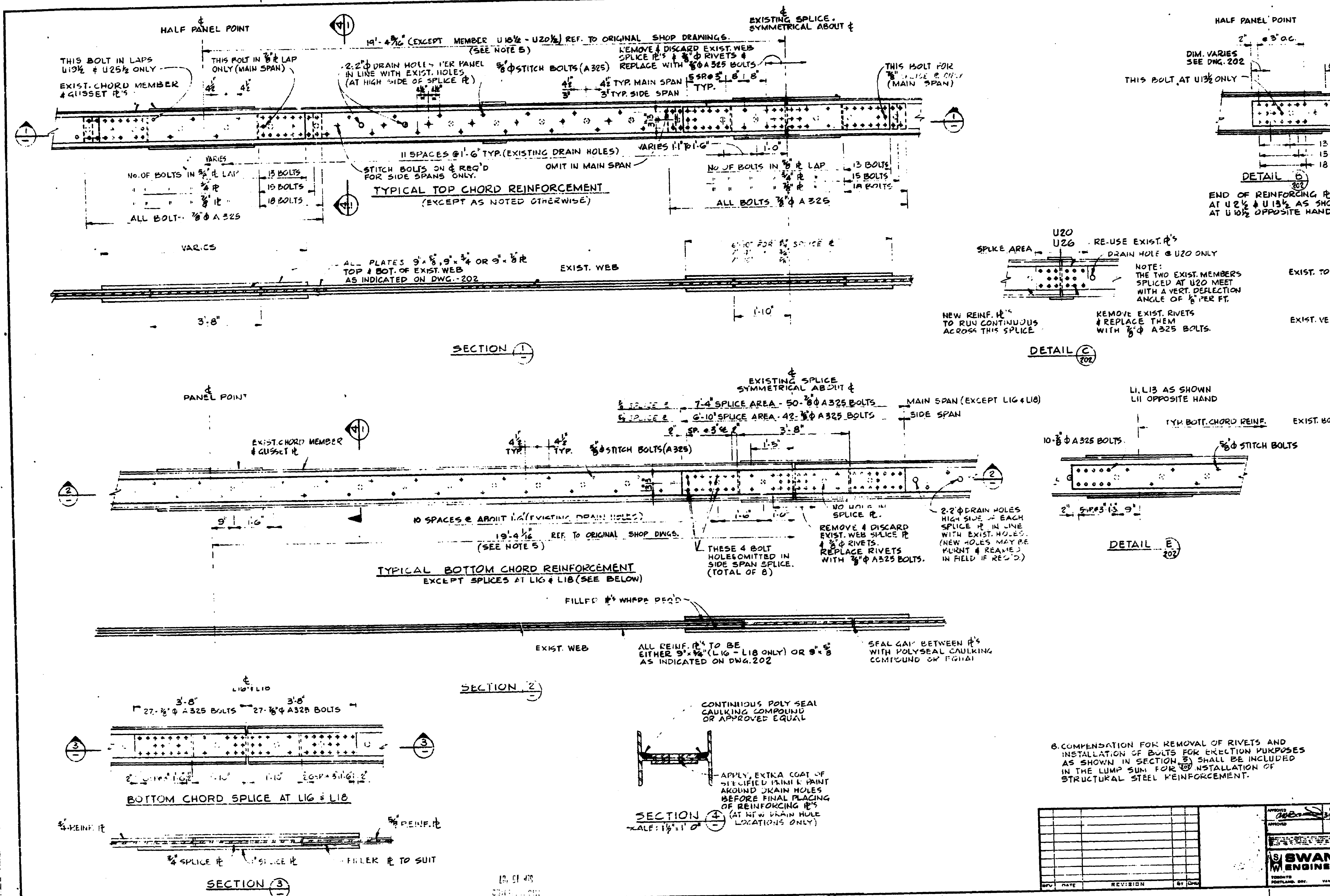
TORONTO PORTLAND, ORE. VANCOUVER, B.C. MONTREAL ST. CATHARINES, ONT.

DEPARTMENT OF PUBLIC WORKS

LIARD RIVER BRIDGE
STRUCTURAL STEEL REINF.
GENERAL LAYOUT

U-2959-00-202 REV.

139-92-2



NOTES.

1. FOR GENERAL ARRANGEMENT AND GENERAL NOTES SEE DWG.-202.
2. ALL DETAILS ORIENTED SO THAT ℄ BRIDGE SPAN LIES ON RIGHT HAND SIDE.
3. USE A SINGLE THICKNESS OF FILLER PLATE WHERE ADJOINING EXISTING MEMBERS OR NEW REINF. ℄'S ARE OF DIFFERENT THICKNESS.
4. THE TOP & THE BOTT. CHORD REINFORCEMENT HAS BEEN DETAILED WITH SPLICES AT EVERY PANEL POINT & ALTERNATE PANEL POINTS, RESPECTIVELY. THE CONTRACTOR MAY ELECT TO PROPOSE ALTERNATIVE SPLICE ARRANGEMENTS.
5. THE DIMENSIONS ASSUME THAT 1/16" WAS ADDED PER 19'-4" PANEL DUE TO DIFFERENCE BETWEEN FABRICATION TEMPERATURE AND 'NORMAL' (30°F) SITE TEMPERATURE. EXISTING D.L. STRESSES IN CHORDS ARE EXPECTED TO:
   A) ADD UP TO 1/32" PER 19'-4" PANEL TO BOTT. CHORDS, AND
   B) SUBTRACT UP TO 1/32" PER 19'-4" PANEL TO TOP CHORDS FROM THE DIM'S SHOWN ON SHOP DWG'S. THESE VARIATIONS SHOULD BE VERIFIED BY FIELD MEASUREMENT.
6. EXISTING STEELWORK FAYING SURFACES IN FRICTION TYPE BOLTED JOINTS TO BE CLEANED DOWN TO BARE METAL BEFORE INSTALLING REINFORCEMENT.
7. ALL BOLTED JOINTS SHALL BE FRICTION TYPE.
8. COMPENSATION FOR REMOVAL OF RIVETS AND INSTALLATION OF BOLTS FOR ERECTION PURPOSES AS SHOWN IN SECTION 3 SHALL BE INCLUDED IN THE LUMP SUM FOR 202 INSTALLATION OF STRUCTURAL STEEL REINFORCEMENT.

REV.	DATE	REVISION	BY	CHK

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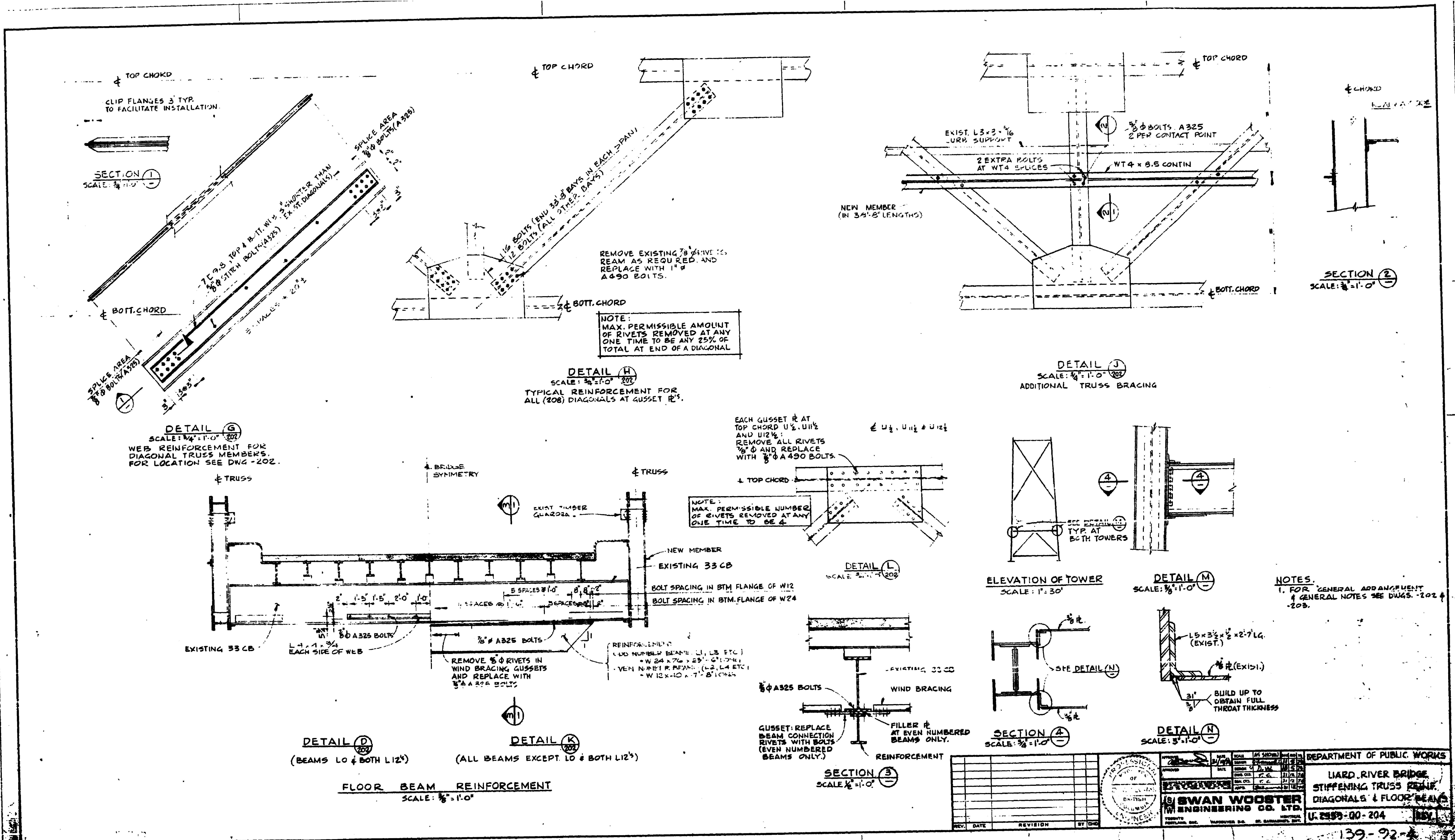
DEPARTMENT OF PUBLIC WORKS

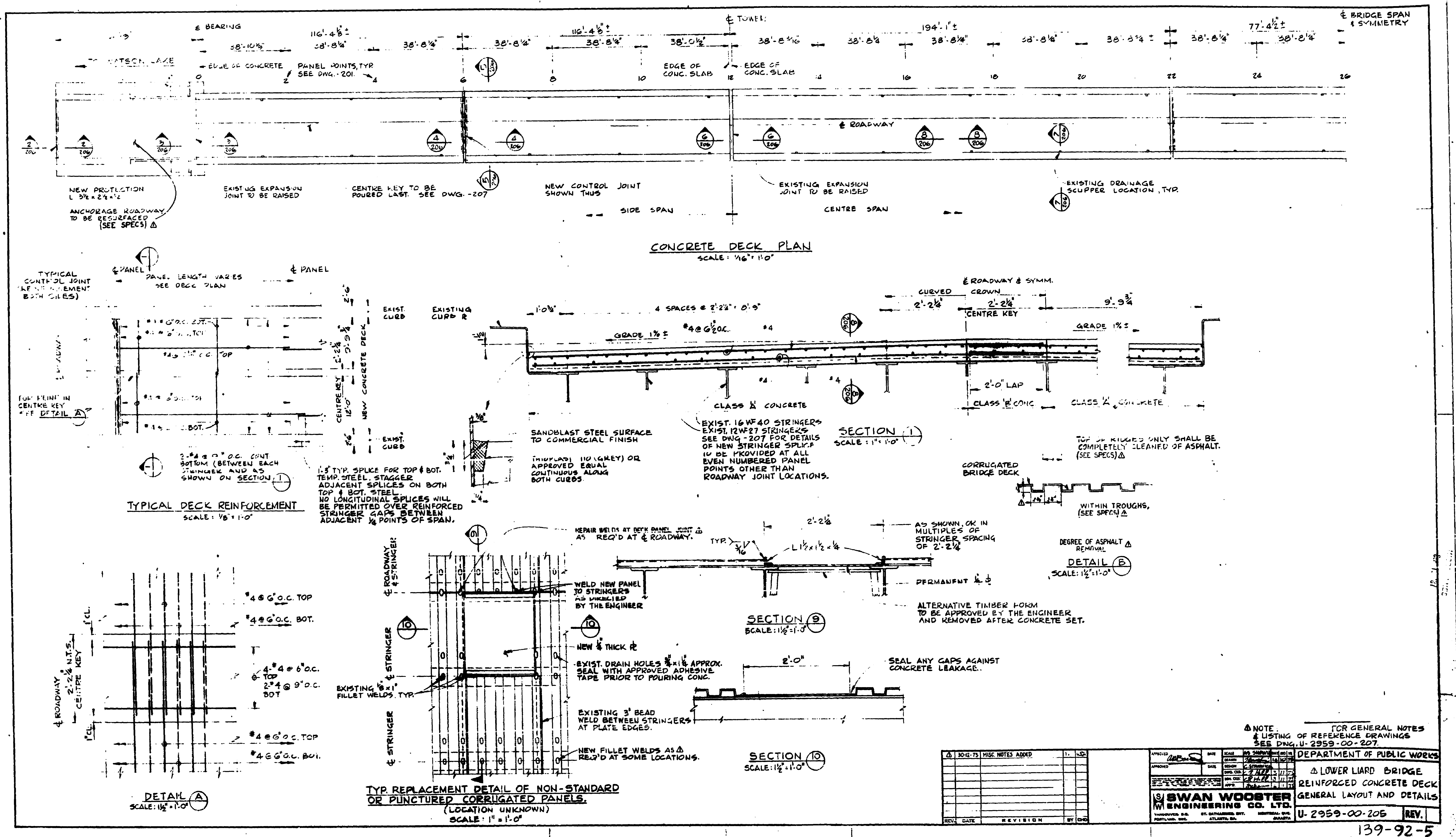
LIARD RIVER BRIDGE
STIFFENING TRUSS REINF.
CHORDS

U-2959-00-203 REV.

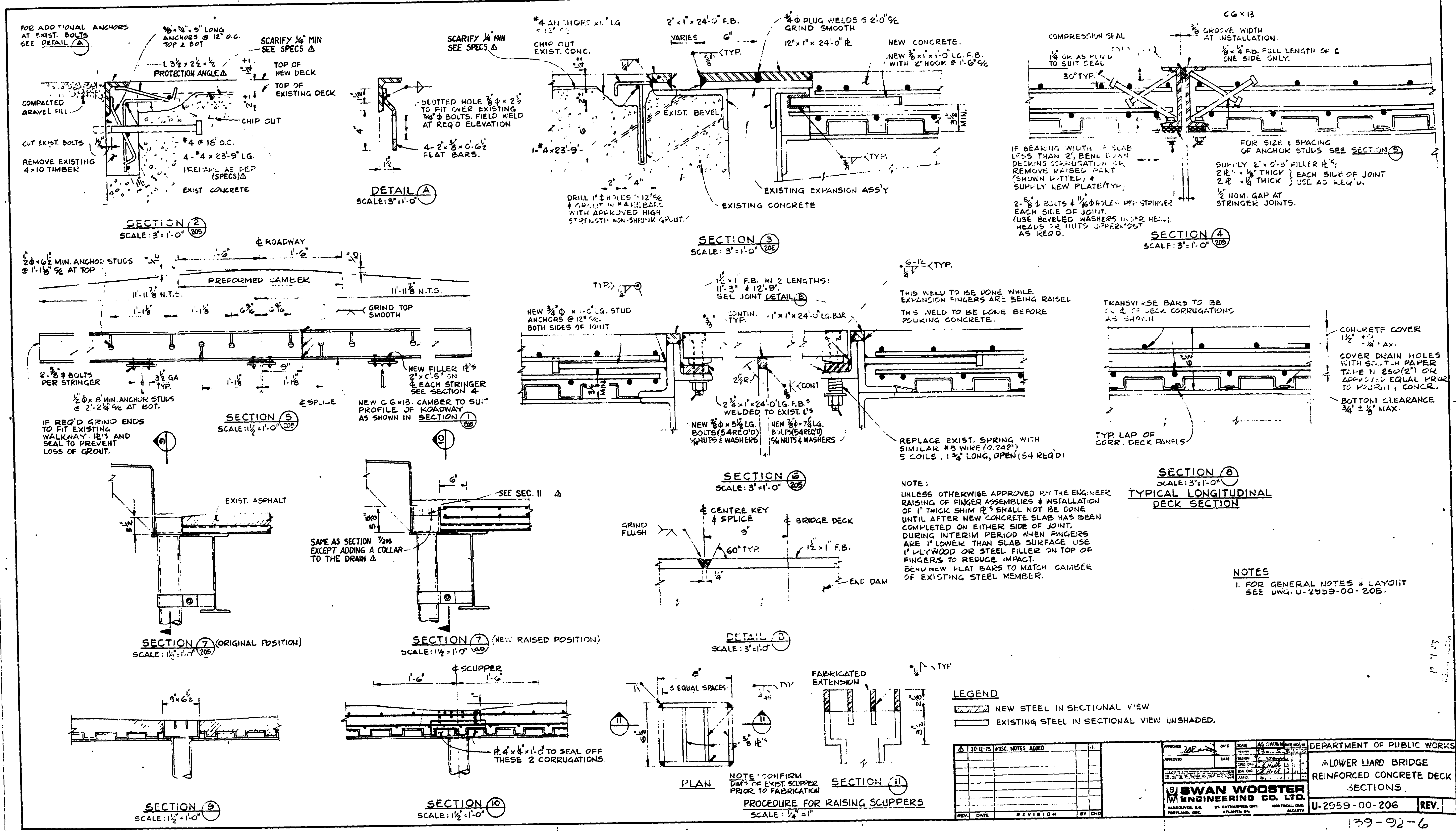
139-92-3



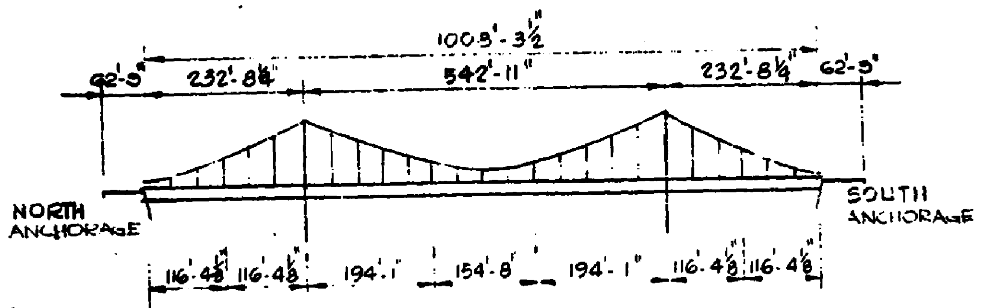
℄ TOP CHORD
CLIP FLANGES 3' TYP. TO FACILITATE INSTALLATION.
SECTION 1
SPLICE AREA 7/8"Φ BOLTS (A325)
℄ BOTT. CHORD
DETAIL G
SCALE: 3/4" = 1'-0"
WEB REINFORCEMENT FOR DIAGONAL TRUSS MEMBERS. FOR LOCATION SEE DWG -202.
℄ TOP CHORD
16 BOLTS (END 33'-8" BAYS IN EACH SPAN) 12 BOLTS (ALL OTHER BAYS)
REMOVE EXISTING 7/8" RIVETS REAM AS REQUIRED AND REPLACE WITH 1" Φ A490 BOLTS.
℄ BOTT. CHORD
NOTE: MAX. PERMISSIBLE AMOUNT OF RIVETS REMOVED AT ANY ONE TIME TO BE ANY 25% OF TOTAL AT END OF A DIAGONAL
DETAIL H
SCALE: 3/4" = 1'-0"
TYPICAL REINFORCEMENT FOR ALL (208) DIAGONALS AT GUSSET ℄'S.
℄ TOP CHORD
EXIST. L3×3×3/16 CURB SUPPORT
5/8"Φ BOLTS A325 2 PER CONTACT POINT
2 EXTRA BOLTS AT WT4 SPLICES
WT4 × 8.5 CONTIN
NEW MEMBER (IN 33'-8" LENGTHS)
℄ BOTT. CHORD
DETAIL J
SCALE: 3/4" = 1'-0"
ADDITIONAL TRUSS BRACING
℄ CHORD
SECTION 2
SCALE: 3/4" = 1'-0"
EACH GUSSET ℄ AT TOP CHORD U1/2, U11 1/2 AND U12 1/2: REMOVE ALL RIVETS 7/8" Φ AND REPLACE WITH 7/8"Φ A490 BOLTS.
℄ U1/2, U11 1/2 & U12 1/2
℄ TOP CHORD
NOTE: MAX. PERMISSIBLE NUMBER OF RIVETS REMOVED AT ANY ONE TIME TO BE 4
DETAIL L
SEE DETAIL M TYP. AT BOTH TOWERS
ELEVATION OF TOWER
SCALE: 1" = 30'
DETAIL M
SCALE: 3/8" = 1'-0"
NOTES.
1. FOR GENERAL ARRANGEMENT & GENERAL NOTES SEE DWGS. -202 & -203.
℄ TRUSS
℄ BRIDGE SYMMETRY
℄ TRUSS
EXIST. TIMBER GUARDRAIL
NEW MEMBER
EXISTING 33 CB
BOLT SPACING IN BTM FLANGE OF W12
BOLT SPACING IN BTM. FLANGE OF W24
7/8"Φ A325 BOLTS
EXISTING 33 CB
L4 × 4 × 3/4 EACH SIDE OF WEB
7/8"Φ A325 BOLTS
REMOVE 7/8"Φ RIVETS IN WIND BRACING GUSSETS AND REPLACE WITH 7/8"Φ A325 BOLTS
DETAIL D
(BEAMS L0 & BOTH L12½)
DETAIL K
(ALL BEAMS EXCEPT L0 & BOTH L12½)
FLOOR BEAM REINFORCEMENT
SCALE: 3/8" = 1'-0"
EXISTING 33 CB
WIND BRACING
7/8"Φ A325 BOLTS
GUSSET: REPLACE BEAM CONNECTION RIVETS WITH BOLTS (EVEN NUMBERED BEAMS ONLY.)
FILLER ℄ AT EVEN NUMBERED BEAMS ONLY.
REINFORCEMENT
SECTION 3
SCALE: 1/2" = 1'-0"
SEE DETAIL N
SECTION 4
SCALE: 3/8" = 1'-0"
L5×3½×½ × 2'-7 LG. (EXIST.)
3/8 ℄ (EXIST.)
BUILD UP TO OBTAIN FULL THROAT THICKNESS
DETAIL N
SCALE: 3" = 1'-0"
REV. DATE REVISION BY CHD
SWAN WOOSTER ENGINEERING CO. LTD.
DEPARTMENT OF PUBLIC WORKS
LIARD RIVER BRIDGE STIFFENING TRUSS REINF. DIAGONALS & FLOOR BEAMS
U. 2559-00-204
139-92-4



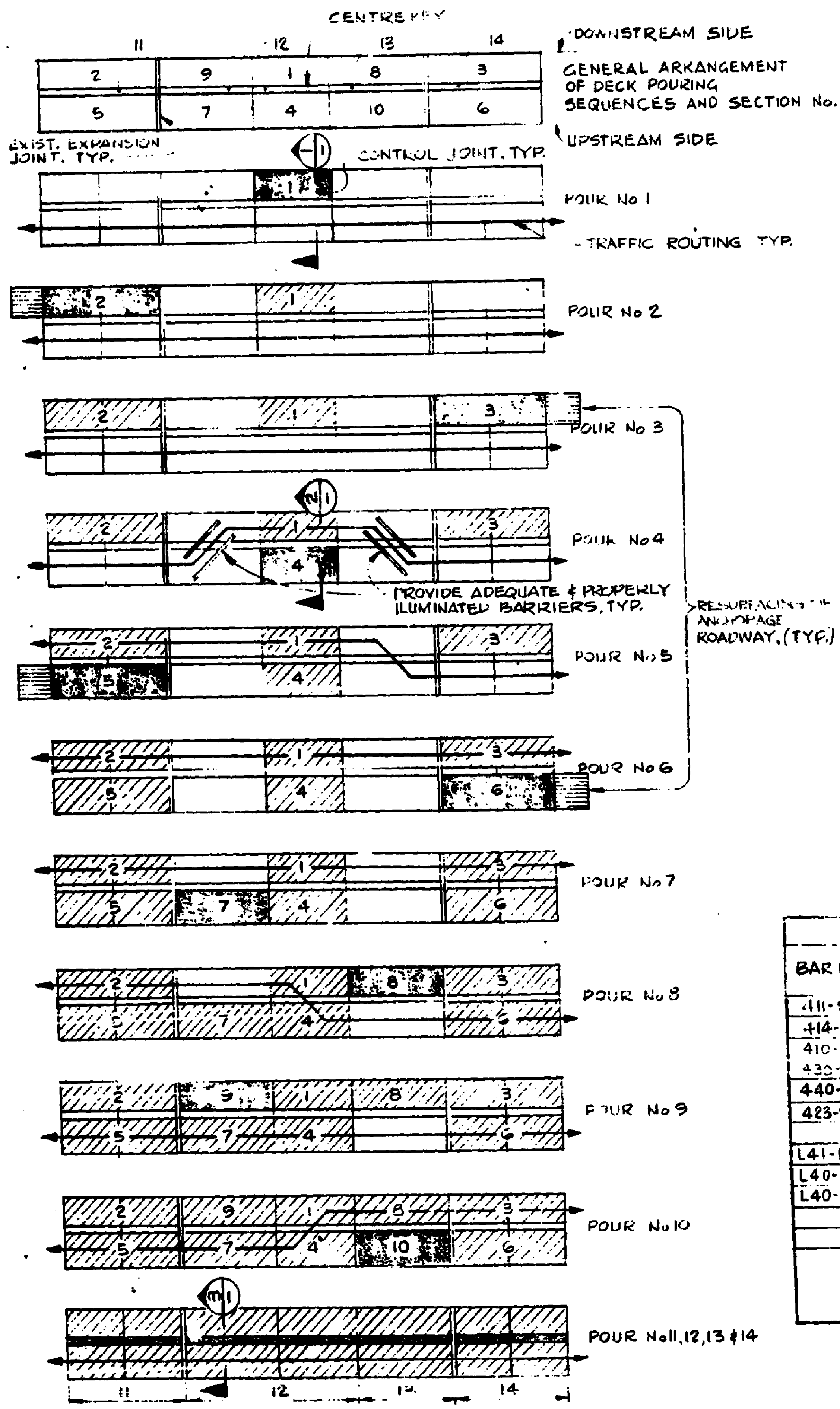
CONCRETE DECK PLAN
SCALE: 1/16" = 1'-0"
℄ BEARING
℄ TOWER
℄ BRIDGE SPAN & SYMMETRY
116'-4 5/8" ±
194'-1" ±
77'-4 1/2" ±
EDGE OF CONCRETE
PANEL POINTS, TYP. SEE DWG.-201.
EDGE OF CONC. SLAB
℄ ROADWAY
NEW PROTECTION L 3 1/2 x 2 1/2 x 1/2
ANCHORAGE ROADWAY TO BE RESURFACED (SEE SPECS) △
EXISTING EXPANSION JOINT TO BE RAISED
CENTRE KEY TO BE POURED LAST. SEE DWG.-207
NEW CONTROL JOINT SHOWN THUS
EXISTING EXPANSION JOINT TO BE RAISED
EXISTING DRAINAGE SCUPPER LOCATION, TYP.
SIDE SPAN
CENTRE SPAN
TYPICAL DECK REINFORCEMENT
SCALE: 1/8" = 1'-0"
℄ PANEL
PANEL LENGTH VARIES SEE DECK PLAN
EXIST. CURB
EXISTING CURB ℞
NEW CONCRETE DECK
CENTRE KEY 12'-0"
1'-3" TYP. SPLICE FOR TOP & BOT. TEMP. STEEL. STAGGER ADJACENT SPLICES ON BOTH TOP & BOT. STEEL. NO LONGITUDINAL SPLICES WILL BE PERMITTED OVER REINFORCED STRINGER GAPS BETWEEN ADJACENT 1/4 POINTS OF SPAN.
SECTION 1
SCALE: 1" = 1'-0"
4 SPACES @ 2'-2 1/4" = 8'-9"
GRADE 1% ±
#4 @ 6 1/2" O.C.
CURVED CROWN
℄ ROADWAY & SYMM.
CENTRE KEY
2'-0" LAP
CLASS 'A' CONCRETE
CLASS 'B' CONC
SANDBLAST STEEL SURFACE TO COMMERCIAL FINISH
EXIST. 16 WF 40 STRINGERS
EXIST. 12 WF 27 STRINGERS
SEE DWG.-207 FOR DETAILS OF NEW STRINGER SPLICE TO BE PROVIDED AT ALL EVEN NUMBERED PANEL POINTS OTHER THAN ROADWAY JOINT LOCATIONS.
TOP OF RIDGES ONLY SHALL BE COMPLETELY CLEANED OF ASPHALT. (SEE SPECS) △
CORRUGATED BRIDGE DECK
WITHIN TROUGHS. (SEE SPECS) △
DEGREE OF ASPHALT △ REMOVAL
DETAIL B
SCALE: 1 1/2" = 1'-0"
REPAIR WELDS AT DECK PANEL JOINT △ AS REQ'D AT ℄ ROADWAY.
AS SHOWN, OR IN MULTIPLES OF STRINGER SPACING OF 2'-2 1/4"
L 1 1/2 x 1 1/2 x 1/4
PERMANENT
ALTERNATIVE TIMBER FORM TO BE APPROVED BY THE ENGINEER AND REMOVED AFTER CONCRETE SET.
SECTION 9
SCALE: 1 1/2" = 1'-0"
SEAL ANY GAPS AGAINST CONCRETE LEAKAGE.
SECTION 10
SCALE: 1 1/2" = 1'-0"
WELD NEW PANEL TO STRINGERS AS DIRECTED BY THE ENGINEER
NEW 1/4" THICK ℞
EXIST. DRAIN HOLES 3/4" x 1 1/4" APPROX. SEAL WITH APPROVED ADHESIVE TAPE PRIOR TO POURING CONC.
EXISTING 3" BEAD WELD BETWEEN STRINGERS AT PLATE EDGES.
NEW FILLET WELDS AS △ REQ'D AT SOME LOCATIONS.
EXISTING 1/8" x 1" FILLET WELDS, TYP.
℄ ROADWAY & STRINGER
℄ STRINGER
TYP. REPLACEMENT DETAIL OF NON-STANDARD OR PUNCTURED CORRUGATED PANELS.
(LOCATION UNKNOWN)
SCALE: 1" = 1'-0"
#4 @ 6" O.C. TOP
#4 @ 6" O.C. BOT.
4-#4 @ 6" O.C. TOP
2-#4 @ 9" O.C. BOT
℄ ROADWAY 2'-2 1/4" N.T.S. CENTRE KEY
DETAIL A
SCALE: 1 1/2" = 1'-0"
△ NOTE.
FOR GENERAL NOTES & LISTING OF REFERENCE DRAWINGS SEE DWG. U-2959-00-207.
△ 30-12-75 MISC. NOTES ADDED
REV. DATE REVISION BY CHD
SWAN WOOSTER ENGINEERING CO. LTD.
DEPARTMENT OF PUBLIC WORKS
△ LOWER LIARD BRIDGE
REINFORCED CONCRETE DECK
GENERAL LAYOUT AND DETAILS
U-2959-00-205
REV.
139-92-5



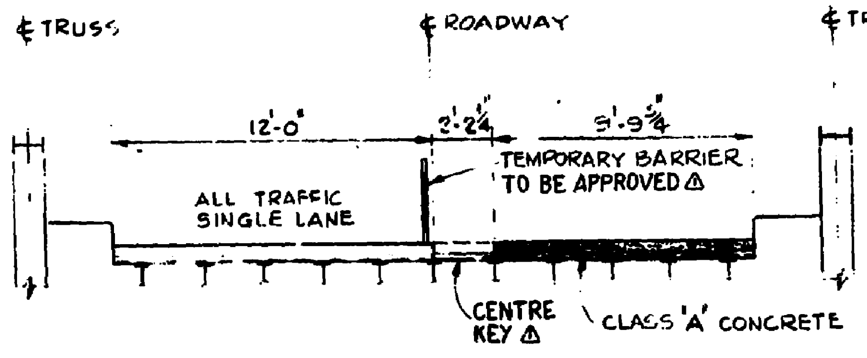
FOR ADDITIONAL ANCHORS AT EXIST. BOLTS SEE DETAIL A
SCARIFY 1/4" MIN SEE SPECS
PROTECTION ANGLE
TOP OF NEW DECK
TOP OF EXISTING DECK
COMPACTED GRAVEL FILL
CHIP OUT
CUT EXIST. BOLTS
REMOVE EXISTING 4×10 TIMBER
EXIST CONCRETE
SECTION 2
SCALE: 3" = 1'-0"
SLOTTED HOLE TO FIT OVER EXISTING 3/4" Φ BOLTS. FIELD WELD AT REQ'D ELEVATION
FLAT BARS.
DETAIL A
SCALE: 3" = 1'-0"
CHIP OUT EXIST. CONC.
GRIND SMOOTH
NEW CONCRETE.
EXIST. BEVEL
EXISTING EXPANSION ASS'Y
EXISTING CONCRETE
SECTION 3
SCALE: 3" = 1'-0"
COMPRESSION SEAL
GROOVE WIDTH AT INSTALLATION.
EXISTING STRINGER
FOR SIZE & SPACING OF ANCHOR STUDS SEE SECTION 5
SECTION 4
SCALE: 3" = 1'-0"
℄ ROADWAY
PREFORMED CAMBER
GRIND TOP SMOOTH
PER STRINGER
NEW FILLER ℄'S
EACH STRINGER SEE SECTION 4
NEW C 6×13. CAMBER TO SUIT PROFILE OF ROADWAY AS SHOWN IN SECTION 1
IF REQ'D GRIND ENDS TO FIT EXISTING WALKWAY ℄'S AND SEAL TO PREVENT LOSS OF GROUT.
SECTION 5
SCALE: 1½" = 1'-0"
THIS WELD TO BE DONE WHILE EXPANSION FINGERS ARE BEING RAISED
THIS WELD TO BE DONE BEFORE POURING CONCRETE.
BOTH SIDES OF JOINT
SEE JOINT DETAIL B
REPLACE EXIST. SPRING WITH SIMILAR #3 WIRE (0.242") 5 COILS, 1 3/4" LONG, OPEN (54 REQ'D)
SECTION 6
SCALE: 3" = 1'-0"
TRANSVERSE BARS TO BE ON ℄ OF DECK CORRUGATIONS AS SHOWN
CONCRETE COVER
TYP. LAP OF CORR. DECK PANELS
SECTION 8
SCALE: 3" = 1'-0"
TYPICAL LONGITUDINAL DECK SECTION
EXIST. ASPHALT
SECTION 7 (ORIGINAL POSITION)
SCALE: 1½" = 1'-0"
SEE SEC. 11
SAME AS SECTION 7/205 EXCEPT ADDING A COLLAR TO THE DRAIN
SECTION 7 (NEW RAISED POSITION)
SCALE: 1½" = 1'-0"
GRIND FLUSH
℄ CENTRE KEY & SPLICE
℄ BRIDGE DECK
60° TYP.
END DAM
DETAIL B
SCALE: 3" = 1'-0"
NOTE:
UNLESS OTHERWISE APPROVED BY THE ENGINEER RAISING OF FINGER ASSEMBLIES & INSTALLATION OF 1" THICK SHIM ℄'S SHALL NOT BE DONE UNTIL AFTER NEW CONCRETE SLAB HAS BEEN COMPLETED ON EITHER SIDE OF JOINT. DURING INTERIM PERIOD WHEN FINGERS ARE 1" LOWER THAN SLAB SURFACE USE 1" PLYWOOD OR STEEL FILLER ON TOP OF FINGERS TO REDUCE IMPACT.
BEND NEW FLAT BARS TO MATCH CAMBER OF EXISTING STEEL MEMBER.
NOTES
1. FOR GENERAL NOTES & LAYOUT SEE DWG. U-2959-00-205.
SECTION 9
SCALE: 1½" = 1'-0"
℄ SCUPPER
TO SEAL OFF THESE 2 CORRUGATIONS.
SECTION 10
SCALE: 1½" = 1'-0"
5 EQUAL SPACES
FABRICATED EXTENSION
PLAN
NOTE: CONFIRM DIM'S OF EXIST. SCUPPER PRIOR TO FABRICATION
SECTION 11
PROCEDURE FOR RAISING SCUPPERS
SCALE: 1/4" = 1"
LEGEND
NEW STEEL IN SECTIONAL VIEW
EXISTING STEEL IN SECTIONAL VIEW UNSHADED.
30-12-75 MISC. NOTES ADDED
REV. DATE REVISION BY CHKD
SWAN WOOSTER ENGINEERING CO. LTD.
VANCOUVER, B.C. PORTLAND, ORE. ST. CATHARINES, ONT. ATLANTA, GA. MONTREAL, QUE. JAKARTA
DEPARTMENT OF PUBLIC WORKS
LOWER LIARD BRIDGE
REINFORCED CONCRETE DECK SECTIONS
U-2959-00-206
REV.
139-92-6



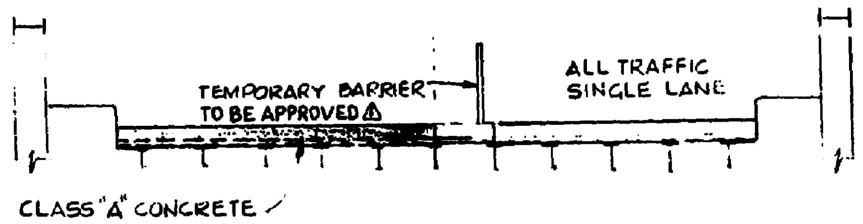
BRIDGE ELEVATION
SCALE: 1/16" = 10'-0"



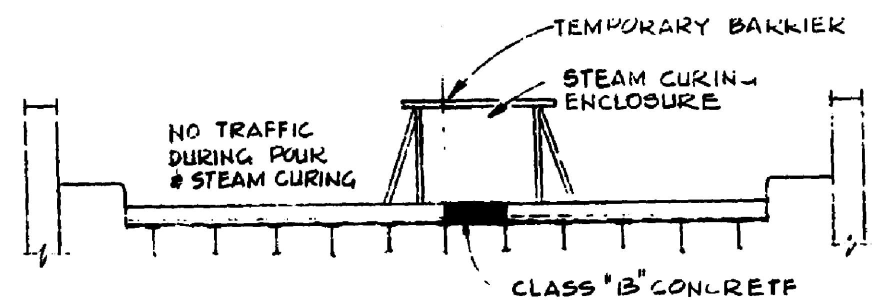
PLANS - POURING SEQUENCES & TRAFFIC ROUTING



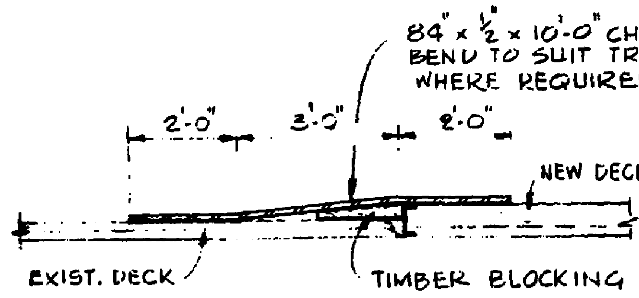
SECTION 1
SCALE: ¼" = 1'-0"
TYP. FOR POURS No 1, 2, 3, 8 & 9



SECTION 2
SCALE: ¼" = 1'-0"
TYP. FOR POURS No 4, 5, 6, 7 & 10

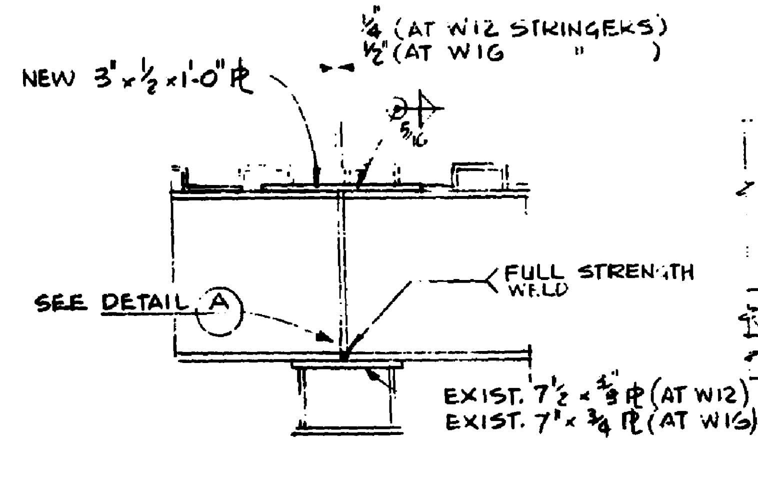


SECTION 3
SCALE: ¼" = 1'-0"
TYP. FOR POURS No 11 TO 14 INCL.

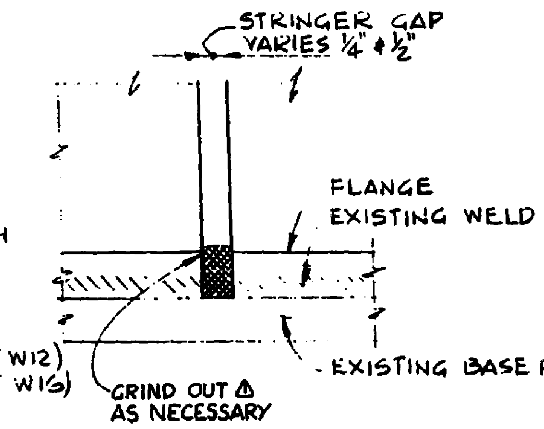


NOTE:
4 BENT ℄'s FOR TRANSITION POINTS BETWEEN EXIST & NEW SLAB REQ'D & 2 FLAT ℄'s FOR BRIDGING CENTRE KEYS REQ'D.

TEMPORARY STEEL ℄ RAMP
SCALE: ½" = 1'-0"



TYP. DETAIL OF STRINGER JOINT MODIFICATIONS OVER FLOOR BEAMS
(NOT REQUIRED AT CONTROL JOINTS)
SCALE: 1½" = 1'-0"



DETAIL A
FULL SIZE

NOTE:
REMOVE CORRUGATED DECK PANELS TO FACILITATE NEW WORK DETAILED ABOVE. AFTER COMPLETION REPLACE OR RENEW PANELS TO SATISFACTION OF THE ENGINEER. E)

REFERENCE DRAWINGS

(DESIGN DRAWINGS FOR NEW DECK CONSTRUCTED IN 1955)

4850-1-3-1 REDECKING LOWER LIARD RIVER BRIDGE, PLAN & SECTIONS
4850-1-3-2 " " " " " DECK DETAILS
4850-1-3-3 " " " " " , EXPANSION DETAILS.
4850-1-3-4 " " " " " , STEEL & SCUPPER DETAILS.
4850-1-3-5 " " " " " , CURB DETAILS.

(ORIGINAL DESIGN & SHOP DRAWINGS - U.S. FED. WORKS AGENCY 1943)

SHEET No 58 EXPANSION DAMS
SHEET No 13 TOWER END DAMS

GENERAL NOTES △

1 CONCRETE (TYPE A & B)
MIN COMP. STRENGTH 3000 PSI PRIOR TO USE BY TRAFFIC, 5000 PSI AT 28 DAYS

2 REINFORCEMENT STEEL
INTERMEDIATE GRADE 40 KSI YIELD
LAP SPLICE - 15 INCHES MINIMUM

3 CEMENT PORTLAND CEMENT CSA A5-TYPE 30 & TYPE 10

POURING SEQUENCES.

POURS No 1 TO 10:

1. IF SECTION LIES ADJACENT TO EXPANSION JOINT, INSTALL 1" FLAT BAR ON EDGE ANGLE TO RAISE DAM TO CORRECT ELEVATION. PROVIDE STEEL ℄ RAMPS AS REQUIRED TO BRIDGE BUMPS.
2. WITHIN EACH SECTION IN TURN:
   A) REMOVE ASPHALT WEARING SURFACE
   B) INSPECT EXISTING DECK PLATE AS PER NOTE 'C' ON DWG - 205 & SEAL DRAIN HOLES WITH TAPE.
   C) INSTALL CONTROL JOINT ASSEMBLIES FOR THE HALF ROADWAY WIDTH AS REQUIRED.
   D) POUR CONCRETE, FINISH AND CURE.

POURS No 11 TO 14:

1. CLOSE OFF TRAFFIC AT [illegible] AND POUR CLASS 'B' CONCRETE FOR CENTRE KEY AS SHOWN ON PLAN
2. PLACE & STEAM CURE CLASS 'B' CONCRETE IN ACCORDANCE WITH REQUIREMENTS OF CONTRACT SPECIFICATIONS.
3. TEMPERATURE INCREASE SHALL NOT EXCEED 50°F PER HOUR TO A MAXIMUM OF 140°F.
4. CHECK CONCRETE STRENGTH WITH TEST CYLINDERS. BRIDGE MAY BE OPENED TO ONE LANE TRAFFIC WHEN CONCRETE HAS ATTAINED STRENGTH OF 3,000 P.S.I.

GENERAL

1. PROVIDE TEMPORARY BARRIERS ON TRAFFIC LANES & TEMPORARY STEEL ℄ RAMPS BETWEEN OLD & NEW DECK SECTIONS & OVER CENTRE KEY WHERE REQD, TO SATISFACTION OF THE ENGINEER.
2. DURING PERFORMANCE OF ALL WORK, TRAFFIC SHALL BE RESTRICTED TO SINGLE LANE AND PERMITTED TO FLOW FOR 20 MINUTES OUT OF EACH HOUR, EXCEPT AS OTHERWISE APPROVED.
3. THE POURING SEQUENCE SHOWN IS INTENDED TO BALANCE THE ADDITIONAL DEAD WEIGHT ON THE BRIDGE, PROVIDE MAXIMUM TIME FOR STRENGTH GAIN AND FACILITATE TRAFFIC CONTROL. SUBJECT TO APPROVAL OF THE ENGINEER, MODIFICATIONS MAY BE MADE TO SUIT CONTRACTORS PROGRAM.
4. IF DESIRED TO SPEED CONSTRUCTION, REMOVAL OF THE ASPHALT SURFACING MAY BE COMMENCED WITHIN ANY DECK SECTION BEFORE POURING OF NEW DECK IN PREVIOUS SECTION IS COMPLETED. HOWEVER, NOT MORE THAN 2 SECTIONS OF DECK SHALL BE WORKED ON SIMULTANEOUSLY.
5. [illegible] CONSTRUCTION, STEAM [illegible] SECTIONS MAY BE [illegible] TO APPROVAL [illegible]
6. [illegible] INFORMATION OF THE CONTRACTOR, THE ORIGINAL DESIGN OF THE [illegible] BRIDGE PROVIDED FOR A REINFORCED CONCRETE DECK. AN ALTERNATIVE TYPE WAS SUBSTITUTED DURING CONSTRUCTION.

REINFORCING STEEL SCHEDULE

BAR No	LOCATION	No REQ'D	CUTTING LENGTH FT. INS.	LENGTH/FEET #4	BENDING DIM'S FT/INS	BENDING DIAGRAMS (DIMENSIONS OUT TO OUT)
411-9	TRANSVERSE, TOP & BOT.	4100	11'-9"	48175		
414-0	TRANSVERSE, TOP & BOT.	4100	14'-0"	57400		
410-0	[illegible]	515	10'-0"	[illegible]		
430-0	[illegible]	515	30'-0"	15,130		
440-0	LONGITUDINAL, TOP & BOT.	[illegible]	40'-0"	50,000		
423-9	LONGITUDINAL IN ANCHOR ENDS, SECT'S 2/206 & 3/206	12	23'-9"	285		
L41-1	SECT. 2/206	[illegible]	1'-1"	36	6"	L-BAR
L40-10	ANCHORS IN SECT. 3/206	50	0'-10"	4[illegible]	2"	
L40-6	" " " "	50	0'-6"	25	1¼"	
TOTAL		LENGTH FEET		182,565	REF. DWG'S: U-2959-00-205, U-2959-00-206	
		WEIGHT LBS.		121,953		

LEGEND

EXISTING ASPHALT DECK
NEW CONCRETE DECK SECTION UNDER CONSTRUCTION
NEW CONCRETE DECK SECTION COMPLETED.
TRAFFIC ROUTING DURING CONSTRUCTION

REV.	DATE	REVISION	BY	CHD
△	30-12-73	MISC. NOTES ADDED		

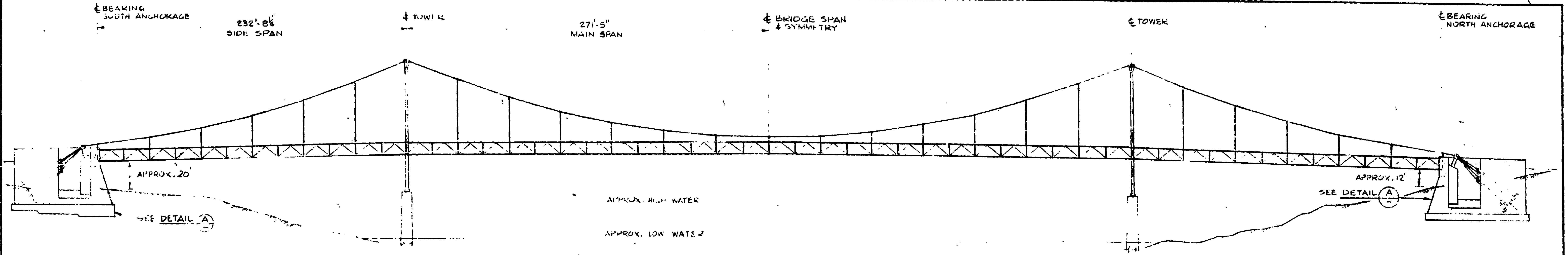
APPROVED / DATE / SCALE AS SHOWN / DESIGN / DWG CKD / DSN CKD / APP'D

SWAN WOOSTER ENGINEERING CO. LTD.
TORONTO, PORTLAND, ORE., VANCOUVER, B.C., MONTREAL, ST. CATHARINES, ONT.

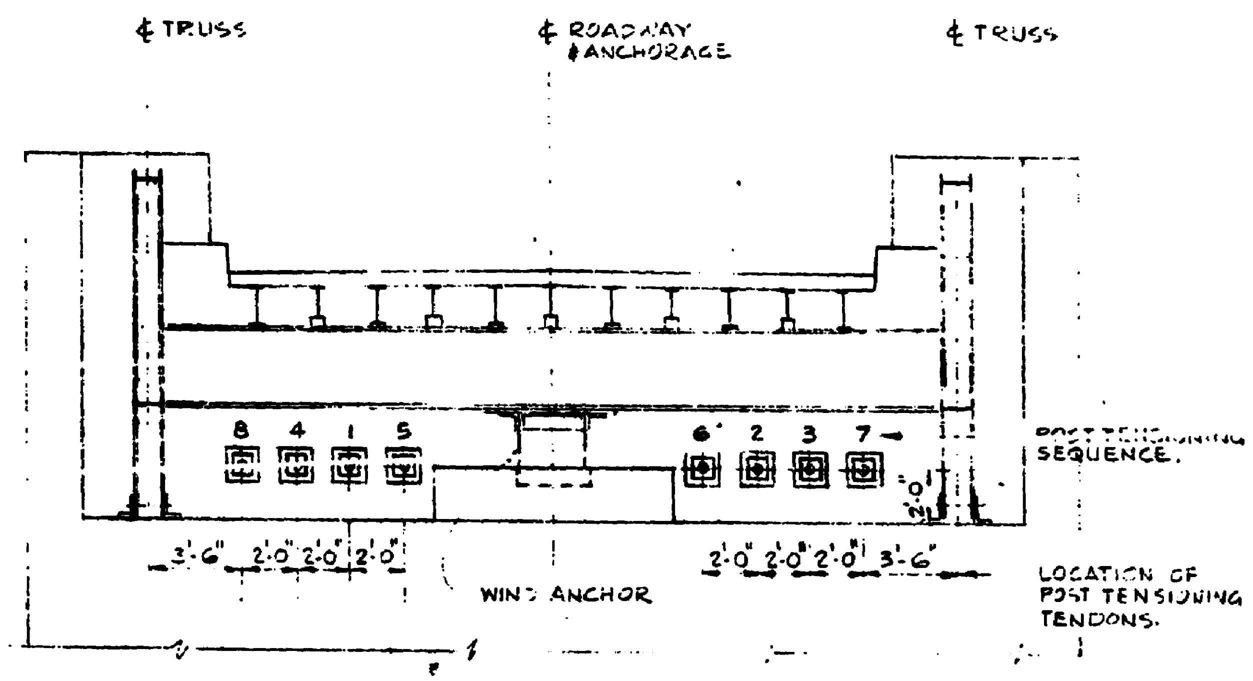
DEPARTMENT OF PUBLIC WORKS
△ LOWER LIARD BRIDGE
REINF. CONCRETE DECK
DECK POURING SEQUENCE

U-2959-00-207 REV.

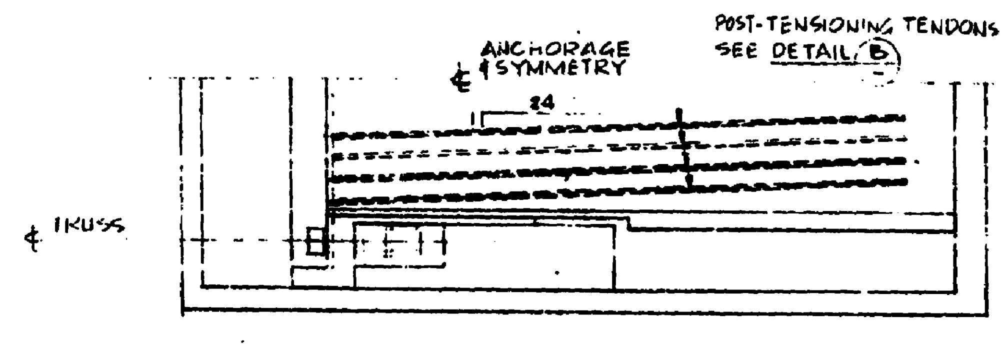
139-92-7



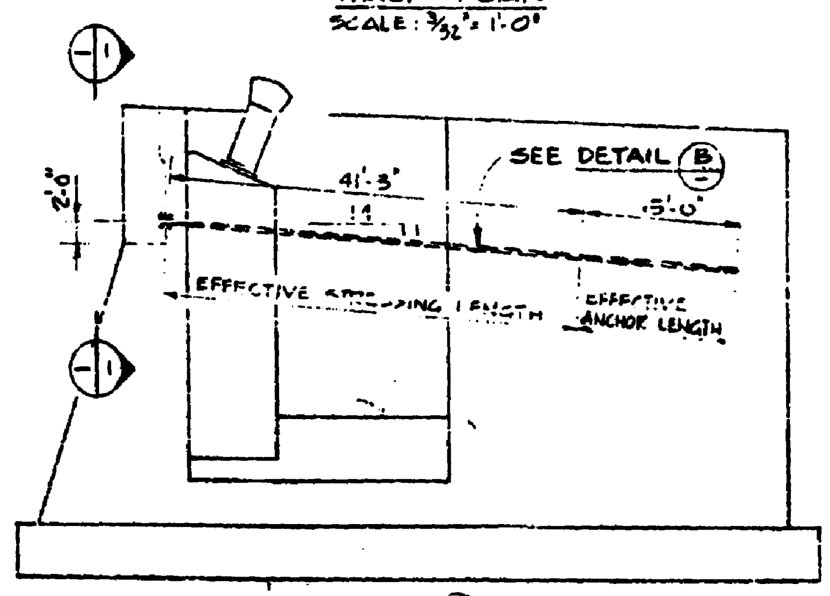
ELEVATION
(LOOKING WEST)
SCALE: 1"=30'



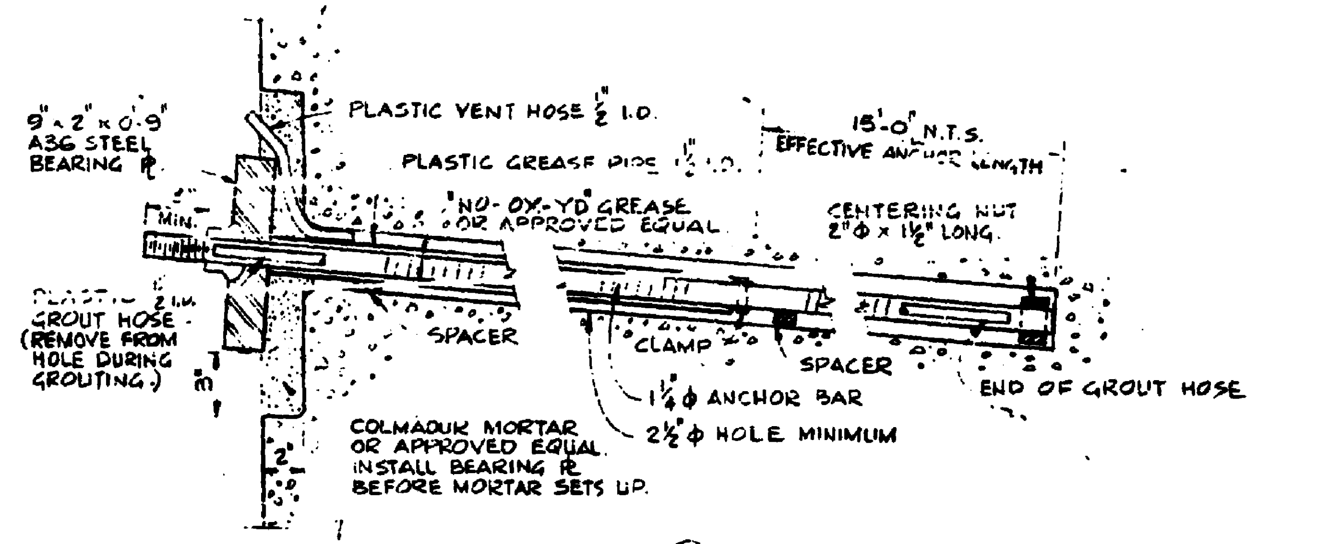
SECTION 1
SCALE: ¼"=1'-0"



HALF - PLAN
SCALE: 3/32"=1'-0"



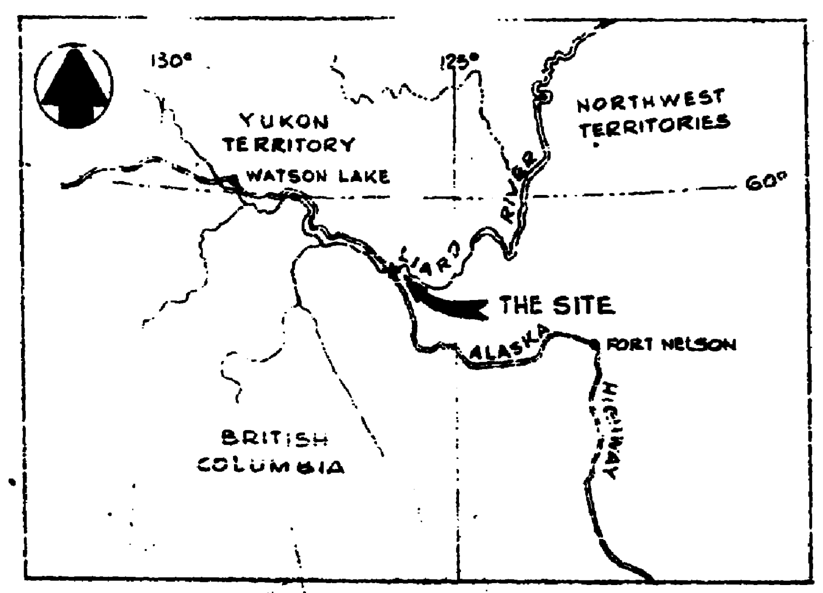
DETAIL A
SCALE: 3/32"=1'-0"
ANCHORAGE POST-TENSIONING
NORTH ANCHORAGE - AS SHOWN
SOUTH ANCHORAGE - OPPOSITE HAND.



DETAIL B
SCALE: 3/16"=1"
TYP. POST-TENSIONING TENDON
(16 REQ'D.)

NOTES.

1. ANCHOR BARS SHALL BE DYWIDAG HIGH STRENGTH THREADED BARS OR APPROVED EQUAL WITH ULTIMATE TENSILE STRENGTH OF 150K/IN²
2. NEAT CEMENT GROUT SHALL BE A MINIMUM OF 5,000 PSI AT TIME OF POST TENSIONING.
3. POST-TENSIONING SEQUENCE AS SHOWN IN SECTION 1.
4. THE END OF VENT AND GROUT HOSE OPENINGS TO BE SEALED AFTER COMPLETION OF PRESSURE GROUTING.
5. PRESSURE GROUTING TO BE PERFORMED UNDER THE SUPERVISION OF THE ENGINEER.
6. PAINT PROJECTING END OF THREADBARS AND BEARING ℞ WITH ONE COATING OF GALVAFROID OR APPROVED EQUAL AFTER INSTALLATION.



KEY PLAN

MILES 50 0 50 100 150 200

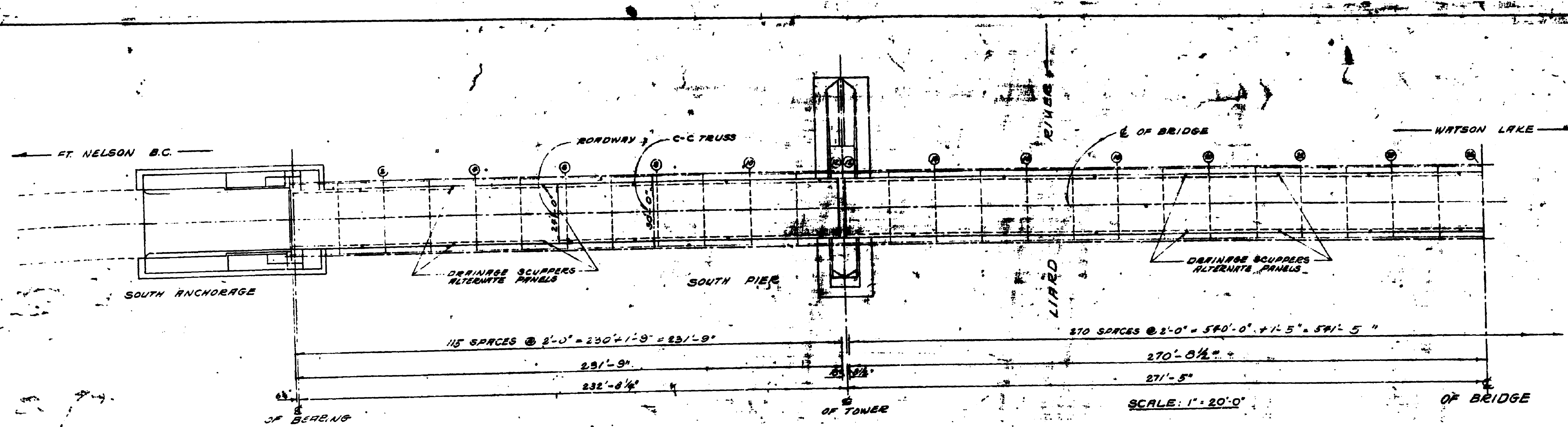
APPROVED	DATE	SCALE	AS SHOWN
APPROVED	DATE	DESIGN	G.S.
		DWG. CKD.	APG
		DSN. CKD.	APG

DEPARTMENT OF PUBLIC WORKS

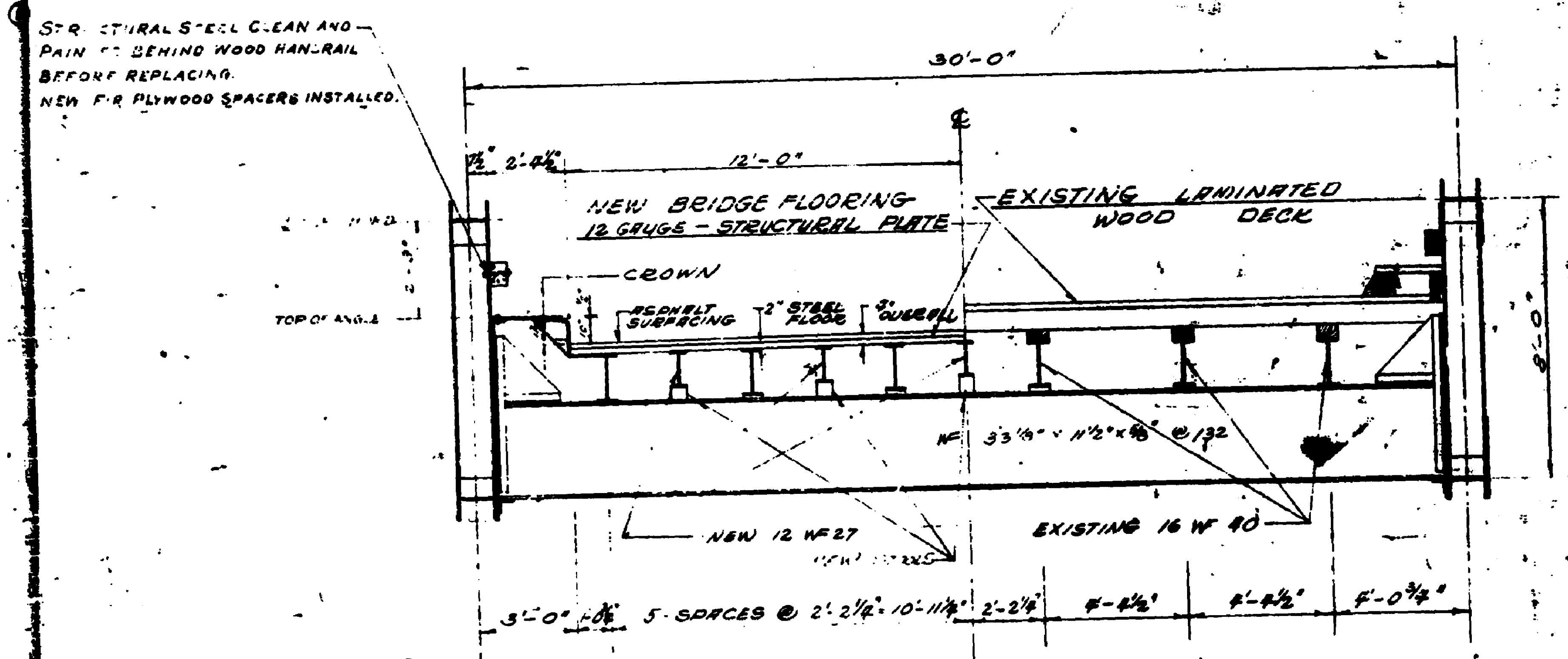
LIARD RIVER BRIDGE
ANCHORAGES
POST-TENSIONING REINFORCEMENT

SWAN WOOSTER ENGINEERING CO. LTD.

[illegible]58-00-220

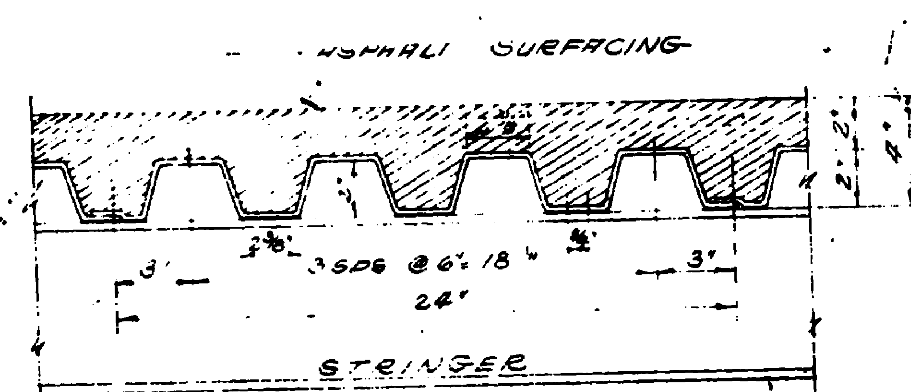


APPROXIMATE QUANTITY ASPHALT SURFACING REQUIRED = 430 tons.



SECTION

SCALE ⅜" = 1'-0"



CROSS SECTION
STRUCTURAL PLATE BRIDGE FLOORING

SCALE 3" = 1'-0"

① NOTE: THIS SECTION SUBSTITUTED FOR, BY "ARMCO METAL BRIDGE PLANK" AS PER CERTIFICATE OF APPROVAL NUMBER 7232, DATED 27 SEPT 1954.
SEE MANUFACTURER'S SHOP DRAWINGS E..., ES ...33-3, DATED FEBR 1955 AS ATTACHED FOR DETAILS.

BILL of MATERIAL

ITEM NO.	NO. REQD.	SHAPE	LENGTH FEET	LENGTH INCHES	WEIGHT	TOTAL WEIGHT	LOCATION	REMARKS
1	10	12 WF 27	39	1⅞	10,570		PANELS 0-2 ER. END	
	100	12 WF 27	38	7⅞	104,290		PANELS 2-12 / 16-28 ER. END	
	10	12 WF 27	38	[illegible]	10,460		PANELS 12-14 ER. END	
	10	12 WF 27	37	11⅝	10,250		PANELS 10-12 ER. END	
						135,570		
2	92	CURB [illegible] ⅝"	18	3⅞	[illegible]		STANDARD SECTION	
3	4	" " "	20	0 9/16	3 920		END SECTION	
4	8	" " "	19	① 11 1/16	① 7 800		ADJ. TO EXP. JOINT	
						88,410		
5	92	L 8" 3" [illegible]	19	3⅞	[illegible]		CURB SUPPORT ANGLE STANDARD SECTION	
6	4	L 3" 3" [illegible]	18	[illegible]	[illegible]		END SECTION	
7	8	L 3" 3" [illegible]	19	[illegible]	333		ADJ. TO EXP. JOINT	
						12,276		
8	92	PLT 9½" [illegible]	19	3⅞	18,488		BOTTOM CURB PL. STANDARD SECTION	
9	4	PLT 9½" [illegible]	19	11⅞	829		END SECTION	
10	8	PLT 9½" [illegible]	18	3⅞	1519		ADJ. TO EXP. JOINTS	
						20,836		
11	1008	12 GA. STEEL PLATE	12	0	151,200	151,200	BRIDGE FLOORING	
12	276	STIFFENING RIB ¼" ⌀			1780		STANDARD SECTION	
13	16	" " "			104		END SECTION	
14	32	" " "			208		FOR EXP. & AT TOWERS	
						2,092		
15	4	PLT. 12" [illegible]	2	0⅛	164	164	EXP. & AT TOWERS	
16	4	PLT. 7½" [illegible]	1	3	50		TOP TRANSITION PL. AT END OF CURB [illegible]	
	4	PLT 8" [illegible]	1	3	68		SIDE OF TRANSITION PL.	
						118		
17	56				1,160		STOOLS 5⅛"	SEE DWG. NO 4850-1-3-4
	102				2,238		" 5 1/16"	
	102				2,085		" 4⅜"	
						5,463		
18	52						DRAIN SCUPPERS	
19	52						SCUPPER BRACKETS	
20	20	L 2" 2" 5/16	0	8	5	5	STRINGER SUPPORT AT TOWER EXP. JOINT	
21	324	BOLTS ¾" ⌀	0	2½	138	138	CURB & ANGLE CON.	
		WITH HEX NUT			42	42	" " " "	
22	324	LOCK WASHERS [illegible]					CURB & ANGLE CON.	
23	52	BOLTS ⅜" ⌀	0	1¼	26	26	SCUPPER BRACKET	
24	52	LOCK WASHERS 7/16" ⌀					SCUPPER BRACKET	
25	92	6" × 8" S4S	19	4			TIMBER GUARDRAIL	8,320 B.F
	12	" " "	20	0			" "	
①	416	CARRIAGE BOLTS ¾" ⌀	0	7½	① 691	① 691	FOR TIMBER GUARDRAIL	
	632	CUT WASHERS FOR ¾" ⌀ BOLTS					" " "	
26	78	BOLTS ⅞" ⌀	0	4½	73	73	FOR TIMBER EXP. JOINT	
		WITH HEX. NUT			15	15	" " " "	
	78	WASHERS 15/16 ⌀					" " " "	
	78	BOLTS ⅞" ⌀	0	6½	98	98	" " " "	
		WITH HEX NUT			5	15	" "	
	78	WASHERS 15/16" ⌀						
	78	SPRING 6 COILS OF #3 WIRE		1¾				

AS ...

STRUCTURAL ENGINEERING SERVICES LTD.
EDMONTON — CONSULTING ENGINEERS — CALGARY

REVISIONS				
DATE	NO	REMARKS	BY	APPROVED
14/11/55	①	As Built Details	[illegible]	

STRUCTURAL

DEPARTMENT OF NATIONAL DEFENCE

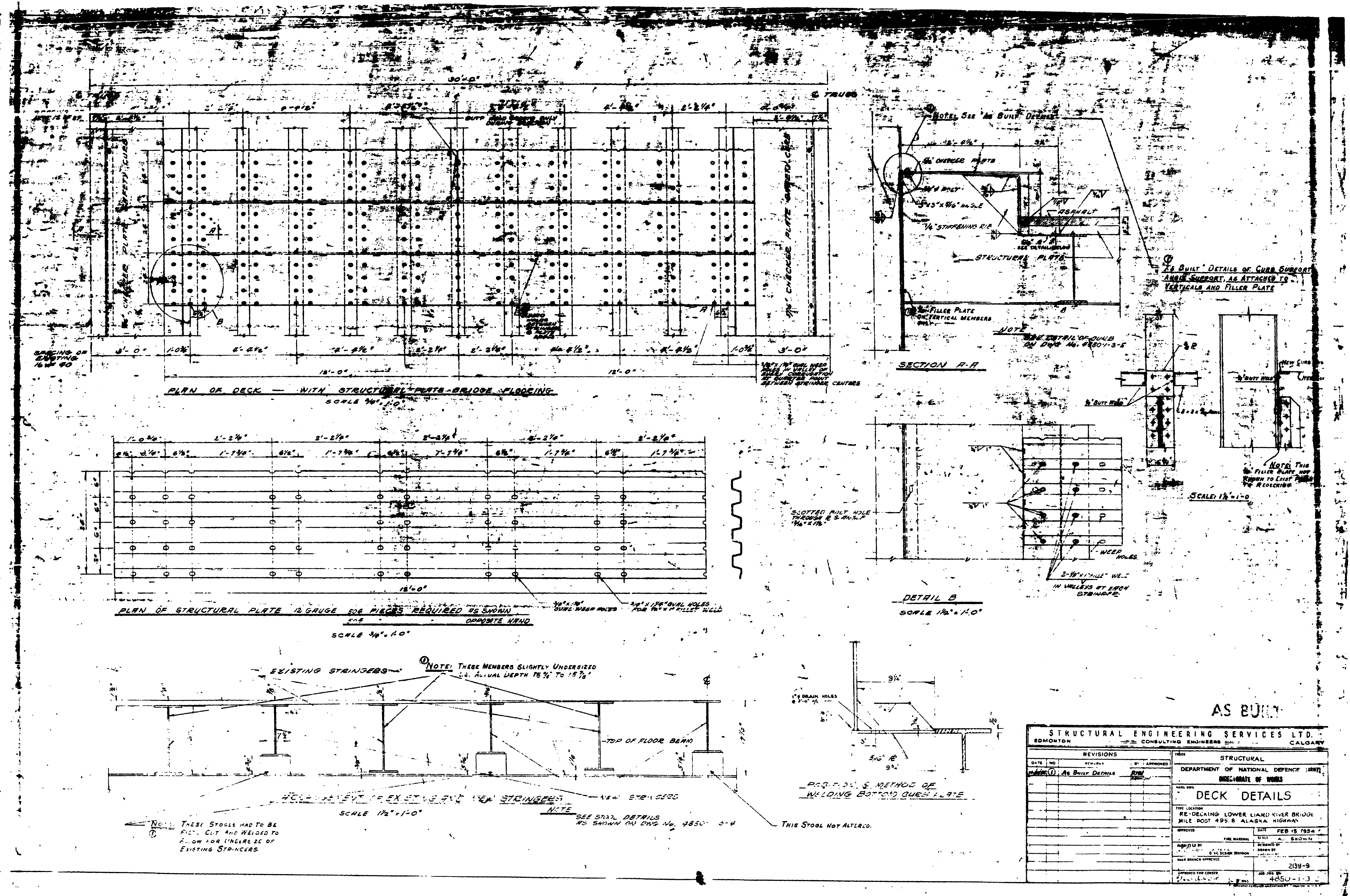
DIRECTORATE OF WORKS

NAME DWG.

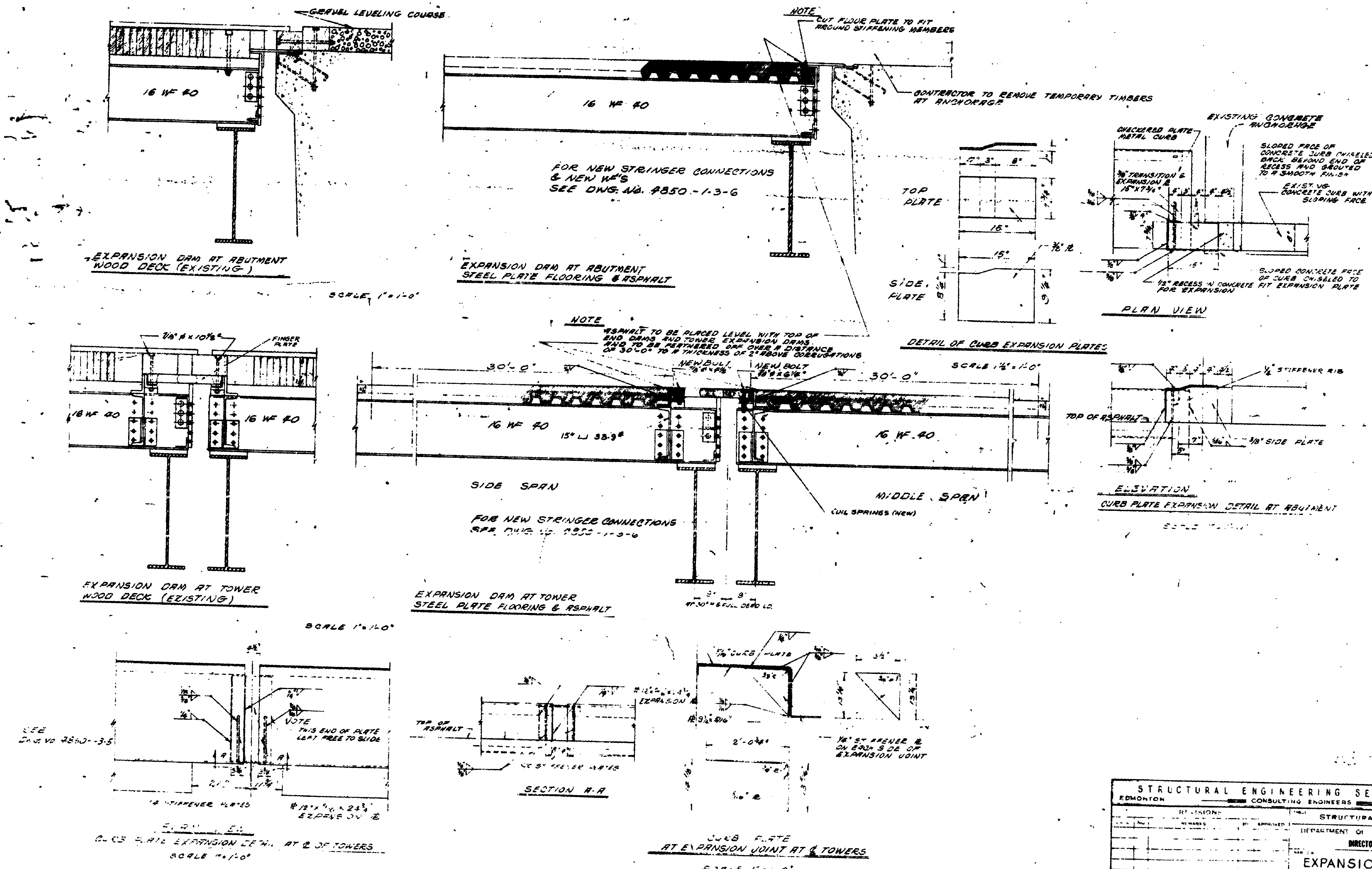
PLAN and SECTIONS

TYPE LOCATION
RE-DECKING LOWER LIARD RIVER BRIDG
MILE POST - 495.8 ALASKA HIGHWAY

APPROVED ... FIRE MARSHAL	DATE FEB. 15 195
	SCALE AS SHOWN
SUBMITTED BY ... DESIGN DIVISION	DESIGNED BY / DRAWN BY / CHECKED BY
USER BRANCH APPROVED	2139-8
APPROVED FOR CONSTR ... D. WKS	JOB DWG NO 4850-1-3



PLAN OF DECK — WITH STRUCTURAL PLATE BRIDGE FLOORING
SCALE 3/8" = 1'-0"
SECTION A-A
AS BUILT DETAILS OF CURB SUPPORT ANGLE SUPPORT, AS ATTACHED TO VERTICALS AND FILLER PLATE
SCALE: 1½" = 1'-0"
PLAN OF STRUCTURAL PLATE 12 GAUGE
SCALE 3/8" = 1'-0"
DETAIL B
SCALE 1½" = 1'-0"
EXISTING STRINGERS
NOTE: THESE MEMBERS SLIGHTLY UNDERSIZED
TOP OF FLOOR BEAM
NEW STRINGERS
SCALE 1½" = 1'-0"
THESE STOOLS HAD TO BE FIELD CUT AND WELDED TO ALLOW FOR UNDERSIZE OF EXISTING STRINGERS
THIS STOOL NOT ALTERED
POSITION & METHOD OF WELDING BOTTOM CURB PLATE
AS BUILT
STRUCTURAL ENGINEERING SERVICES LTD.
EDMONTON
CONSULTING ENGINEERS
CALGARY
REVISIONS
AS BUILT DETAILS
STRUCTURAL
DEPARTMENT OF NATIONAL DEFENCE (ARMY)
DIRECTORATE OF WORKS
DECK DETAILS
RE-DECKING LOWER LIARD RIVER BRIDGE
MILE POST 495.8 ALASKA HIGHWAY
FEB 15 1954
AS SHOWN
2139-9
4850-1-3



STRUCTURAL ENGINEERING SERVICES LT
EDMONTON — CONSULTING ENGINEERS

REVISIONS

No.	REMARKS	BY	APPROVED

STRUCTURAL

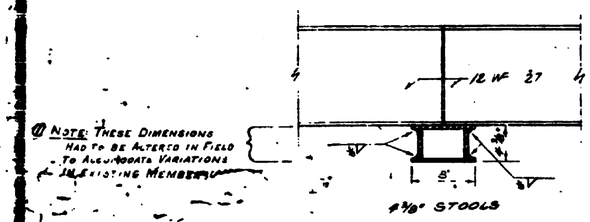
DEPARTMENT OF NATIONAL DEFENCE

DIRECTORATE OF WORKS

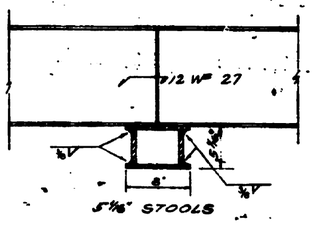
EXPANSION DETAIL

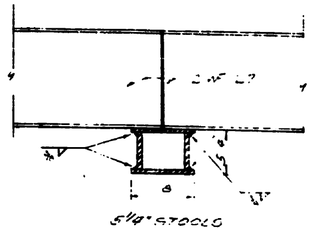
RE-DECKING LOWER LIARD RIVER BRI
MILE POST 495 B ALASKA HIGHWAY

APPROVED — FIRE MARSHAL — DATE FEB
DESIGN DIVISION — DESIGNED BY — DRAWN BY

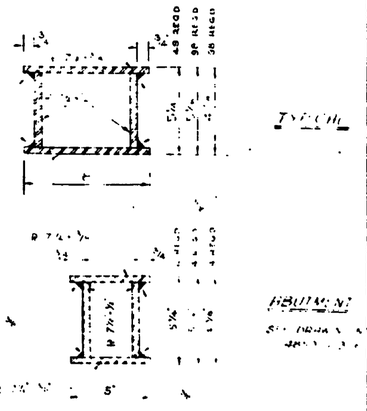


① NOTE: THESE DIMENSIONS HAD TO BE ALTERED IN FIELD TO ACCOMMODATE VARIATIONS IN EXISTING MEMBERS.

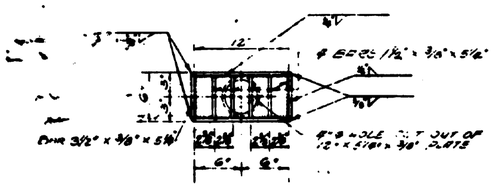


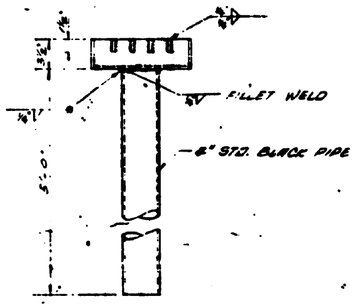


DETAILS OF STOOLS (TYPICAL)
SCALE 1½"=1'-0"

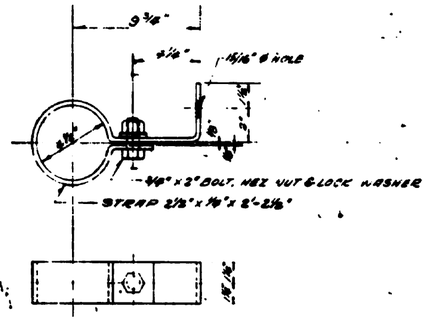


① NOTE: THESE DIMENSIONS HAD TO BE ALTERED IN FIELD TO ACCOMMODATE VARIATIONS IN EXISTING MEMBERS.

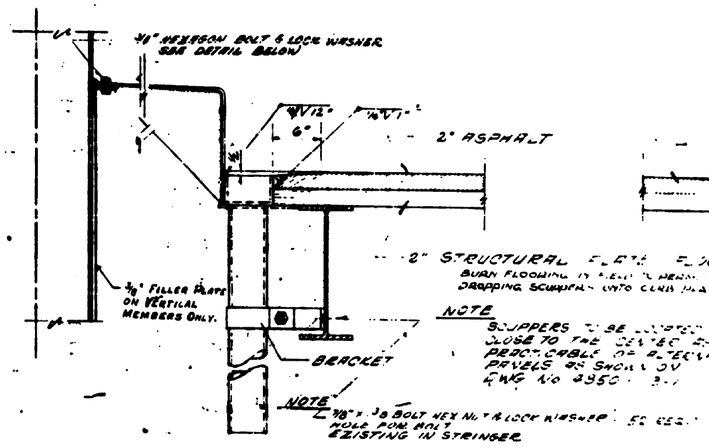




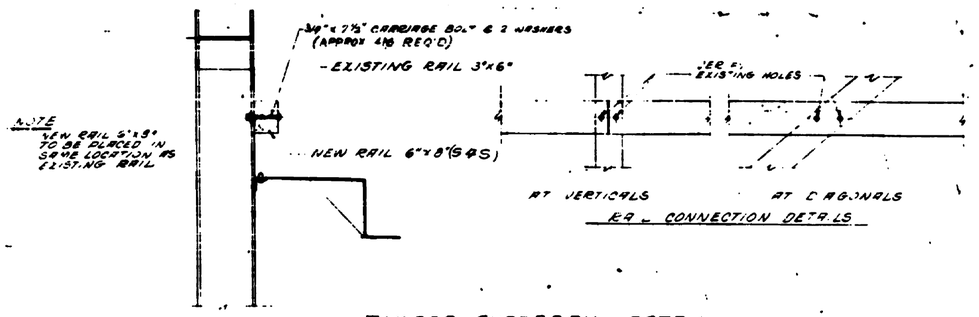
SCUPPER DETAIL
50 REQ'D.



SCUPPER BRACKET
52 REQ'D.

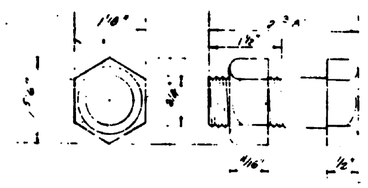


DRAINAGE SCUPPER DETAIL
SCALE 1½"=1'-0"



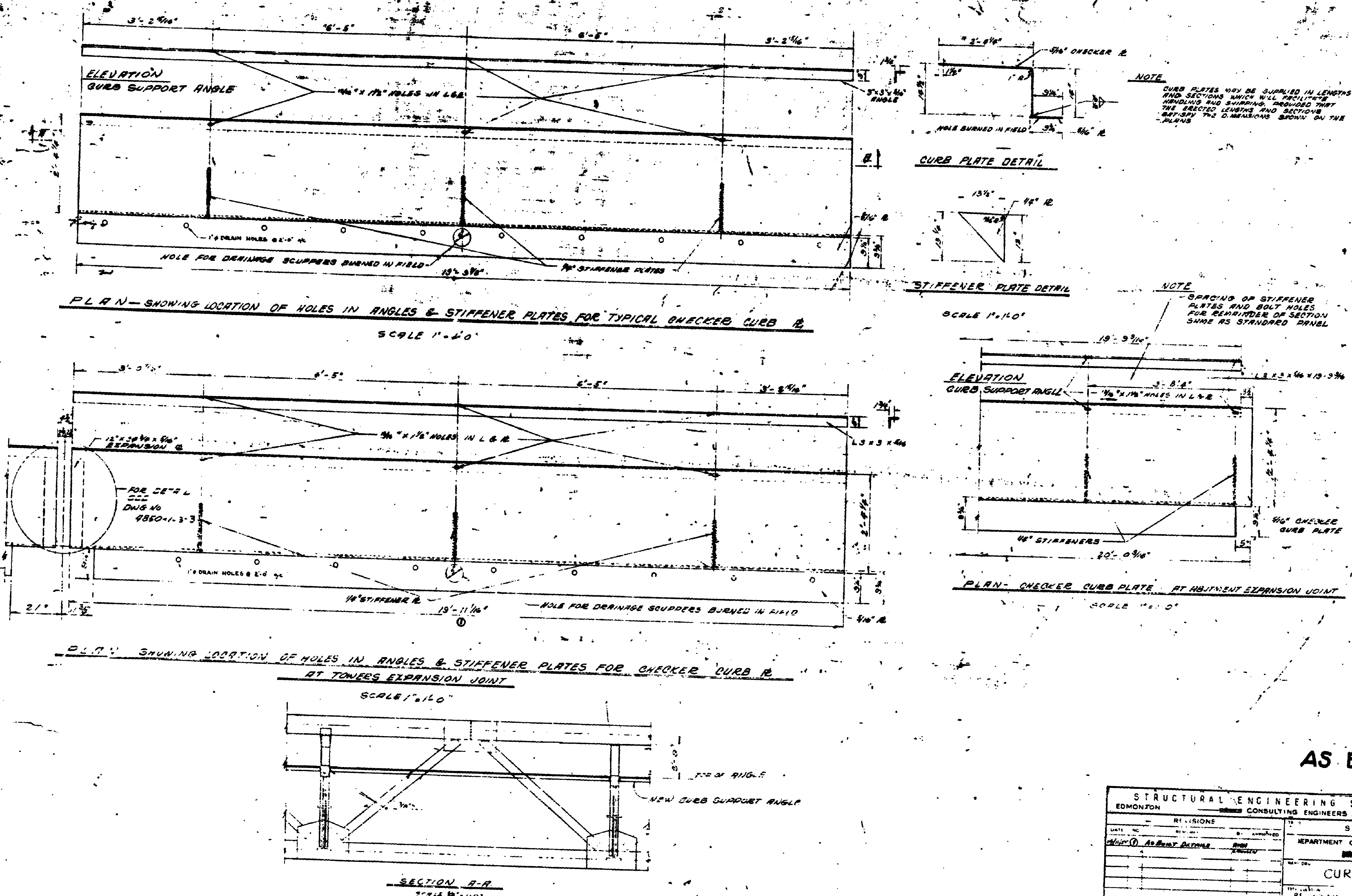
EQ. CONNECTION DETAILS

TIMBER GUARDRAIL DETAIL
SCALE 3/8"=1'-0"



DETAIL OF 3/8" HEXAGON BOLT FOR CHECKER PLATE & EAGLE CONVERTOR
SCALE FULL SIZE
328 REQ'D

STRUCTURAL ENGINEER
STRUCTURE
STOOL AND SCUPPER DETAILS
2139



AS BUILT.

STRUCTURAL ENGINEERING SERVICES LTD.
EDMONTON — CONSULTING ENGINEERS — CALGARY

REVISIONS

DATE	NO	REVISION	BY	APPROVED
	1	AS BUILT DETAILS		

STRUCTURAL

DEPARTMENT OF NATIONAL DEFENCE

DIRECTORATE OF WORKS

CURB DETAILS

LOWER RIVER BRIDGE
MILE POST 495.8, ALASKA HIGHWAY

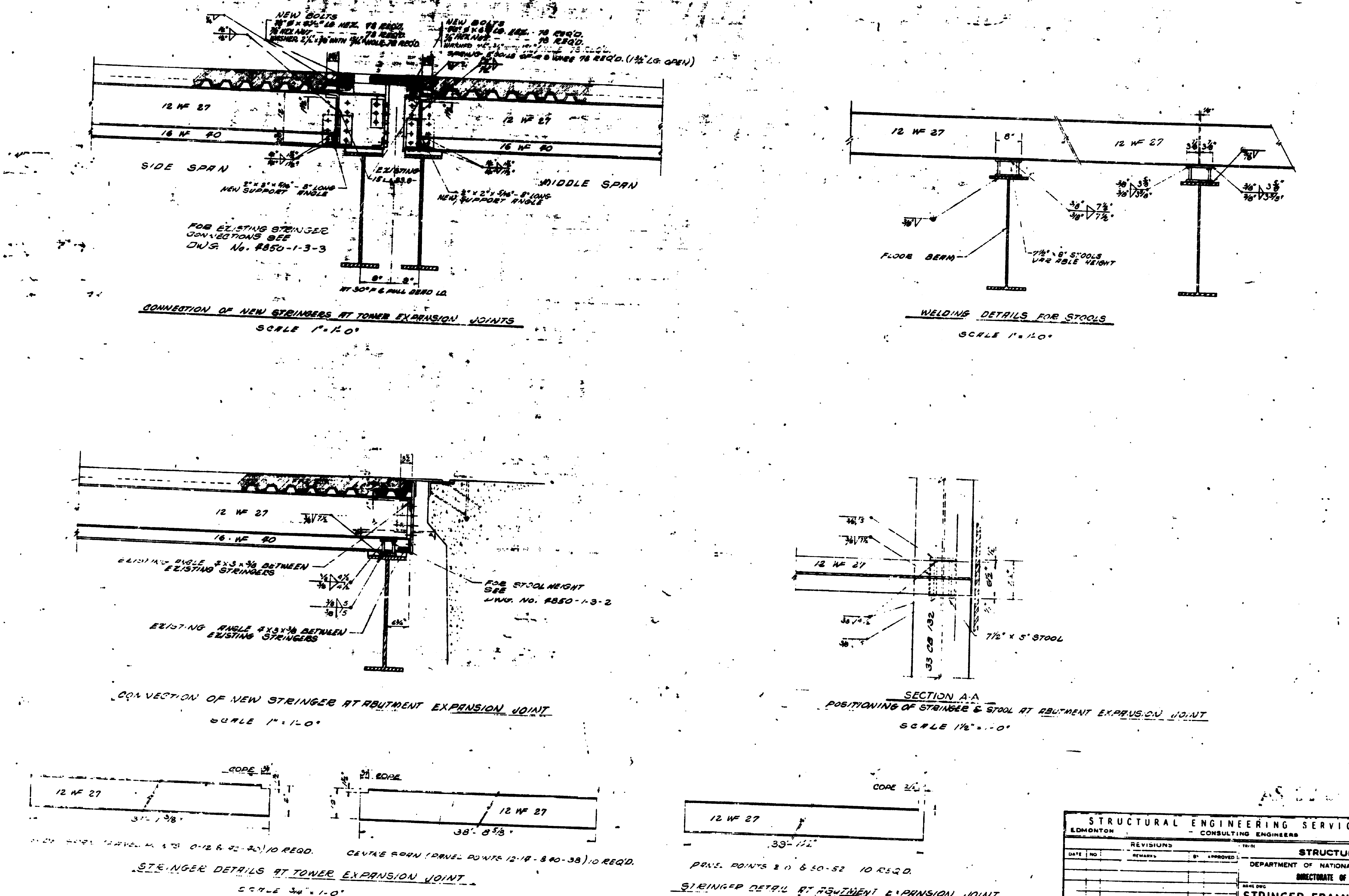
APPROVED — FIRE MARSHAL
SUBMITTED BY — D.C.E. DESIGN DIVISION
USER BRANCH APPROVED
APPROVED FOR CONSTR

DATE FEB 15, 19

2139 12

4850-1-3-5

133



STRUCTURAL ENGINEERING SERVICES LTD.
EDMONTON - CONSULTING ENGINEERS CALGARY

REVISIONS				
DATE	NO	REMARKS	BY	APPROVED

STRUCTURAL

DEPARTMENT OF NATIONAL DEFENCE ARMY

DIRECTORATE OF WORKS

NAME DWG

STRINGER FRAMING DETAILS

TYPE-LOCATION

RE DECKING LOWER LIARD RIVER BRIDGE
MILE POST 495 8 ALASKA HIGHWAY

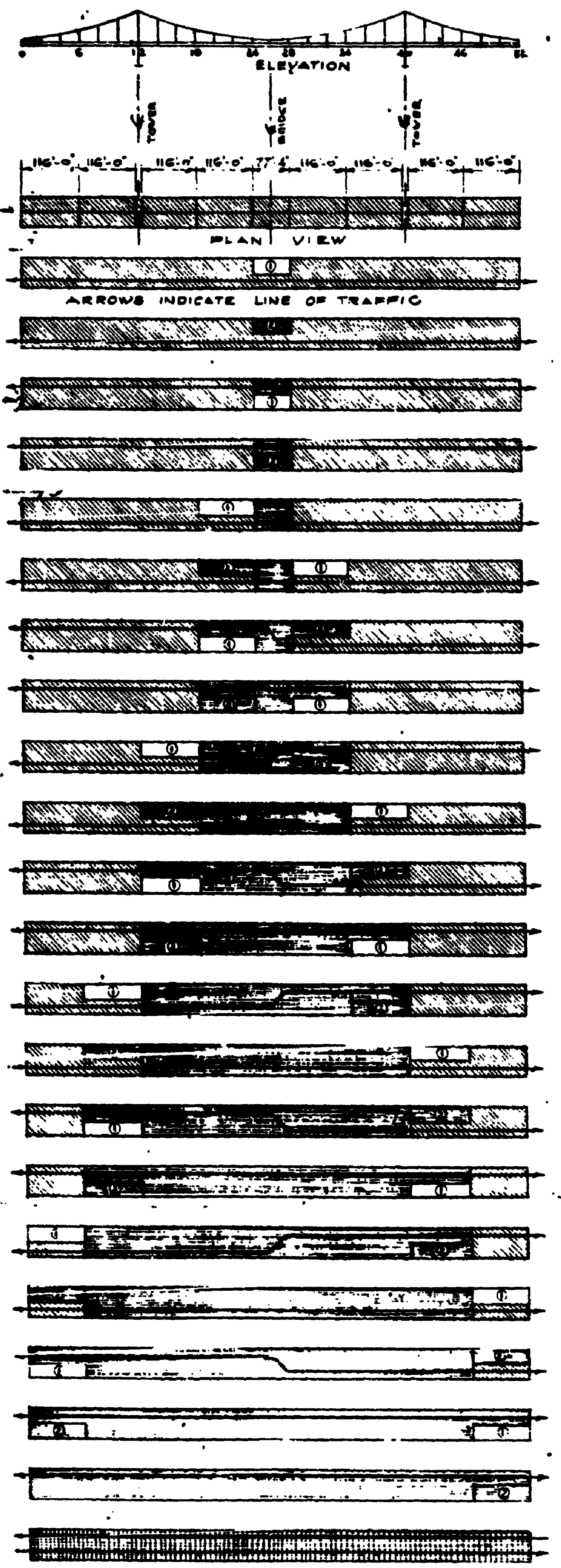
DATE FEB 15, 1954
SCALE AS SHOWN

SUBMITTED BY
DESIGNED BY
DRAWN BY
CHECKED BY
STAND DWG NO

APPROVED FOR CONSTR

JOB DWG NO 4850-1-3-6

PROCEDURE FOR REMOVAL OF TIMBER DECK AND PLACING STEEL DECK AND ASPHALT



① REMOVE TIMBER DECK, PLACE STEEL DECK

② APPLY FIRST LAYER ASPHALT (¾" ABOVE CORRUGATION)

① REMOVE TIMBER DECK, PLACE STEEL DECK

② APPLY FIRST LAYER ASPHALT

① REMOVE TIMBER DECK PLACE STEEL DECK

① REMOVE TIMBER DECK, PLACE STEEL DECK
② APPLY FIRST LAYER ASPHALT

① REMOVE TIMBER DECK, PLACE STEEL DECK
② APPLY FIRST LAYER ASPHALT

① REMOVE TIMBER DECK, PLACE STEEL DECK
② APPLY FIRST LAYER ASPHALT

① REMOVE TIMBER DECK, PLACE STEEL DECK
② APPLY FIRST LAYER ASPHALT

① REMOVE TIMBER DECK, PLACE STEEL DECK
② APPLY FIRST LAYER ASPHALT

① REMOVE TIMBER DECK, PLACE STEEL DECK
② APPLY FIRST LAYER ASPHALT

① REMOVE TIMBER DECK, PLACE STEEL DECK
② APPLY FIRST LAYER ASPHALT

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① REMOVE TIMBER DECK PLACE STEEL DECK
② APPLY FIRST LAYER ASPHALT

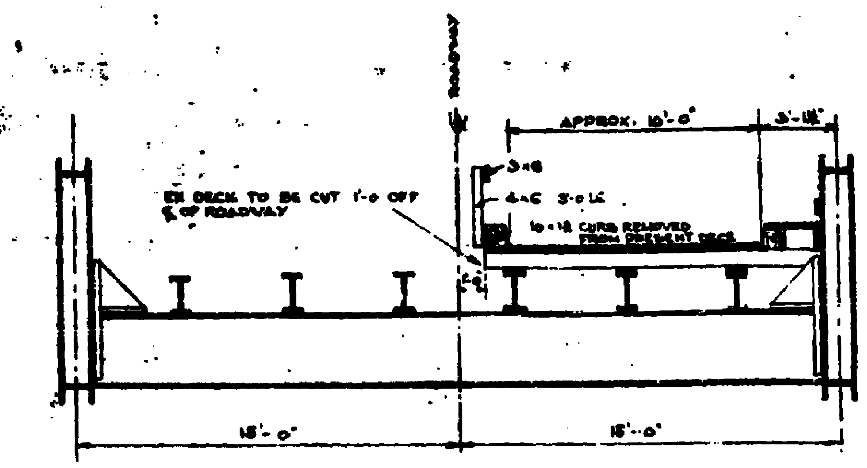
① REMOVE TIMBER DECK PLACE STEEL DECK
② APPLY FIRST LAYER ASPHALT

① REMOVE TIMBER DECK, PLACE STEEL DECK
② APPLY FIRST LAYER ASPHALT

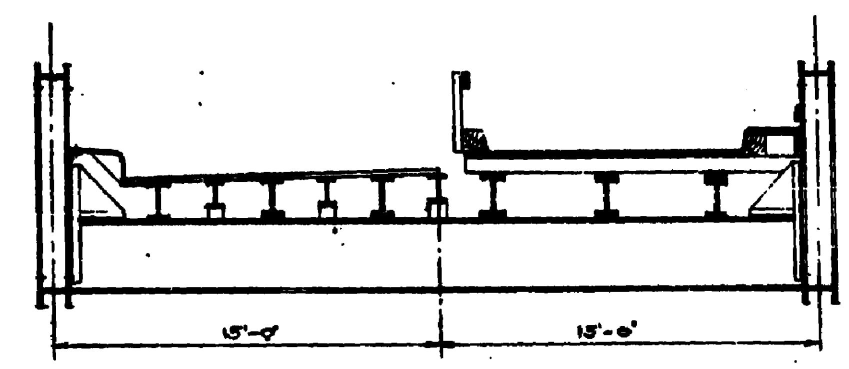
② APPLY FIRST LAYER ASPHALT

REMAINING 1¼" ASPHALT APPLIED AND SEALCOATED, ONE LANE AT A TIME, OVER THE ENTIRE LENGTH OF THE BRIDGE. TRAFFIC TO BE KEPT MOVING AT ALL TIMES.

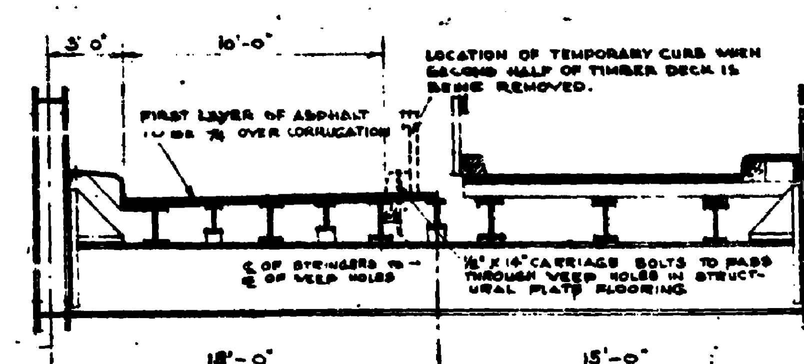
NOTE: SMALL RAMPS TO BE PROVIDED TO ALLOW TRAFFIC TO PASS SMOOTHLY FROM WOODEN DECK TO NEW STEEL DECK AND VICE VERSA



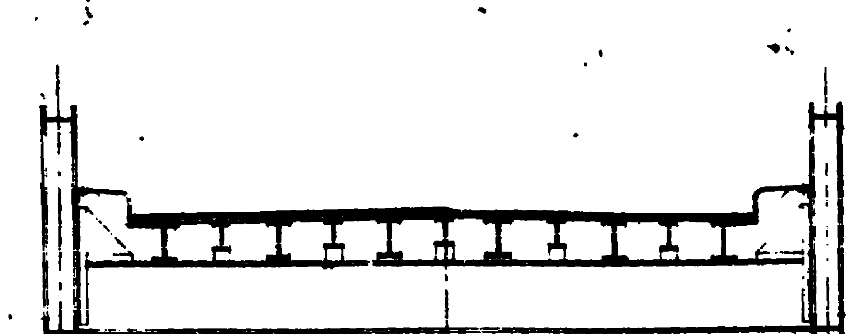
REMOVING TIMBER DECK



PLACING STEEL DECK

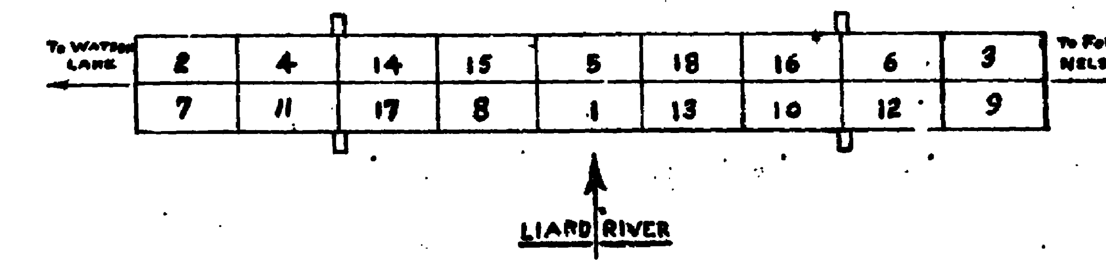


APPLYING FIRST LAYER ASPHALT



APPLYING TOP 1¼" LAYER ASPHALT
TRAFFIC TO BE KEPT MOVING AT ALL TIMES

① AS BUILT SEQUENCE OF REMOVAL AND PLACING NEW DECK



① **OBSERVED DEFLECTIONS**
BEFORE AND AFTER REPLACING DECK/1955

LOCATION OF POINT OBSERVED	ELEVATIONS EAST TRUSS			ELEVATIONS WEST TRUSS		
	BEFORE MAY, 13.	AFTER SEPT, 15.	DEFLECT'S DOWNWARD	BEFORE MAY, 13.	AFTER SEPT, 15.	DEFLECT'S DOWNWARD
N. END APPROACH SPAN TRUSS	0.67	0.67	0.00	[illegible]	0.68	0.00
1ST HANGAR	2.13	2.09	0.04	2.15	2.10	0.05
2ND "	3.18	3.13	0.05	3.20	3.15	0.05
3RD "	4.11	4.07	0.04	4.18	4.09	0.09
4TH "	4.99	4.97	0.02	4.99	4.93	0.06
5TH "	5.56	5.53	0.03	5.54	5.48	0.06
ENDS OF APPROACH ℄	6.25	6.25	0.00	6.25	6.25	0.00
CENTER SPAN TRUSSES	6.27	6.27	0.00	6.27	6.27	0.00
6TH HANGAR	7.08	6.94	0.14	7.03	6.93	0.10
7TH "	7.94	7.71	0.23	7.91	7.70	0.21
8TH "	8.49	8.19	0.30	8.52	8.24	0.28
9TH "	8.96	8.61	0.35	8.98	8.64	0.34
10TH "	9.14	8.76	0.38	9.11	8.73	0.38
11TH "	9.27	8.87	0.40	9.19	8.78	0.41
12TH " CENTER	9.35	8.95	0.40	9.18	8.78	0.40
13TH "	9.30	8.92	0.38	9.11	8.74	0.37
14TH "	9.18	8.84	0.34	9.01	8.69	0.32
15TH "	9.01	8.74	0.27	8.82	8.55	0.27
16TH "	8.52	8.31	0.21	8.86	[illegible]	0.20
17TH "	7.93	7.76	0.17	7.79	7.66	0.13
18TH "	7.11	6.94	0.17	7.01	6.92	0.09
ENDS OF CENTRE ℄	6.20	6.20	0.00	6.23	6.23	0.00
APPROACH SPAN TRUSSES	6.18	6.18	0.00	[illegible]	[illegible]	[illegible]
19TH HANGAR	5.50	5.49	0.01	5.54	5.50	0.04
20TH	4.90	4.88	0.02	4.94	4.90	0.04
21ST	4.06	4.06	0.00	4.10	4.08	0.02
22ND	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.01
23RD	2.16	2.16	0.00	2.19	2.16	0.03
S. END APPROACH SPAN TRUSS	0.78	0.78	0.00	0.74	0.74	0.00

NOTE: ELEVATIONS TAKEN ON TOP SIDE OF TOP CHORD OF STIFFENING TRUSS. GEODETIC B.M. 366F USED, ELEVATION ASSUMED TO BE 0.00 ft.

STRUCTURAL ENGINEERING SERVICES LTD.
EDMONTON — CONSULTING ENGINEERS — CALGARY

REVISIONS				
DATE	NO	REMARKS	BY	APPROVED
[illegible]	①	AS BUILT DETAILS	[illegible]	

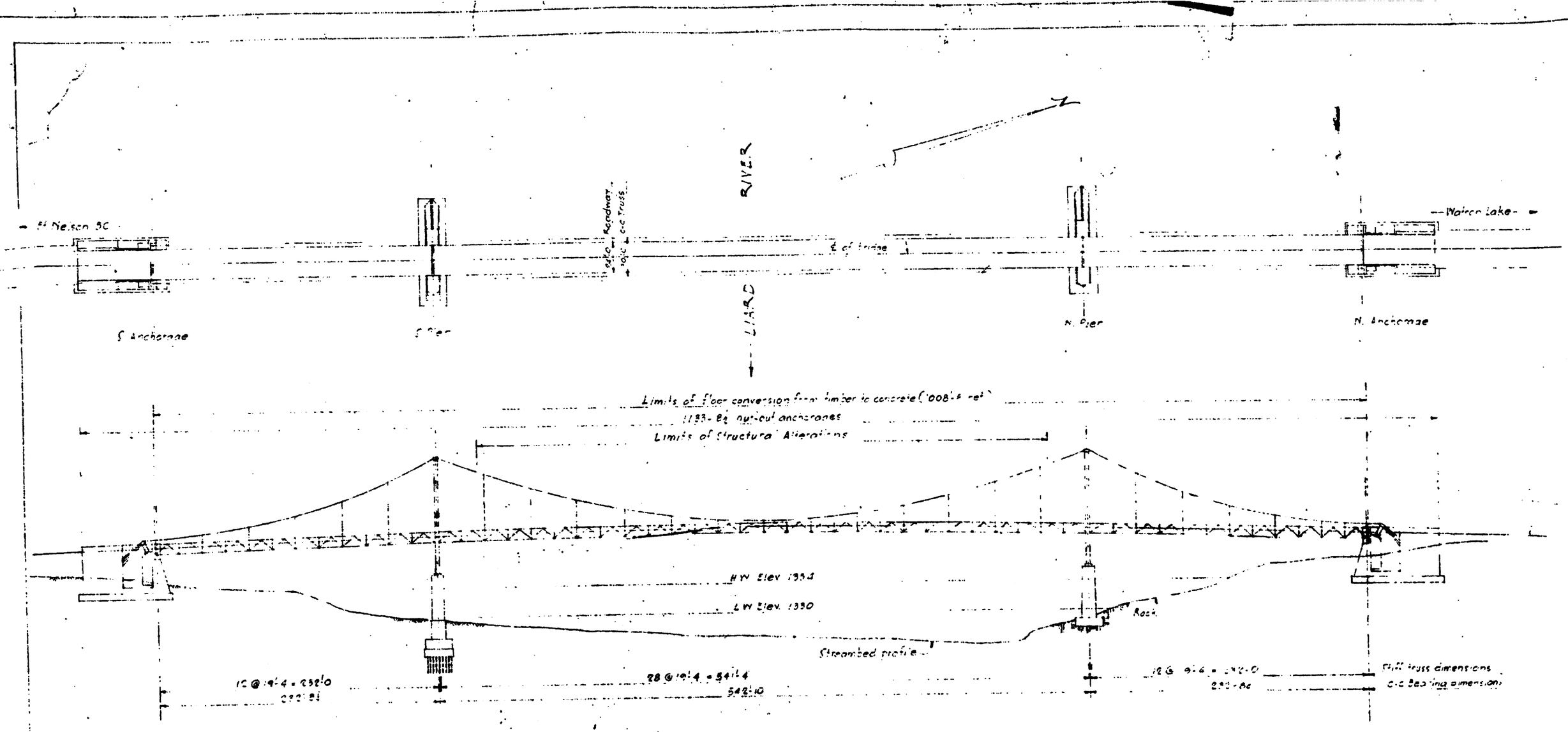
TRADE: STRUCTURAL
DEPARTMENT OF NATIONAL DEFENCE — ARMY
DIRECTORATE OF WORKS

NAME OR: **CONSTRUCTION PROCEDURE**

TYPE LOCATION: RE-DECKING LOWER LIARD RIVER BRIDGE, MILE POST 495.8 ALASKA HIGHWAY

APPROVED: — FIRE MARSHAL
DATE: FEB 15 1954
SCALE: NOT TO SCALE
SUBMITTED BY: [signature] DESIGN DIVISION
DESIGNED BY:
DRAWN BY:
CHECKED BY:
UNDER BRANCH APPROVED:
APPROVED FOR:
JOB UNIT No: 4850-1-3-7

2:39-14



LIST OF DRAWINGS

SHEET NO	DRWG NO	DESCRIPTION
1	2008-B	Layout of Bridge
2	2008-C	Conversion Procedure - Deck
3	2008-D	Concrete Deck Detail
4	2008-G	Misc. Details
5	E 1 AB	Anchorage Plan
6	E 1 B	" "
7	E 2	Steel Erection Diagram
8	E 3	" " "
9	E 4	" " "
10	E 6	Rope Diagram
11	E 7	End Dam Detail
12	E 8 AB	Conversion Detail-Steelwork
13	E 8 B	" " "
14	E 9	Abutment End Dam
15	E 10	Cable Movement

NOTES

1. The drawings listed on this sheet are those considered necessary to include all details concerning the alteration of the deck from timber to concrete and inherent changes to the steelwork.
2. For design of the temporary suspention rigging in connection with change of suspender lengths, complete shop drawings may be required. One complete set of these drawings is available at the office of Sr. Hwy. Engr., N.W.H.S., Whitehorse, Y.T.
3. Fabrication details for all required steel parts as well as rivet & bolt list have been condensed from several drawings and shown on Drwg. No 2008-G for the sake of clarity.
4. All references on the "E" series drawings to sheet "E8" are void. Details shown on Drwgs No E8AB & E8B are applicable.
5. Where small discrepancies in drawings are found, the latest dated drawing shall govern.

SUMMARY OF QUANTITIES

Item	Unit	Quant
Concrete, Class "Y"	Cu Yd	565
Reinforcing Steel	lbs	164 200
Structural Steel *	lbs	16,807
Structural Timber	BM	8320

* Includes all rivets and bolts in structure

APPROVED

LT COL. R.C.E., SR. HWY. ENGR., N.W.H.S.

LIARD RIVER BRIDGE	MP 495.8
LAYOUT	
SCALE 1" = 40'	
DEPARTMENT OF NATIONAL DEFENCE	
HQ - NORTHWEST HIGHWAY SYSTEM WHITEHORSE, Y.T.	NOV. 1951
DRAWN J.Q. 17 NOV 61 CHECKED CTY 20 NOV 61	REVISION DATE FILE NO
	SHEET 1 OF
	DRWG. NO 2008-A

2139

DOWNSTREAM TRUSS (Dash Line)

UPSTREAM TRUSS (Full Line)

ELEVATIONS

PANEL POINT		U.S. TRUSS	D.S. TRUSS
S Anchor	0	1392.19	1392.14
	2	93.32	93.32
	4	94.27	94.28
	6	95.22	95.19
	8	96.06	96.03
	10	96.85	96.83
South Tower	12	97.55	97.54
	14	98.20	98.19
	16	99.08	99.19
	18	99.69	99.83
	20	1400.19	1400.35
	22	00.39	00.55
	24	00.49	00.69
S. Bridge	26	00.51	00.73
	24	00.36	00.64
	22	00.46	00.49
	20	1400.32	1400.30
	18	1399.82	1399.80
	16	99.19	99.20
	14	98.49	98.46
North Tower	12	97.64	97.63
	10	96.90	96.92
	8	96.18	96.17
	6	95.36	95.32
	4	94.38	94.37
	2	93.36	93.34
N Anchor	0	92.84	92.84

← Fort Nelson

PANEL POINTS

0 2 4 6 8 10 12 14 16 18 20 22 24 26 24 22 20 18 16 14 12 10 8 6 4 2 0

Whitehorse →

1400 99 98 97 96 1395 94 93 92 91 1390 1380 1370 1360

ABUT. NO 1

PIER NO 1

PIER NO 2

ABUT. NO 2

PROFILE ALONG WEB OF TOP CHORDS

VERT. SCALE 1 INCH = 1 FOOT

ELEVATIONS AT TOP OF BEARING PLATES NO SCALE

BRIDGE Nº 139 MILEPOST 495.8

LIARD SUSPENSION BR.

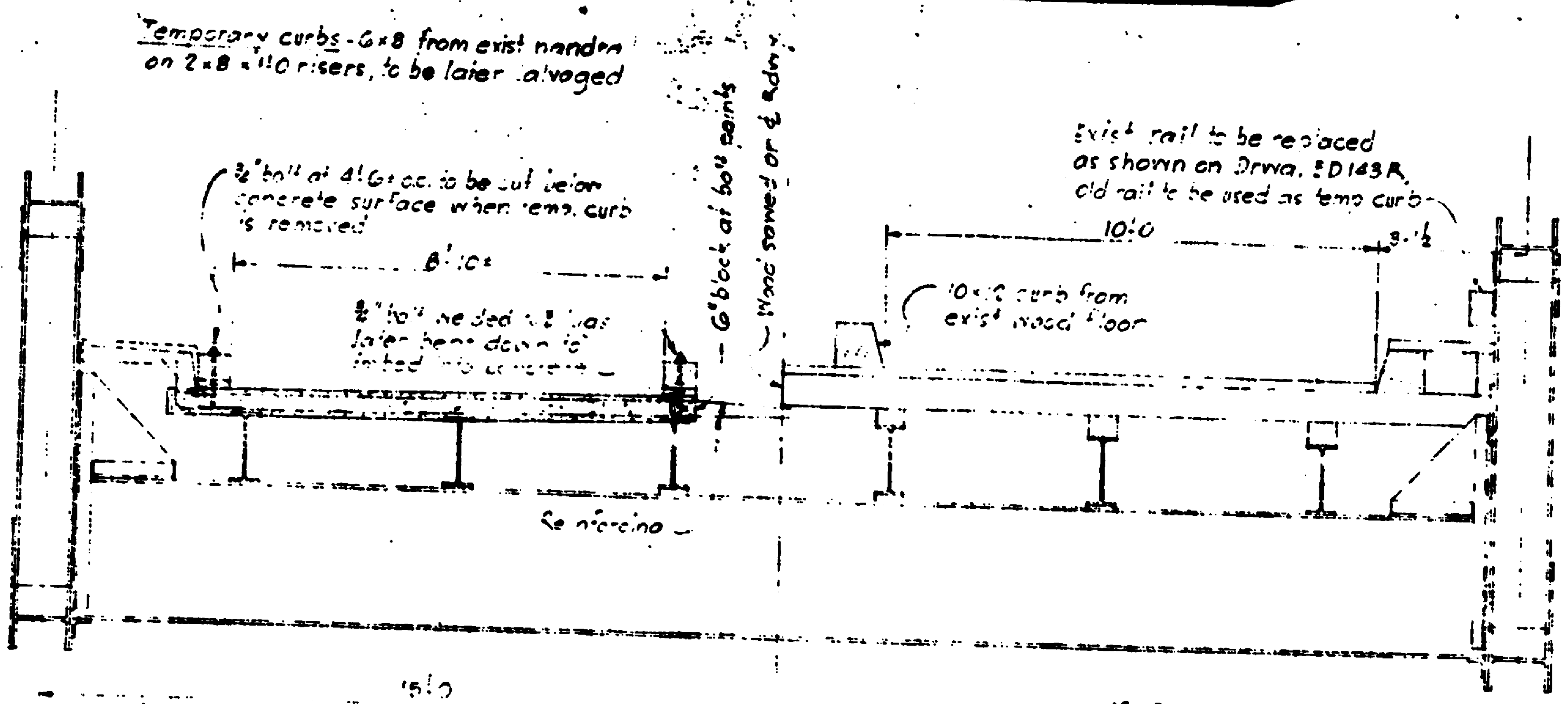
SCALE AS SHOWN

NORTHWEST HIGHWAY SYSTEM HEADQUARTERS
WHITEHORSE Y.T. CANADA

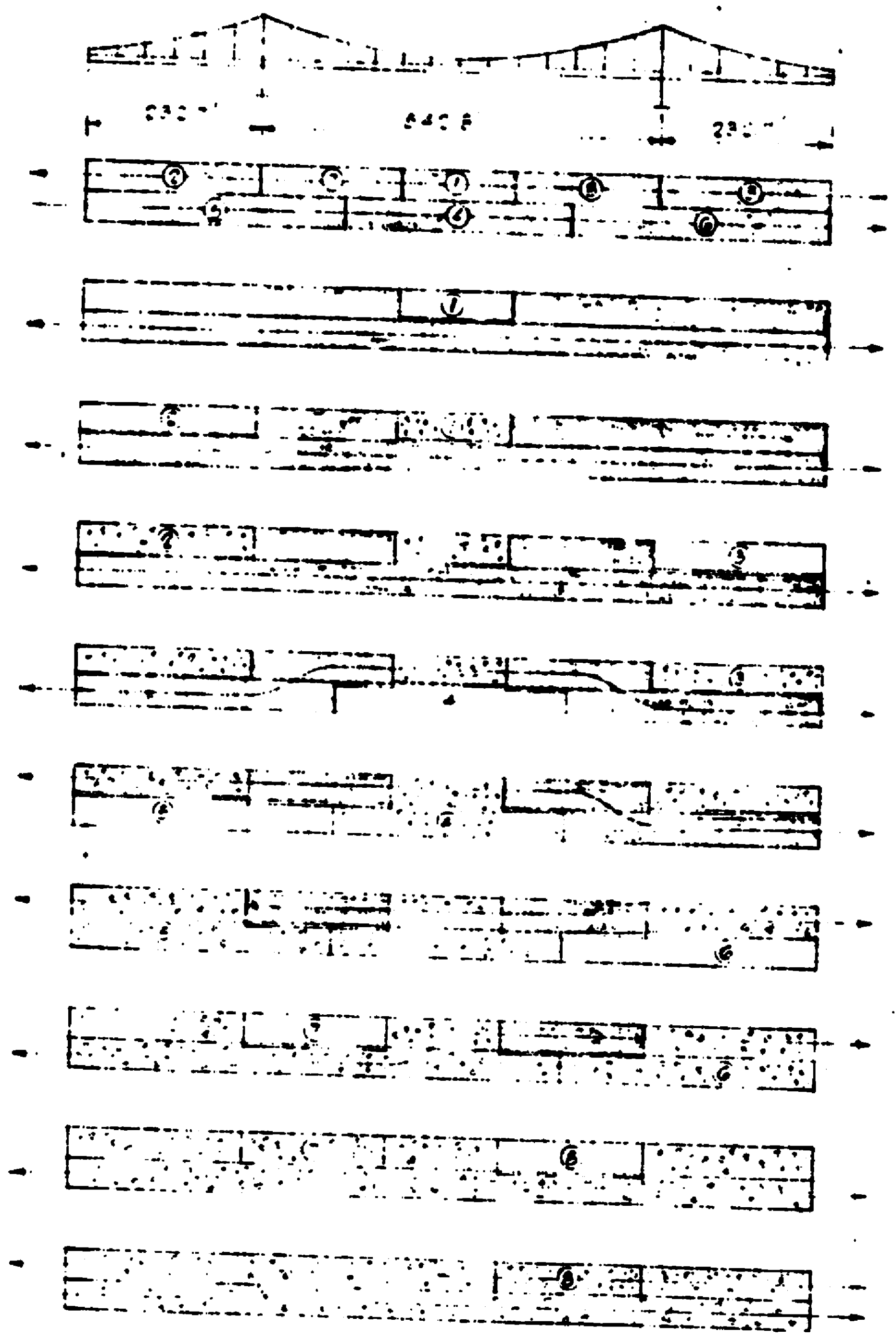
SURVEYED 8 AUGUST 1946 TEMP 65°F DELL, CALM & CLOUDY

DRWG. Nº 2008-1

2139-1



SECTION SHOWING HALF OF WOOD FLOOR REMOVED & CONCRETE POURED FOR ONE LANE



PROCEDURE

FOR REMOVAL OF WOOD FLOOR & POURING OF CONCRETE

1. Steel work alterations completed. Wood floor intact. Traffic in both directions at same time.
2. One lane traffic alternating in direction. In Section ① remove wood floor, place forms for concrete.
3. In Section ① pour concrete. In Section ② remove wood floor, place forms for concrete.
4. In Section ② pour concrete. In Section ③ remove wood floor, place forms for concrete.
5. Divert traffic as shown. In Section ③ pour concrete. In Section ④ remove wood floor, place forms for concrete.
6. Divert traffic as shown. In Section ④ pour concrete. In Section ⑤ remove wood floor, place forms for concrete.
7. Divert traffic as shown. In Section ⑤ pour concrete. In Section ⑥ remove wood floor, place forms for concrete.
8. Divert traffic as shown. In Section ⑥ pour concrete. In Section ⑦ remove wood floor, place forms for concrete.
9. Divert traffic as shown. In Section ⑦ pour concrete. In Section ⑧ remove wood floor, place forms for concrete.
10. In Section ⑧ pour concrete. Allow concrete to set. Restore simultaneous traffic in both directions as shown. Place forms and pour concrete for curbs and sidewalks.

NOTES

For inst[illegible]tions and recommended procedure to be used in the change-over from wood floor to concrete floor, use this drawing together with drawing ED 2008-5 and American Bridge Co. erection plans drawings Nos. E.1, E.2, E3, E4, E6 [illegible] E8, E9 & E10, Order No. J[illegible]4. Drwg. No. E8 [illegible] not applicable to this change-over.

Drawings E7 & E9 show the expansion dams for the wood floor condition in an elevated position. This detail was not followed in the actual construction and the expansion dams were erected in the position as required for the concrete floor. Wood fillers were used to bring the roadway surface to the required elev. The change-over listed on Drwgs. E7 & E9 are therefore not needed except that anchor bars must be provided and welded in place. (See Drwg. No. ED2008-5).

The pieces listed on Drwg. E[illegible], scuppers SC1, scupper supports M[illegible], [illegible] Nos. for concrete floor and field bolts and rivets for same were not provided originally and must be furnished for this change-over.

It will be necessary to remove and later re-drive the pins in certain suspender connections. The pilot and driving nuts used in original construction were manufactured by the American Bridge Co. [illegible]. One each of [illegible] as listed on American Bridge Co. Sheet No. C1* Order No. 1310 shall be provided by contractor.

In proceeding with the change-over, perform first the operations outlined under Step No. 2 as shown Drwg. No. E8, paying particular attention to notes [illegible].

*Sheet C1 does not contain drawings of pilot & driving nuts but should be quoted when ordering these nuts from the manufacturer along with original order number.

During step 8, check the clearance between the ends of the chords at U20. Flame cut the ends of the chords if required to make the connecting holes in the new plates. It may be necessary to apply a local load at panel 20, such as a heavy tractor or truck, to close the splice at U20.

The temporary device or rigging used for support while releasing the suspenders must be of a substantial nature. A full panel concentration must be supported and an additional force applied to obtain proper hanger lengths by displacing both the cable and the truss. The rigging at each panel point shall be able to pull at least 50 tons. See Drwg. E10 for amount of hanger shortening.

After steelwork alterations are complete, proceed with removal of wood floor and concrete pouring as outlined on this sheet.

Details of B lugs N[illegible], Scuppers SC1, Bracket M50, Plates [illegible], 40, 41, 42, 31 & 32, Sidewalk plates and rivet list mentioned in various drawings are shown in drawing No. 2008-6 superseding Drwg. C4, C5 & F5.

The concrete curbs will be formed & poured as a separate operation and not poured integral with slab.

The procedure has been designed so as to permit traffic at all times, maintain reasonable stress conditions and minimize objectionable distortions.

The Contractor shall submit complete information on details of the erection procedure.

Note: This drawing supersedes PRA drawing No. [illegible] (Jul '44) revised & redrawn.

APPROVED

[illegible] HIGHWAY ENGR. N.W.H.S.

LIARD RIVER BRIDGE — MP 495.6

PROCEDURE FOR CONVERSION TO CONCRETE DECK

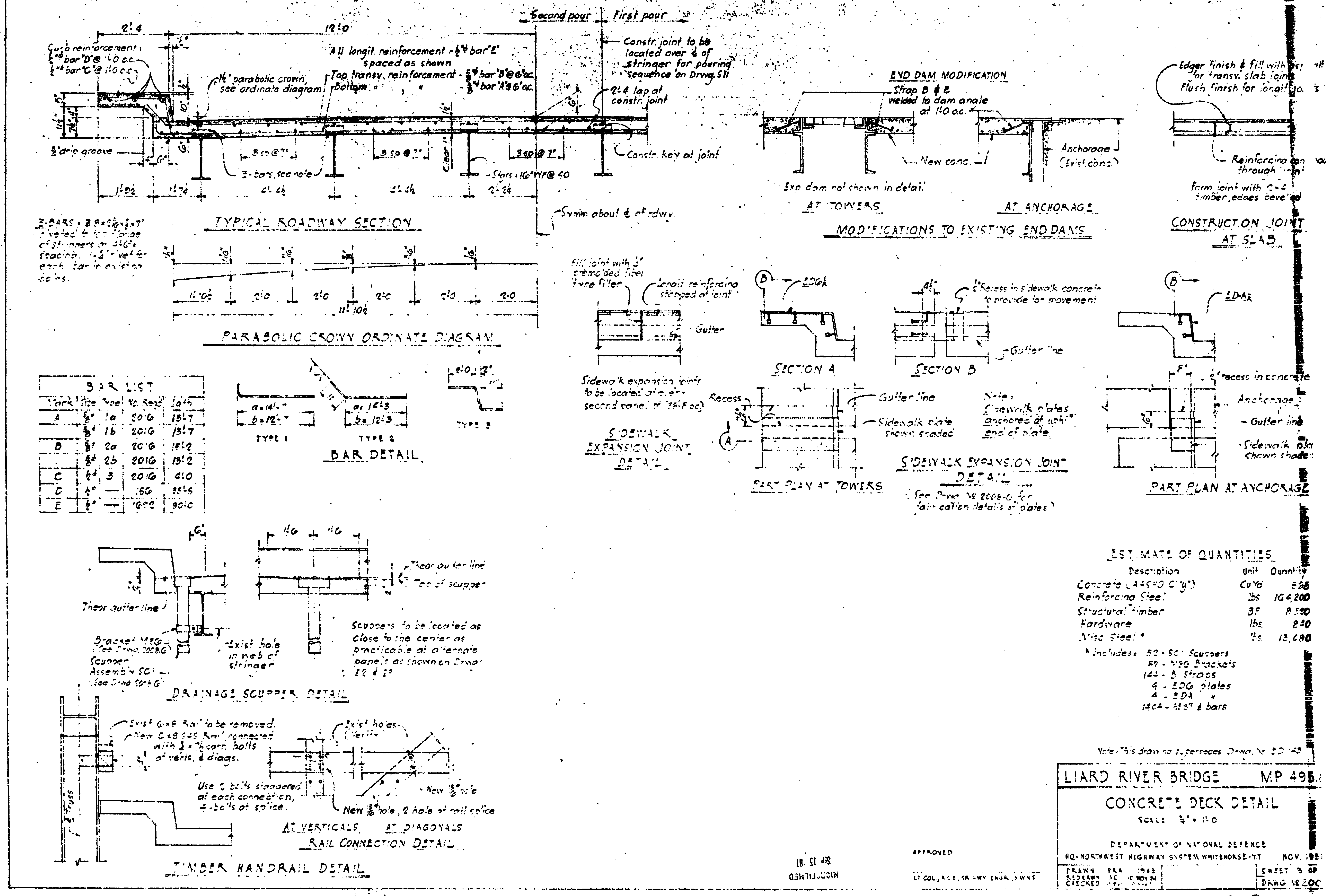
SCALE ⅛" = 1'0 & DIAGRAMMATIC

DEPARTMENT OF NATIONAL DEFENCE
NORTHWEST HIGHWAY SYSTEM, WHITEHORSE, Y.T.

NOV [illegible] 51

DRAWN		14-[illegible]-51	REVISIONS	FILE No.
TRACED				SHEET 2 OF 3
CHECKED		20-[illegible]-51		DRWG. No. 2008-[illegible]

2139-2



BAR LIST				
Mark	Size	Type	No. Reqd.	Length
A	⅝"	1a	2016	15'-7
	⅝"	1b	2016	13'-7
B	⅝"	2a	2016	15'-2
	⅝"	2b	2016	13'-2
C	½"	3	2016	4'-0
D	½"	—	156	35'-5
E	½"	—	1692	30'-0

ESTIMATE OF QUANTITIES

Description	Unit	Quantity
Concrete (AASHO C"y")	Cu Yd	535
Reinforcing Steel	lbs	164,200
Structural Timber	B.F.	8,320
Hardware	lbs.	840
Misc Steel *	lbs.	13,080

* Includes: 52 - SC1 Scuppers
52 - M8G Brackets
144 - B Straps
4 - EDG plates
4 - EDA "
1404 - MS7 ⅞ bars

Note: This drawing supersedes Drwg. No. SD 145

LIARD RIVER BRIDGE MP 496

CONCRETE DECK DETAIL

SCALE ⅜" = 1'-0

DEPARTMENT OF NATIONAL DEFENCE
HQ-NORTHWEST HIGHWAY SYSTEM WHITEHORSE-Y.T. NOV. 1951

APPROVED
LT. COL., R.C.E., SR. HWY. ENGR., NWHS

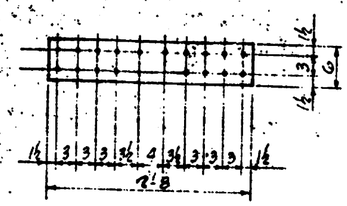
DRAWN, REDRAWN, CHECKED

SHEET 3 OF 5
DRWG. No 2006

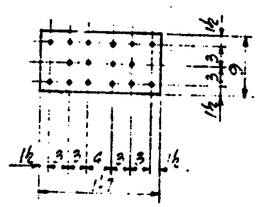
MICROFILMED

LIST OF FIELD RIVETS AND BOLTS

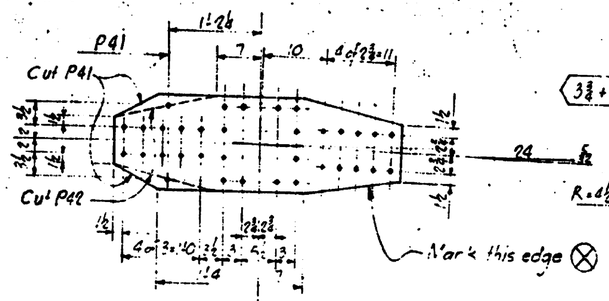
Actual No. Read	No. to be provided	Diam.	RIVETS Lgth.	BOLTS Lgth.	BOLTS Remarks	Grip	Calc. Wt.
1404	1500	¾	2½			⅞	
486	550	⅞	2¾			1¼	
64	80	"	2⅞			1⅜	
40	55	"	3¼			1⅝	
192	220	"	3½			1¾	
96	115	"	4¼			2¼	
24	35	1	2½			⅞	
24	35	"	3			1⅛	
32	45	"	3¼			1¼	
108	130	"	4			2⅛	
4	10	"	4½			2⅜	
8	15	1¼	3¼			1⅜	
8	15	"	4¼			2⅛	
8	15	"	4¾			2⅜	
52	60	⅞		1½	Hex hd & nut	⅜	
24	30	¾		1⅝	"	⅞	
196	150	"		2¼	"	1¼ - 1⅜	
32	40	"		2½	"	1½	
96	105	"		2¾	"	1¾	
108	120	"		3	"	2⅛	
52	60	"		3½	"	2½ - 2⅜	
624	700	¾		7½	Carriage		



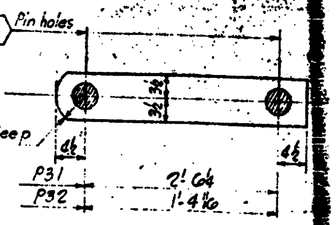
P39 - Pl. G - ¾ x 2'-8
(16 Read.)



P40 - Pl 9 x ⅜ x 1'-7
(8 Read.)



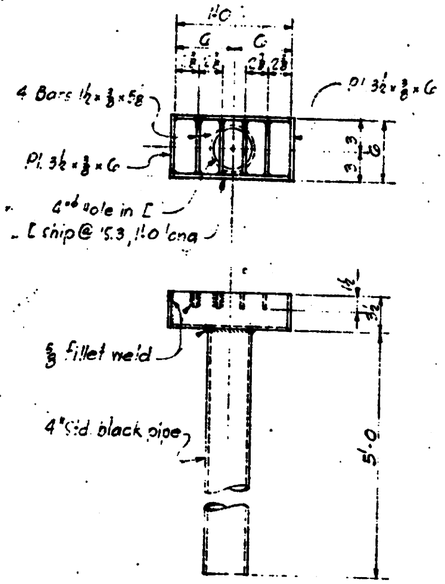
P41 - Pl. 14 x ¾ x 3'-9½ (4 Read.)
P42 - Pl. 14 x ¾ x 3'-9½ (4 ")



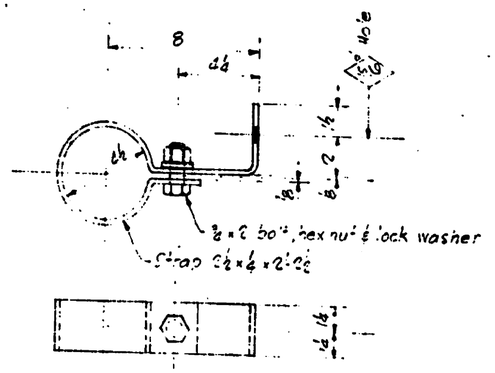
P31 - Pl. 7 x 1½ x 3'-3¼ (8 Read.)
P32 - Pl. 7 x 1½ x 2'-1 59/60 (4 Read.)

FABRICATION DETAIL OF STEEL PARTS FOR STEELWORK ALTERATIONS

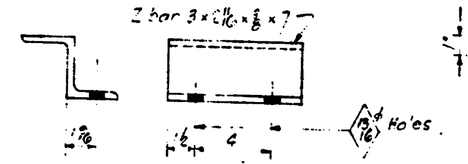
Note: Unless noted, all holes 13/16"; holes in materials over ¾" thick to be punched & reamed.
All part to be given one shop coat of red lead paint.



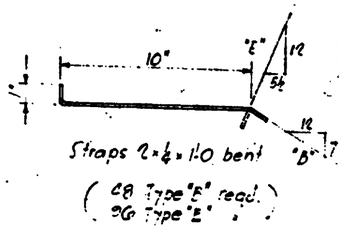
SCUPPER SC1 DETAIL
(52 Read.)
Scale: 1½" = 1'-0
Paint: 1 coat red lead, 1 coat black



SCUPPER BRACKET M3G
(52 Read.)
Scale: 3" = 1'-0
Paint: 1 coat red lead, 1 coat black



Z-LUG M37 DETAIL
(1404 Read.)
Scale: 3" = 1'-0
No paint

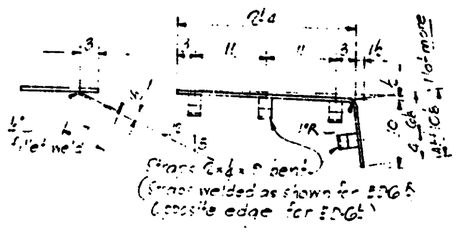


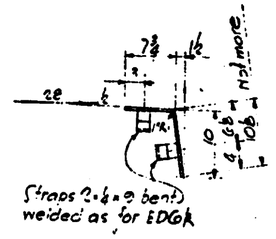
Straps 2 x ¼ x 1'-0 bent
(28 Type "B" read.)
(96 Type "E" ")

END DAM ANCHOR BARS
Scale: 3" = 1'-0
No paint

ED-CL
Pl. 12 x ½ x 1'-5½ abt (Bent)

ED-AL
Pl. 12 x ½ x 1'-5½ abt (Bent)





SIDEWALK EXPANSION DAMS
(Reqd. 2 each EDGL, EDGR, EDAL & EDAR)
Scale: 1" = 1'-0
Paint: 1 coat Red lead

Note: This drawing supersedes Dwgs. Nº C4, C5 & C5

LIARD RIVER BRIDGE MP 495.8

MISC. DETAILS

SCALE AS SHOWN

DEPARTMENT OF NATIONAL DEFENCE
NC-NORTHWEST HIGHWAY SYSTEM, WHITEHORSE, Y.T. NOV. 1951

APPROVED

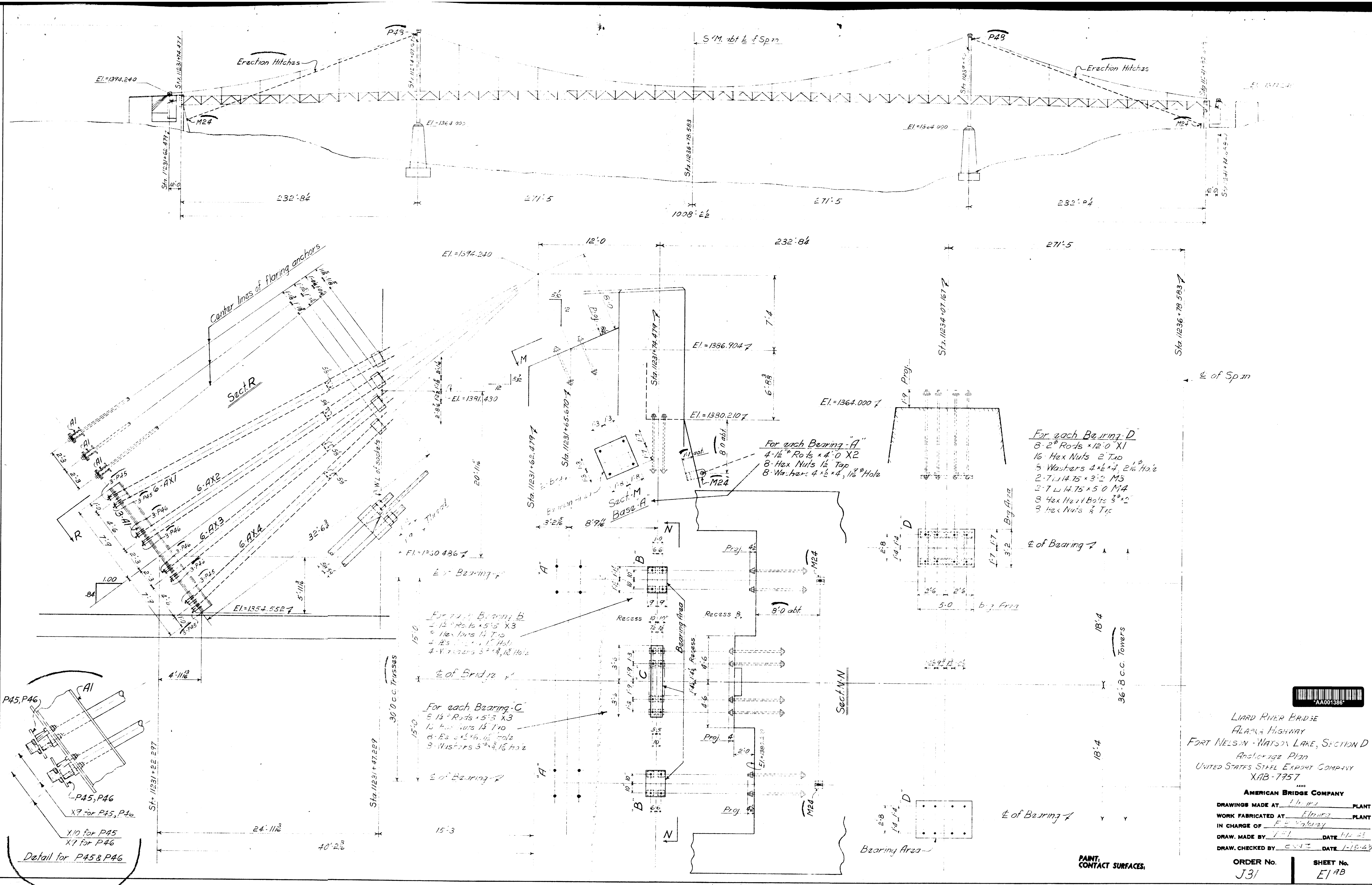
LT. COL., R.C.E., SR. RWY. ENGR. NWHS

DRAWN JG 16 NOV 51 | CHECKED Cmy 20 NOV 51 | REVISION | DATE | FILE Nº | SHEET 4 OF 15 | DRWG. Nº 2008-6

MICROFILMED OCT 15 '81

2137-4

Appendix B - Original Drawings Dated Jan. 1943



LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
Anchorage Plan
UNITED STATES STEEL EXPORT COMPANY
XAB-7957

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF F. B. Maloney
DRAW. MADE BY V. F. I. DATE 1-14-43
DRAW. CHECKED BY C. W. Z. DATE 1-15-43

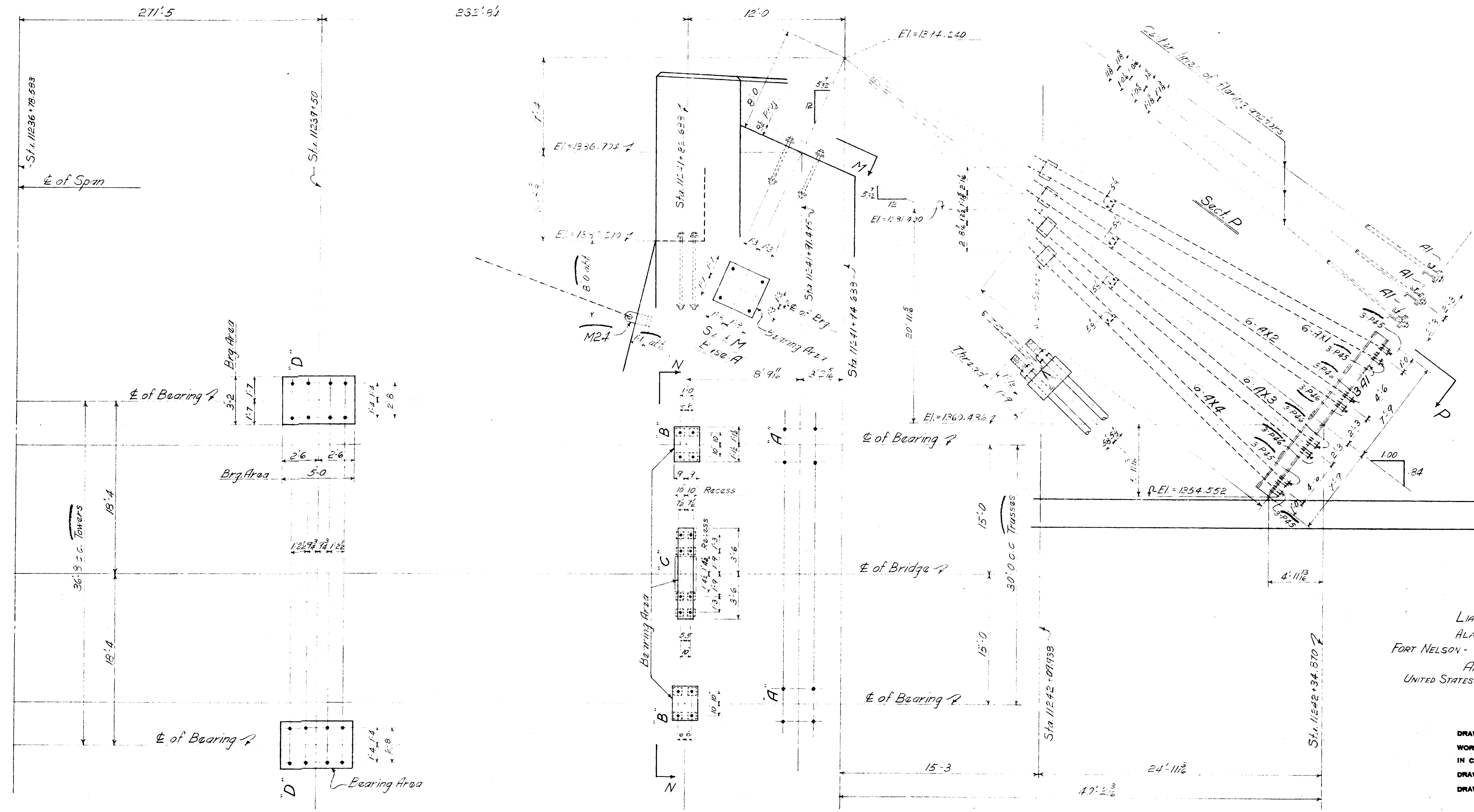
ORDER No.	SHEET No.
J31	E1 AB

NOTES:
Anchor bolts and rods must be set according to dimensions shown on this plan or the steel work will not fit.

The steel work for the bridge is manufactured to suit these dimensions on the basis that the normal temperature at bridge site is 30°F.

All bearing areas to be bush-hammered level and to exact elevation.

REVISIONS FOR $E1^{AB}$, $E1^{B}$
Erection Hitches P48 and M24 added.
Ps. P45 & P46, bolts X9 & X10, and sketch for detail of same added. V.F.I. 2-3-43

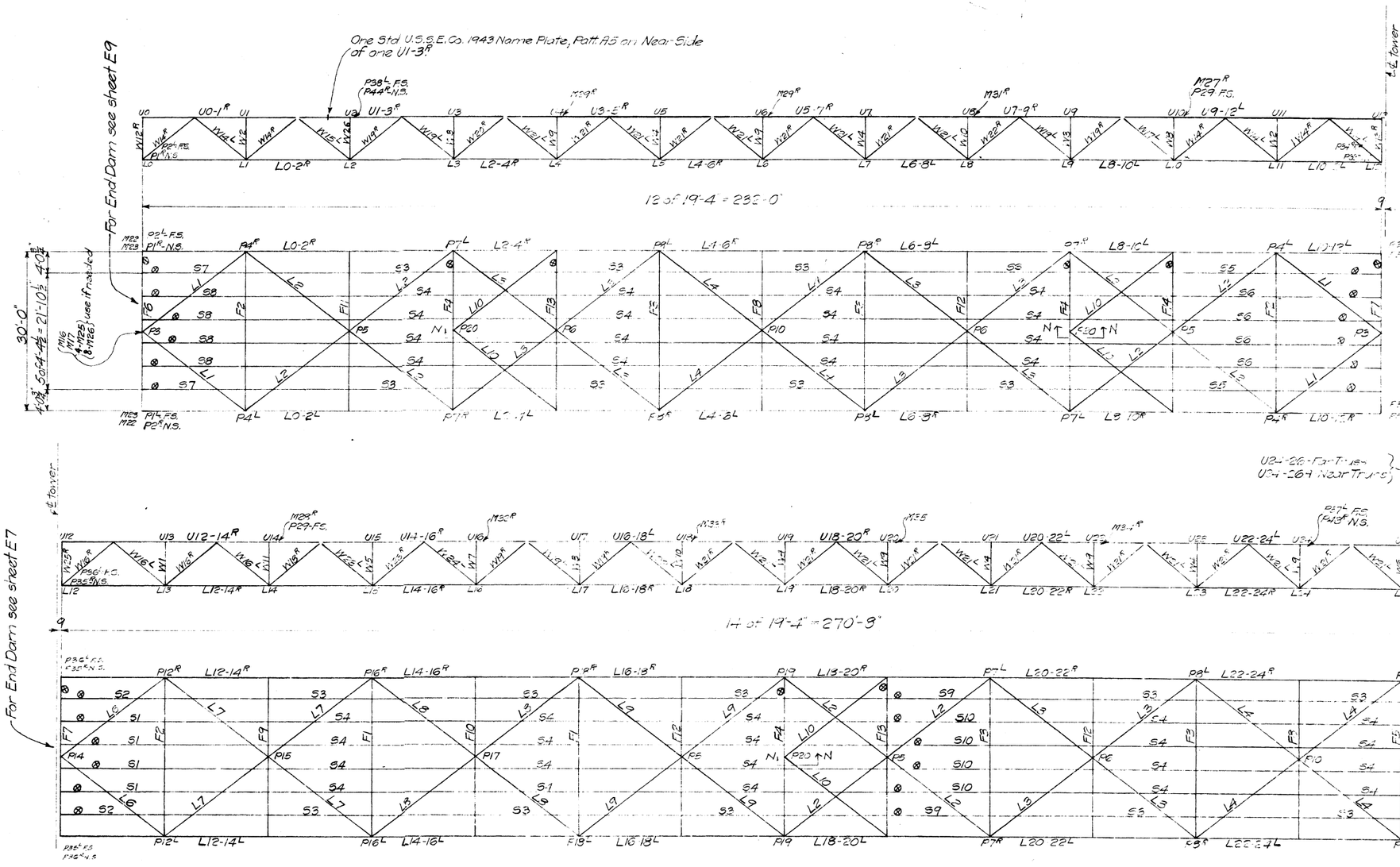


LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
Anchorage Plan
UNITED STATES STEEL EXPORT COMPANY
XAB-7957

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E. B. Maloney
DRAW. MADE BY V.F.I. DATE 1-16-43
DRAW. CHECKED BY CWZ DATE 1-16-43

ORDER No. J31
SHEET No. $E1^{B}$



	LIST OF SHEETS
B2110	Dead Load Concentrations
B2112	Sag Variations
E1-AB	Anchorage Plan
E1-2	" "
E2	Erection Diagram
E3	" "
E4	" "
E5	Tower Computations
E6	Rope Diagram
E7	End Dam
E8AB	Conversion
E8B	
E9	Abutment End Dam
E10	Cable Movements
1	Cable Bent Saddles
2	Tower "
3	" Cross Girders
A1-10C	Towers
5	Tower Bracing
6	" "
7	Laterals
8	"
9	"
10	Bottom Chords (Trusses)
11	" " "
12	" " "
13	Tower Dams
14	Cable Bands
15	Cable Bents
16	Top Chords (Trusses)
17	" " "
18	" " "
19	Diagonals
20	Verticals
21	End Verticals
22	Abutment Dam
23	Floorbeams
24	Stringers
25	Top Chords (Trusses)
26	" " "
27	" " "
28	Hanger Plate Gussets
F1	Anchor Bolts
F2	Anchorage Rods
F3	Anchorage Channels
F4	Wind Shear Connection
F5	Link at Abutment
F6	Plate Hanger Gussets
F7	Anchor Washer
F8	Hitch
SC1	Cables & Sockets
SC2	Suspenders & Sockets
K1	Index of Marks
P1	Wind Shear Detail
C100	Hardware for Wood
C1	Pins & Nuts
C2	Turned Bolts
C3	Field Rivets & Bolts
C4	" " " "
EF1M16	Field Rivets

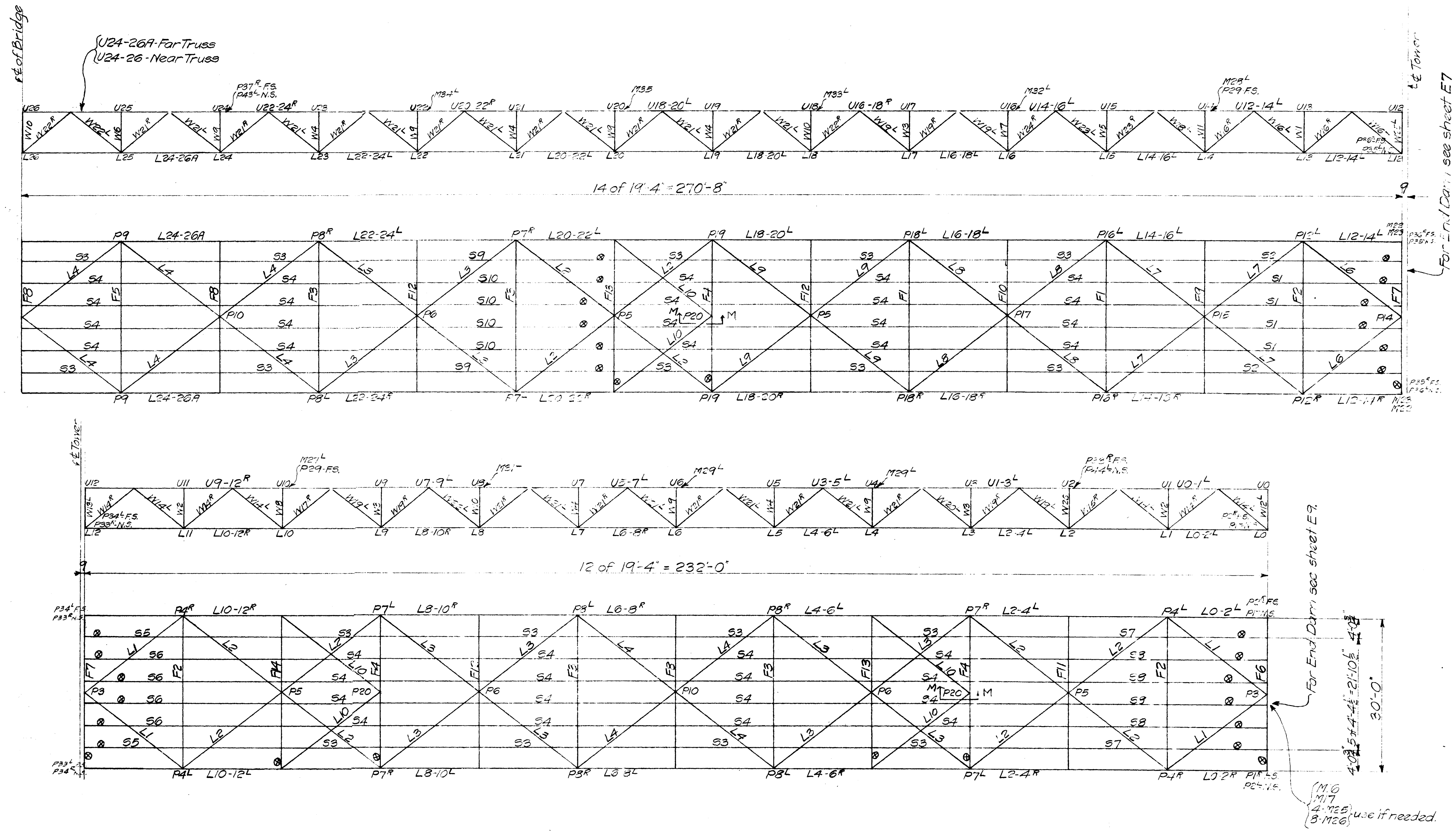
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE, SECTION D,
Erection Diagram
UNITED STATES STEEL EXPORT COMPANY
XAS-795-A

AMERICAN BRIDGE COMPANY

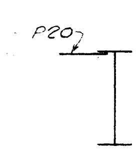
DRAWINGS MADE AT Fl[illegible] PLANT
WORK FABRICATED AT [illegible] PLANT
IN CHARGE OF M.G. [illegible]
DRAW. MADE BY [illegible] DATE [illegible]
DRAW. CHECKED BY E.E.T. DATE 1-8-43

ORDER No. J31-A
SHEET No. E2

"AA001384"



Elevation of far truss shown.
Elevation of near truss opposite hand except as noted.



Sect. M

Note:
Faces marked ⊗ on M27, M28, M29, M31, M32, M33 & M34 are to be placed toward the roadway.

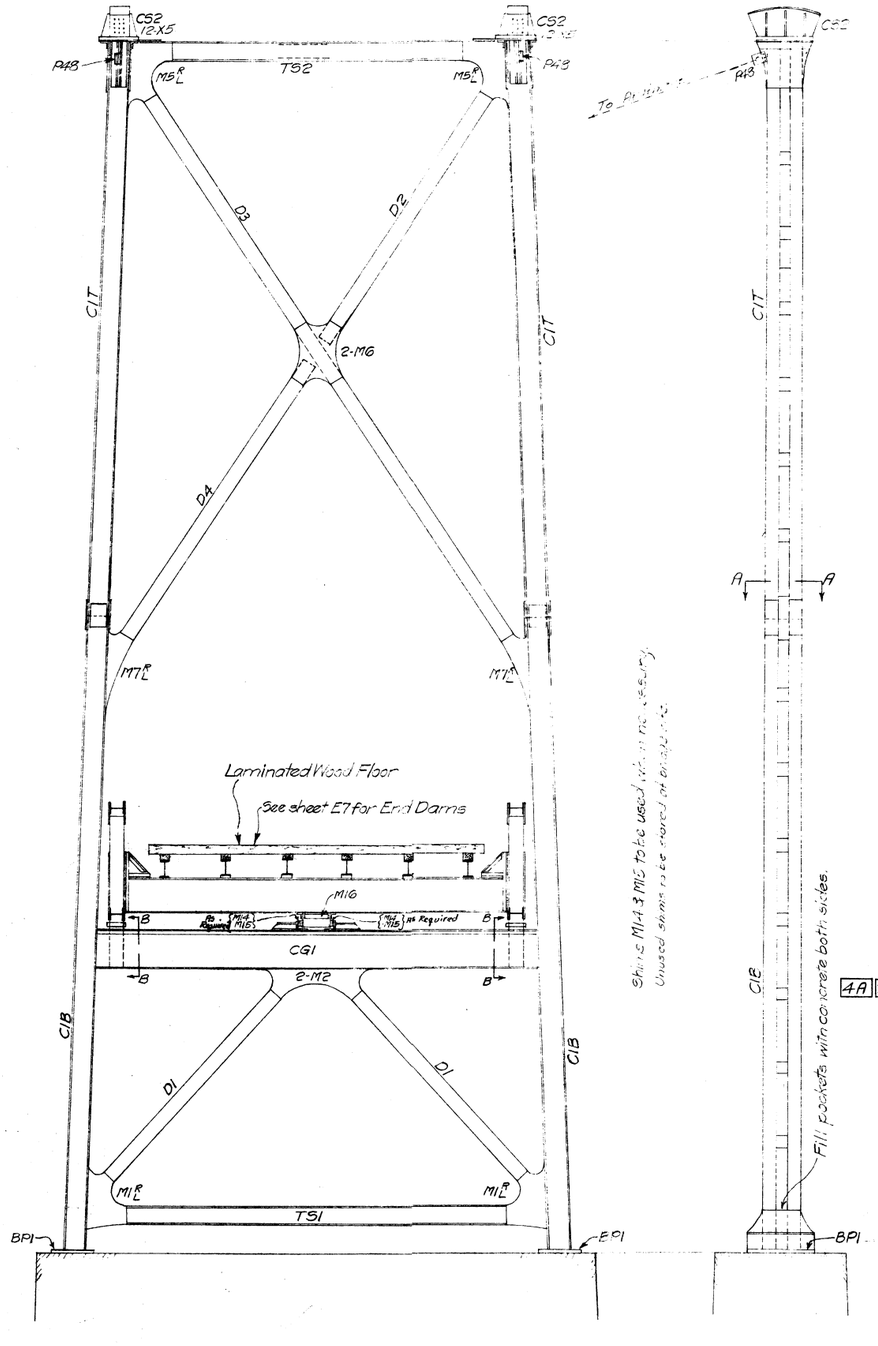
[redacted]

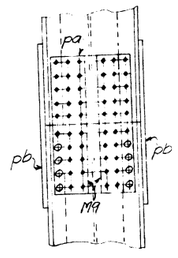
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE, SECTION D,
Erection Diagram
UNITED STATES STEEL EXPORT COMPANY
XAB-7957A

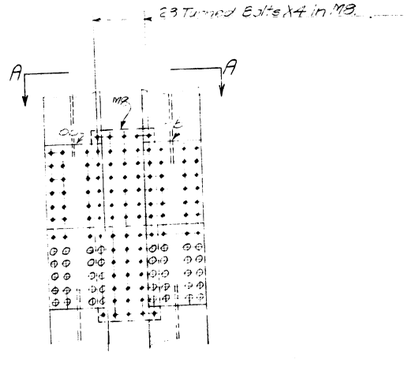
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Malone
DRAW. MADE BY 794 DATE 1-11-43
DRAW. CHECKED BY DATE 1-13-43

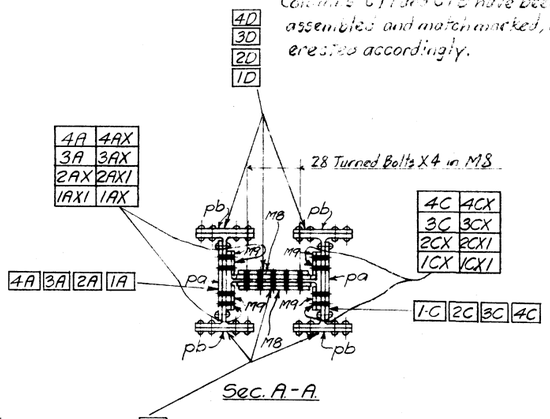
ORDER No.	SHEET No.
J31-A	E3





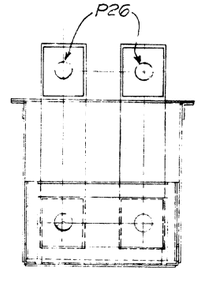


Sketches showing Splice at Tower Columns. Columns C1T and C1B have been reamed assembled and match marked, and must be erected accordingly.



1-B
2-B
3-B
4-B

Steps for field riveting of splice plates:
1st - Rivet plates pb before plates M9 are put in place.
2nd - " " pa & M9 " " M8 " " " .
3rd - " " M8.
Plates M8 must be inserted before the upper section of column is in place.



Sec. B-B.

Field Painting of Saddles C51 & CS2.
Curved slabs and inside faces of saddles inaccessible after erection are to be field painted before erection. Care should be used so as not to obliterate the center scribing. After placing each layer of strands, the strand grooves and other voids are to be completely filled with red lead paste and the top of the curved plate is to be covered with red lead paste before placing the next curved plate or, in the case of the last layer, the cover plate.

"AA001382"

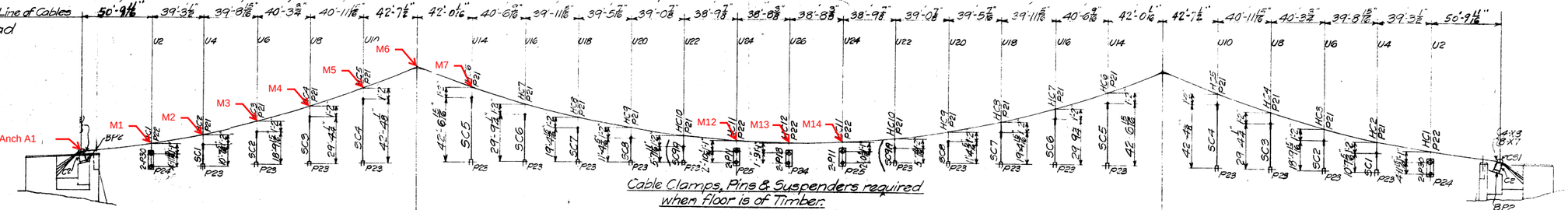
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE - SECTION D.
Erection Diagram
UNITED STATES STEEL EXPORT COMPANY
XAB-7957-A

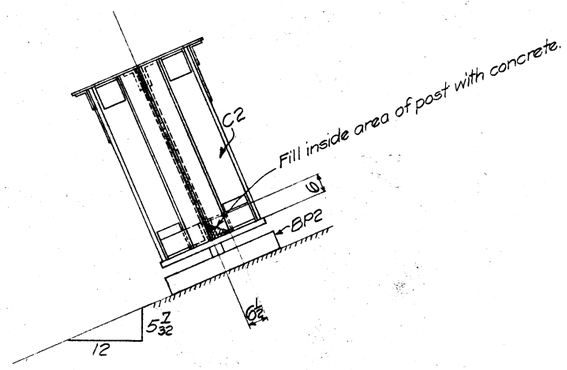
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Maloney
DRAW. MADE BY F.H.T. DATE 1-13-43
DRAW. CHECKED BY E.E.T. DATE 2-9-43

ORDER No. J31-A

SHEET No. E4





Suspenders SC1 to SC8 are so fabricated that when the stripe is aligned, the pins at top and bottom will be parallel. To connect the bottom pin, the lower socket must be rotated 90° in the direction tending to untwist the outside wires. Suspenders SC9A are so fabricated that the pins can be inserted at 90° to each other without any untwisting. The 4 suspenders SC9 are to be discarded.

Note to Erector
Check all pin threads after erection. On pins subject to removal delay this work until concrete floor is in place. Refer to Sh E8B and E8

(Revised 3-10-43
SC9 changed to SC9A
Note added.

Revised 6/4/43,
Makes reference to sh E8
Revised 9/21/43
Corrected Length Hangers P11 2'-6 1/2" to 2'-10 1/16"
and P13 1'-4 1/2" To 1'-9")

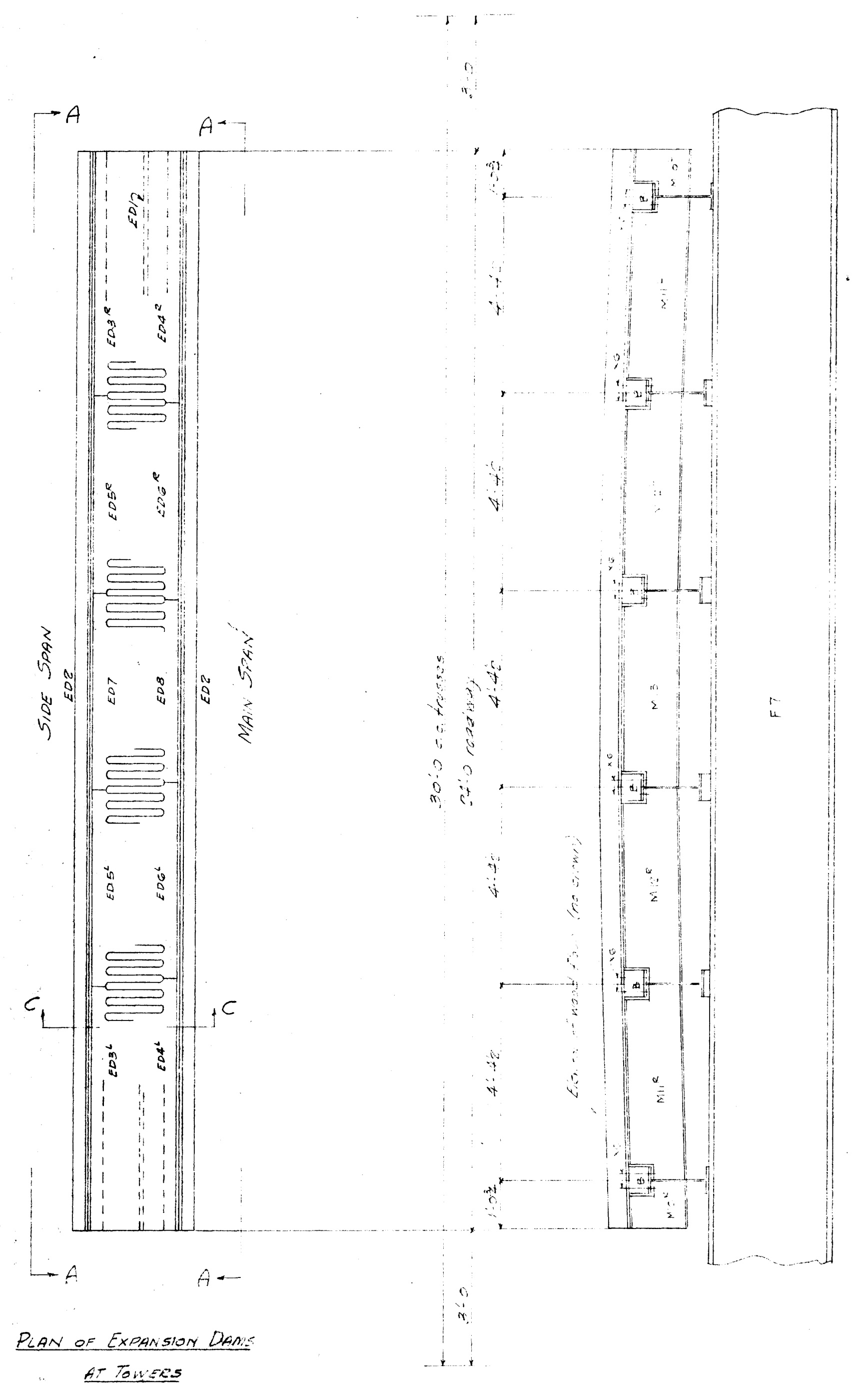
[redacted]

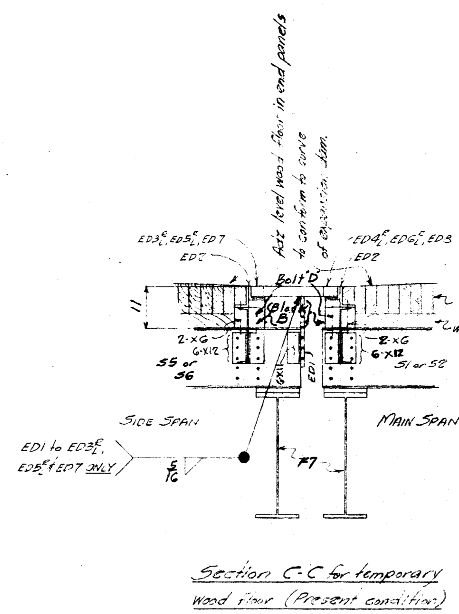
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE, SECTION D,
Erection Diagram
UNITED STATES STEEL EXPORT COMPANY
XAB-79576
AMERICAN BRIDGE COMPANY

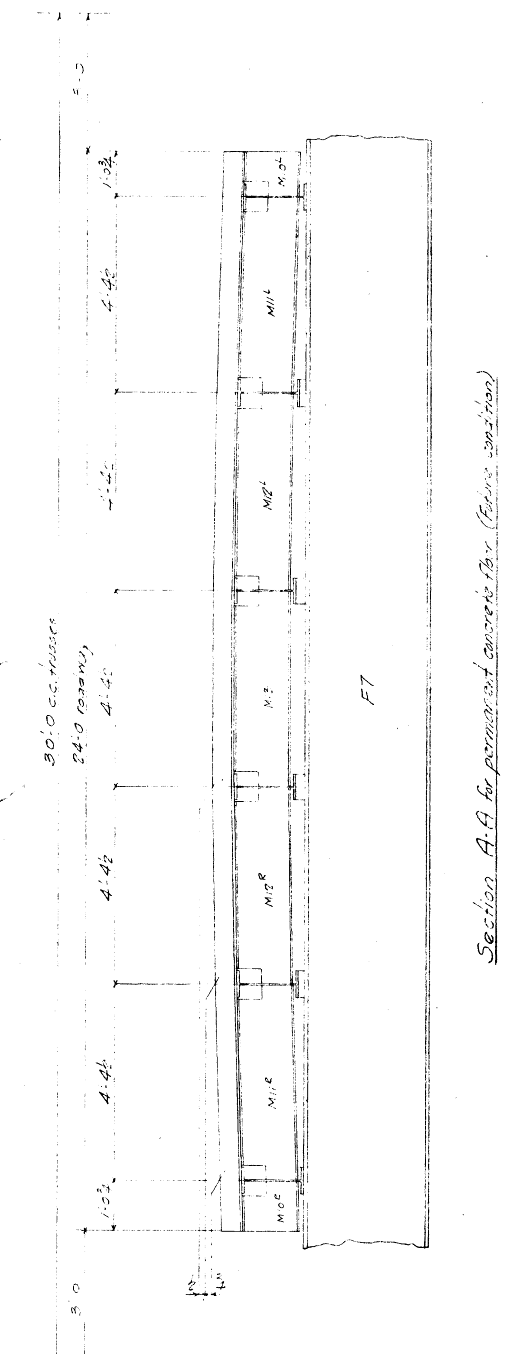
DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Maloney
DRAW. MADE BY [illegible] DATE
DRAW. CHECKED BY [illegible] DATE 2-10-43

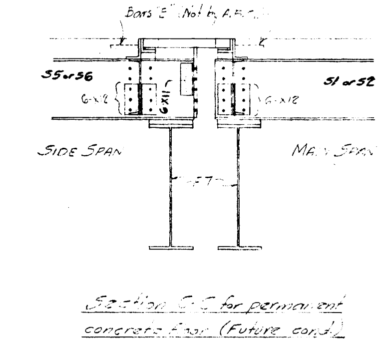
ORDER No. J31
SHEET No. E6

"AA001380"









NOTE:- See contract drawing 510 for details of wood floor.

NOTE TO ERECTOR:-

TO CHANGE FROM WOOD FLOOR TO CONCRETE FLOOR:-

1. Remove turned bolts X6, X11 and X12 and nuts from bolts "D".
2. Discard steel blocks "B" and ... 5½" so that ED2 rests on top flange ... 55 and 56.
3. Replace nuts on bolts "D" and cut off ... bolt shank.
4. Replace turned bolts X11 and X12.
5. Discard turned bolts X6 and ... formerly occupied by these bolts.
6. Weld bars "E" to ED2.

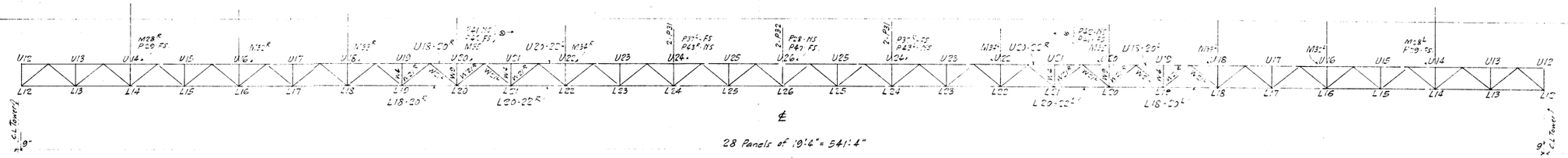
Note: Expansion dams include: ED1, ED2, ED3, ED4, ED5, ED6, ED7, ED8, M10, M11, M12, ...

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON ... SECTION D
ERECTION DIAGRAM ... TOWER EXP. DAMS
INCLUDING FUTURE CHANGES FOR CONCRETE FLOOR
United States Steel Export Co.
XAB 4957-A

ABCO
AMERICAN BRIDGE COMPANY

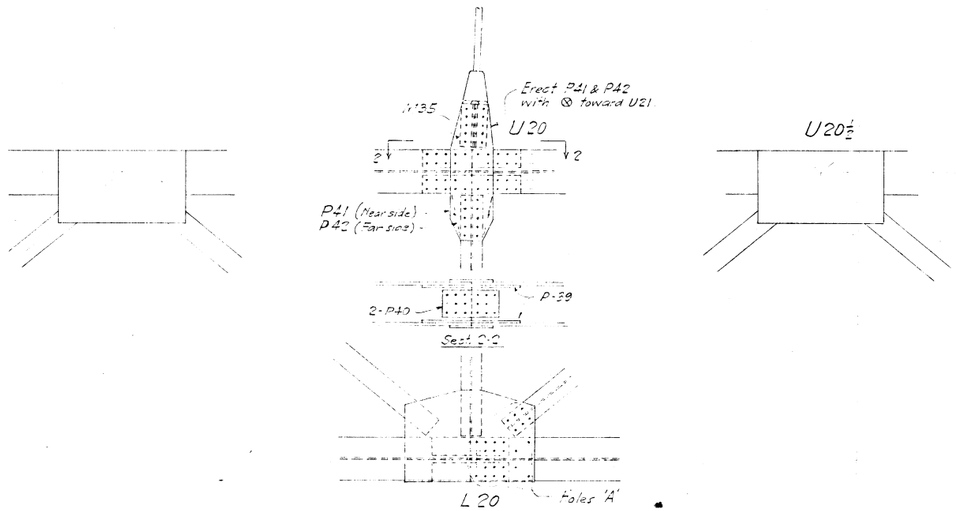
DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.P. MAHONEY
DRAW. MADE BY ... DATE ...-30-43
DRAW. CHECKED BY EFT DATE 2-9-43

ORDER No.	SHEET No.
J31A	E7

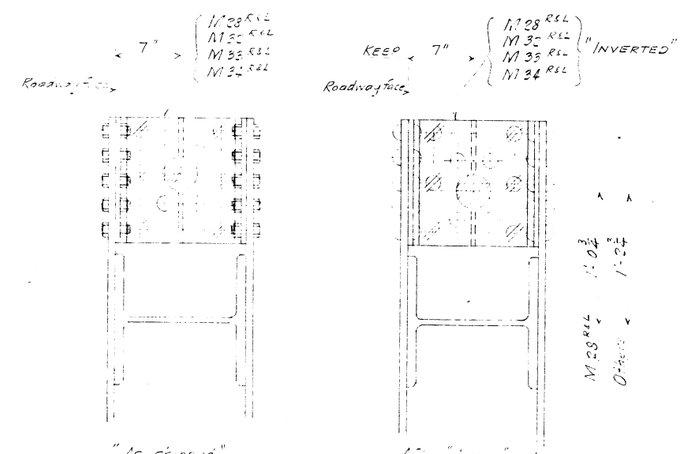


28 Panels of 19'-6" = 541'-4"

ELEVATION OF FAR TRUSS



PART ELEVATION OF SOUTH END OF FAR TRUSS



SUSPENDER CONNECTIONS TO TRUSS AT PANEL POINTS U14, U16, U18 & U22

ALTERATIONS TO BE MADE IN THE FIELD TO ACCOMODATE CONCRETE FLOOR IN PLACE OF WOOD

1. On the ground, before erection, unbolt the diaphragms for the suspender connections at panel points U14, U16, U18 and U22. (Piece marks M28 R&L, M35 R&L, M35 R&L and M34 R&L) Invert the diaphragms so that the pin holes will be eccentric toward the center line of chord, taking care that the pin holes are maintained at 7" from the Roadway face of the top chord. The distance from the C.L. of top chord to the pin hole will now be 1'-0¾" for U14, and 1'-2¾" for U16, U18 and U22. Rivet the diaphragms before erecting trusses.

2. At Panel Points U20 on members U18-U20 R&L, remove the suspender diaphragm M35. Also remove and discard the shop riveted gusset plates and splice material at the same panel points. Replace the gusset plates with plates P41 and P42, keeping edge marked ⊗ toward panel point 21. Replace the splice material with plates P39 and P40. Replace diaphragm M35 in its original position without turning or inverting. All connections, except the diaphragms, to be temporarily pinned and bolted, or riveted. The diaphragms must be riveted before erecting.

3. The trusses are to be assembled on the ground in sections about 50' long with connections of web members either pinned and bolted, or riveted, except at points L20 where holes A" are to be reamed as per Paragraph 4, before fitting up".

4. Put together the two truss sections that splice at L20 and U20½, and while assembled, ream holes 'A' (see above) to 1 1/16" diam. using small bolts in these holes for any temporary clamping. It is essential that the complete splice at U20½ and the web splice at L20 be well pinned and bolted before reaming holes 'A'.

5. Discard suspender links P11 at panel pts. 24, and link P13 at point 26, and substitute P31 and P32 respectively.

6. Plug the two holes in the bottom flange in each of stringers S9 and S10, at the end marked ⊗, with welds and drill two new 15/16" diam. holes 2 11/16" from the same end of the beam on the same gage lines, making the beams the same as S3 and S4 respectively.

7. Before erecting the expansion dams at the abutments and towers, complete the changes indicated on sheets E7 and E9 for the concrete floor condition.

8. Pieces M37, detailed on sheet C5, are to be riveted to the top flanges of the stringers at about 4'-6" spacing using one ¾" diam. rivet for each clip and the 13/16" diam. holes punched for wood.

9. Scuppers S61, on sht. C5, are to be located at the center of each alternate floor panel at each curb, staggering the locations at opposite sides. The supporting straps M36, on sht. C5, are to be located to the stringer webs through the lower line of existing holes provided in the webs, using one strap per scupper.

NOTE:- This Sheet supersedes Sheets E8AB & E8B. No alterations required in Side Spans except for expansion joints.

"AA001378"

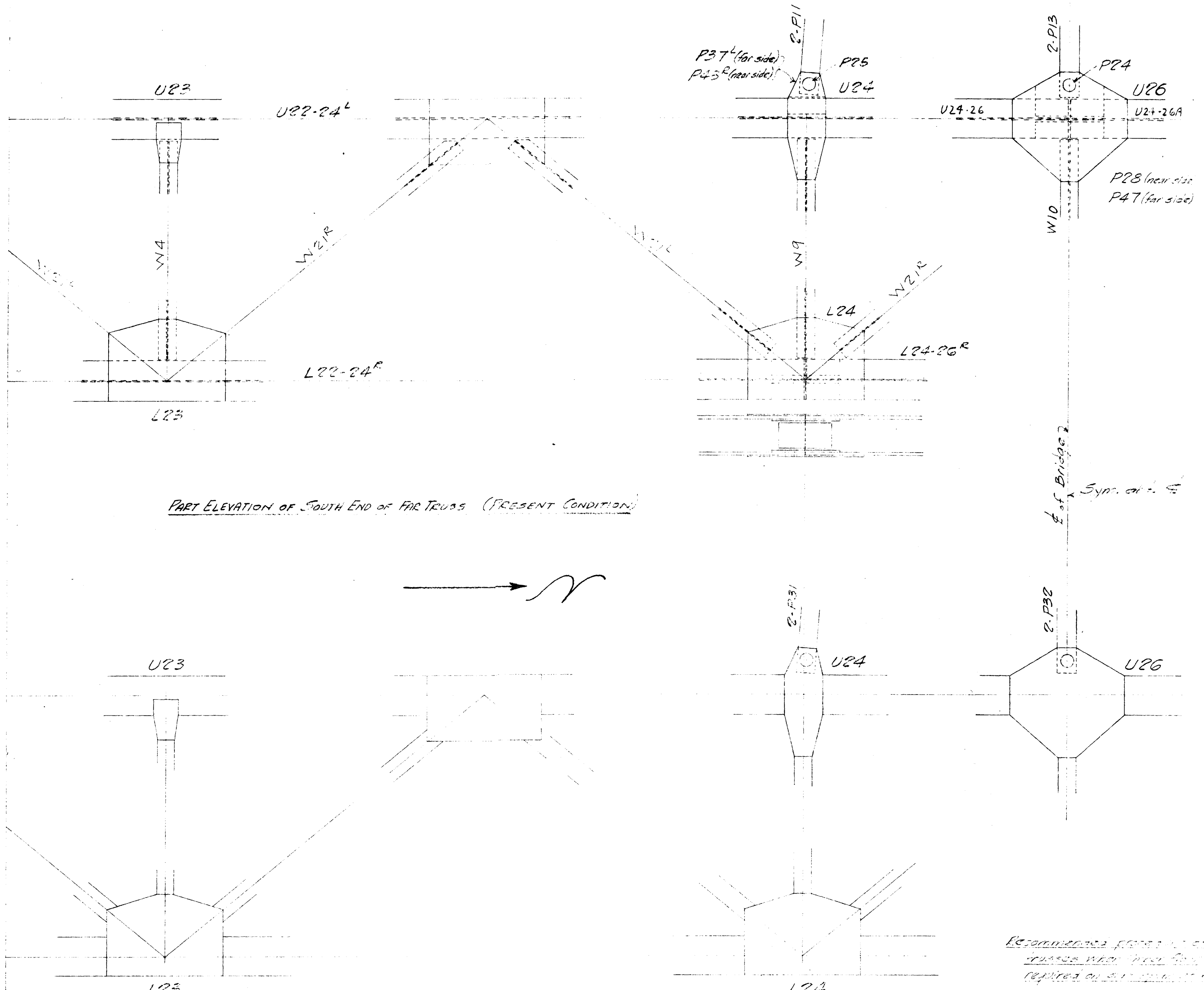
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE - SECTION D
Erection Diagram
UNITED STATES STEEL EXPORT COMPANY
XAB 7257 A

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT	Elmira PLANT
WORK FABRICATED AT	Elmira PLANT
IN CHARGE OF	E. B. Wallace
DRAW. MADE BY	J.E.R. DATE 5-28-43
DRAW. CHECKED BY	DATE

ORDER No. J31-A

SHEET No. E8



PART ELEVATION OF SOUTH END OF FAR TRUSS (PRESENT CONDITION)

PART ELEVATION OF SOUTH END OF FAR TRUSS (FUTURE CONDITION)

CROSS SECTION FOR TEMPORARY WOOD FLOOR

CROSS SECTION FOR PERMANENT CONCRETE FLOOR

NOTE W: - Whenever a plate or cable suspender is released, the top chord must be supported at this point by some temporary devise, which shall also be able to raise or lower the chord at this point as needed for reconnecting the suspenders.

NOTE X: - Steps 2 to 9, inclusive, in the accompanying procedure, may be carried out on both trusses simultaneously or independently.

NOTE Y: - Referring to Steps 6, 7 and 8, since the pin-hole is eccentric in the diaphragm transversely as well as vertically, care must be taken to insure the maintenance of a constant distance of seven (7) inches from the center of the pin hole to the back of angles on the roadway side of the diaphragms.

NOTE Z: - Contractor is to submit complete information on details of erection procedure including placing of concrete floor.

Recommended procedure [illegible]

1. Remove timber deck.
2. At Pts. L20 North and South, simultaneously or independently, cut out rivets "F", and insert ¾" bolts in diagonals and in chord holes adjacent to [illegible] point.
3. At Pts. 20 North and South, replace [illegible] two rivets in each stringer (between Pts. 20 and 22) connecting stringers to floorbeams with ¾" bolts.
4. At Pts. U20 North and South, simultaneously or independently, cut out rivets "D" and "H", and discard plates "B" and "[illegible]".
5. At Pt. U26 and Pt. U24 North and South, simultaneously, remove existing plate suspenders and replace with P32, P31 and P31 respectively.
6. At Pt. U22 North and South, simultaneously, disconnect suspenders, remove bolts "G", invert diaphragms, rivet and reconnect suspenders.
7. At Pts. U14 South, U16 South and U18 South, simultaneously, disconnect suspenders, remove bolts "G", invert diaphragms, rivet and reconnect suspenders. Repeat for Pts. U14 North, U16 North and U18 North.
8. At Pts. U20 North and South, simultaneously, remove bolts "E", discard plates "A", erect plates P39, P40, P41 and P42, reconnect diaphragms M35, in original position (without inverting).
9. At Pts. L20 North and South, simultaneously, ream holes "F" to 1 1/16".
10. Ream holes between stringers and floorbeams at Pts. 20 North and South, from which rivets were previously cut, to 1 5/16".
11. Rivet all connections.
12. Place concrete floor including Z-bars on stringers.

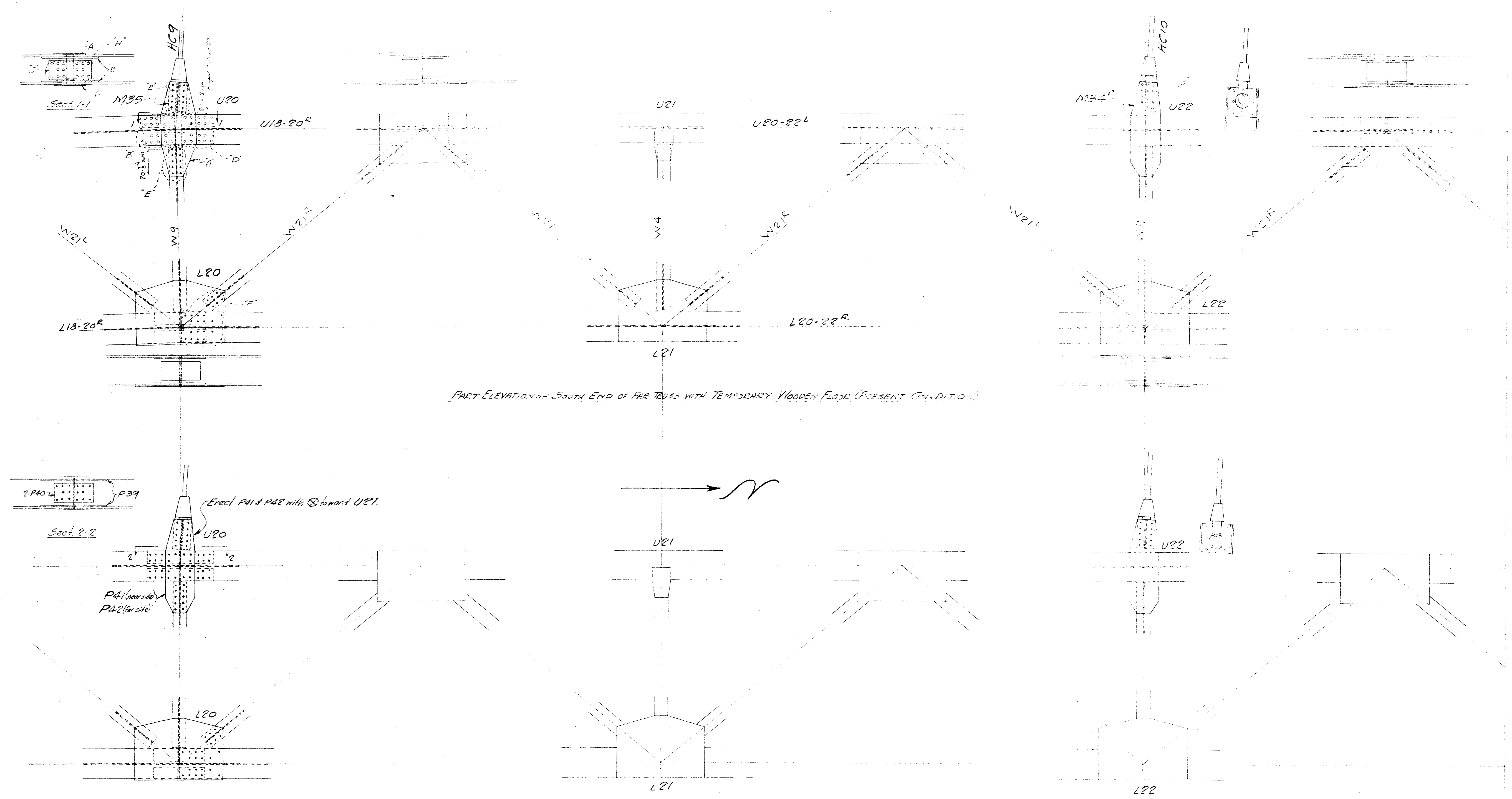
AA001376

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECT. D
Erection Diagram including changes for conversion from wood to concrete floor
XAB 7157 A

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF [illegible]
DRAW. MADE BY [illegible] DATE [illegible]
DRAW. CHECKED BY T.J.K. DATE 2-9-43

ORDER No. J51A | SHEET No. E8E



PART ELEVATION OF SOUTH END OF FAR TRUSS WITH TEMPORARY WOODEN FLOOR (PRESENT CONDITION)

PART ELEVATION OF SOUTH END OF FAR TRUSS WITH PERMANENT CONCRETE FLOOR (FUTURE CONDITION)

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECT. D.

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT

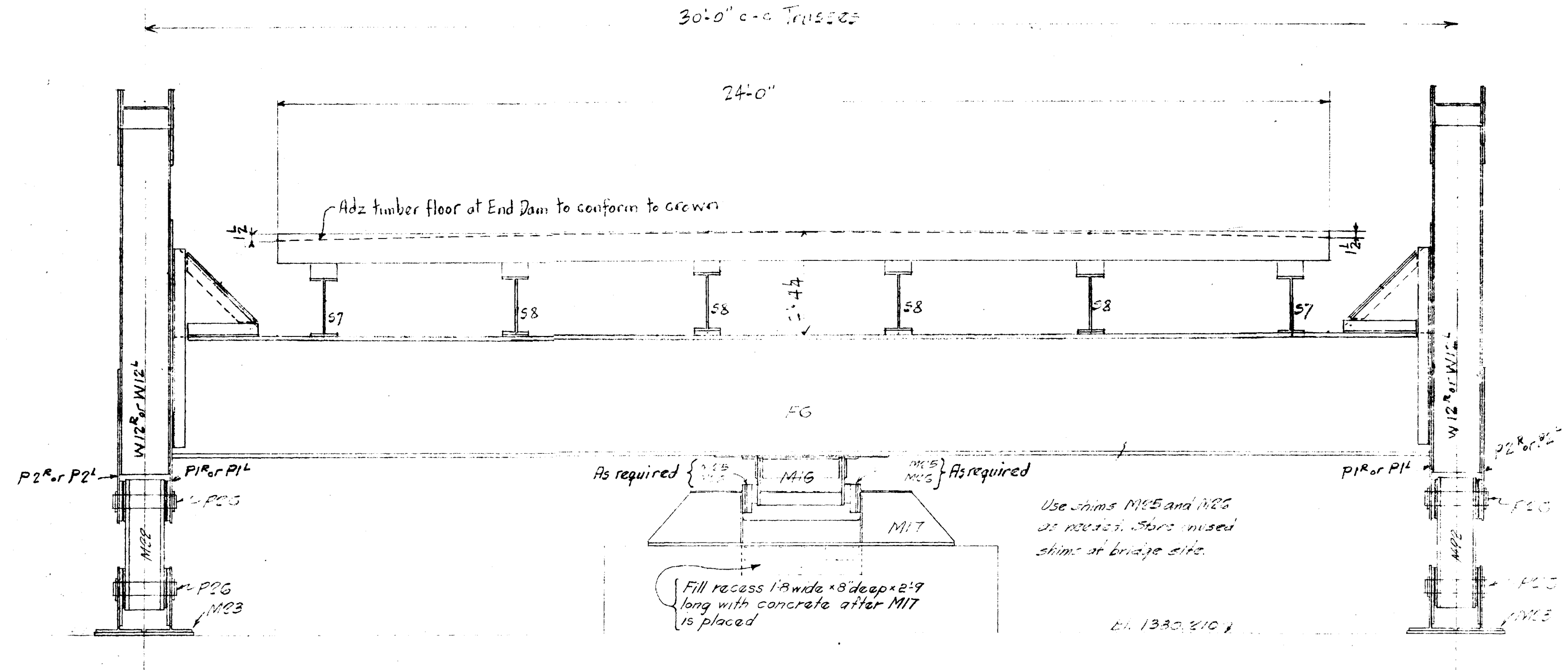
WORK FABRICATED AT Elmira PLANT

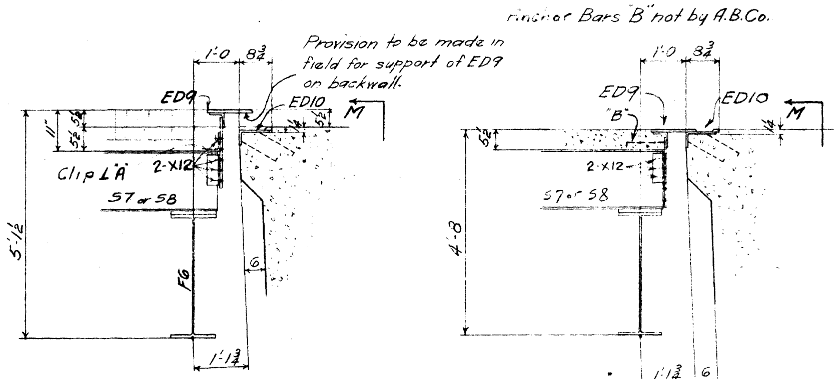
IN CHARGE OF E.B. Maloney

DRAW. MADE BY CWZ DATE 2-3-43

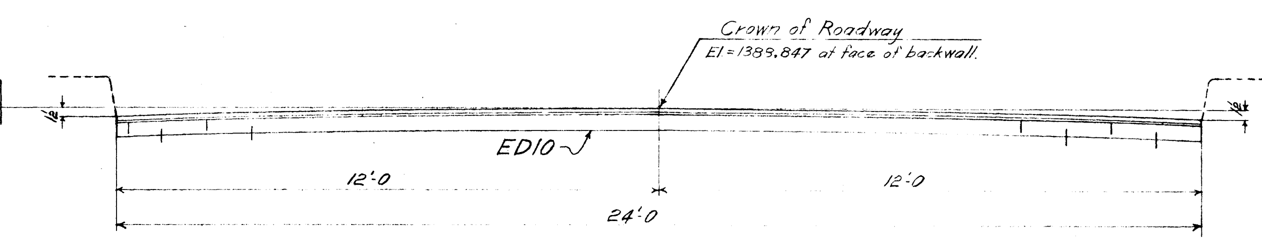
DRAW. CHECKED BY TJK DATE 2-9-43

ORDER No.	SHEET No.
J31 A	E8AB





Abutment Expansion Dams
Wood Floor (Present)



Section-M

Remove clip L"A" and discard
Remove X12 bolts
Weld anchor bars "B" to ED7
Drop ED9 - 5½"
Replace bolts X12 connecting S7 & S8 to ED7

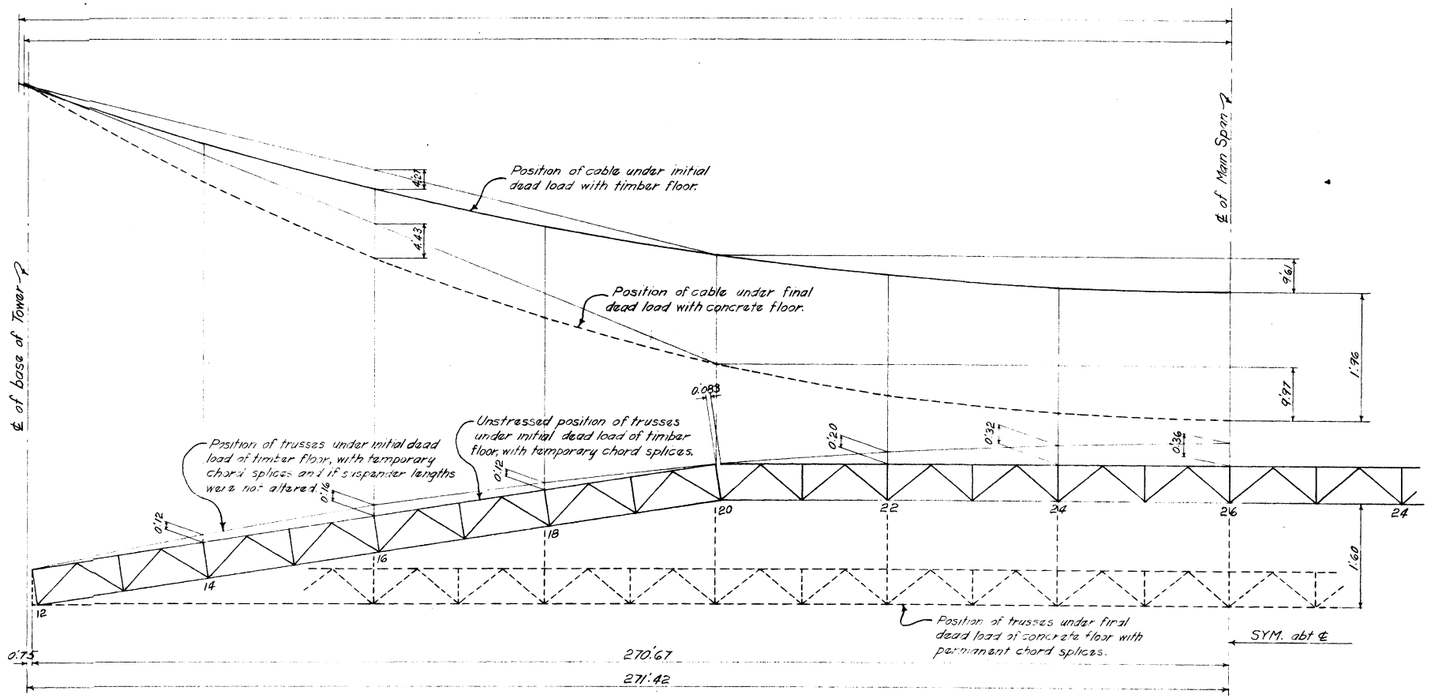
AA001375

LIARD RIVER BRIDGE
ALASKA HIGHWAY
Fort Nelson - Watson Lake, Section D
Erection Diagram of Steelwork at Abutments including future changes to be made to exp. dams.
United States Steel Export Co.
XAB 7457-4

AMERICAN BRIDGE COMPANY

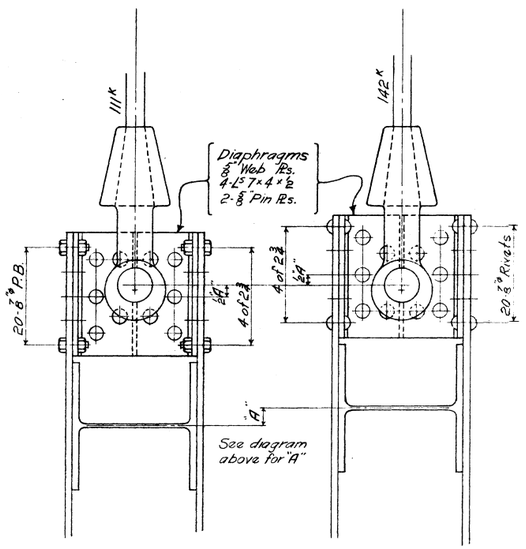
DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF EB Maloney
DRAW. MADE BY CWZ DATE 2-4-43
DRAW. CHECKED BY EET DATE 2-10-43

ORDER No.	SHEET No.
J31 A	E9



Relative positions at normal temperature of cable and main span trusses under final dead load of concrete floor and under initial dead load of timber floor.

Sketch is diagrammatic only. For clarity, trusses are represented as horizontal under final load and all positions referred to that base.



INITIAL CONNECTION
Timber Floor

FINAL CONNECTION
Concrete Floor

Main span suspender connections at all points except 20, 24, & 26.
See Sheet E6 for suspender connections at other main span points.

To avoid strass under initial dead load of timber floor, certain temporary connections for main span are provided, as described below, and are to be used in erection of bridge. When timber floor is replaced by concrete, these connections are to be replaced or altered as further described below. No temporary connections or future alterations are required for side span trusses.

1.- Fabrication
At Pts. 20, two sets of splice plates are provided for top chords. The temporary set is to meet the conditions shown for initial dead load; the permanent set, the conditions shown for final dead load. See Sheets E8AB & E8B. Permanent plates are to be stored at bridge site until required. At Pts. 20, bottom chord splice plates are provided to meet the conditions shown for initial dead load. (Future reaming will be required.)

At all main span suspender points except 20, 24, & 26, suspender diaphragms are provided to permit future change of suspender lengths. At Pts. 24 & 26, two sets of plate suspenders are provided; temporary set to meet initial dead load conditions; permanent set, the final dead load conditions. Permanent plates are to be stored at bridge site until required. At Pts. 20, no future change of suspender length will be required, but suspender plates will be changed. See Sheets E8AB & E8B.

2.- Initial Erection
At Pts. 20, top chords have temporary splice & suspender plates; bottom chords, the permanent splice plates.
At all main span suspender points, except Pts. 24 & 26, suspender diaphragms are to be bolted in initial position. At Pts. 24 & 26, temporary plate hangers are to be used. At Pts. 20, bolt verticals and diaphragms to suspender plates.

3.- Future alterations when Timber Floor is Replaced by Concrete.
(a.) Remove timber deck.
(b.) At Pts. 20, cut out rivets in bottom chord splice plates, and in diagonals, on side of splice point toward ℄.
(c.) At the same points, and on the same side of panel points, cut out rivets connecting stringers to floorbeams.
(d.) At the same points, remove and discard top chord splice plates.
(e.) Release suspenders (procedure to be such as to avoid overstress of trusses) at all main span points except 20, 24, & 26, invert diaphragms, and re-connect suspenders. At Pts. 24 & 26, remove temporary plate suspenders and replace with permanent plates. See Sheet E6.
(f.) At Pts. 20, erect permanent top chord splice and suspender pls. & replace diaphragms. See Sheets E8AB, & E8B.
(g.) At the same points, ream holes in bottom chord gusset pls. thru chords and diagonals to 1 1/16". Ream holes connecting stringers to floorbeams to 1 5/16".
(h.) Rivet all connections.
(i.) Place concrete floor.

This procedure of replacement realizes the desired objectives. Contractor for the alterations may submit for approval an alternate procedure. However, under no circumstances may the concrete floor be placed before temporary top chord splices are released nor may the permanent top chord splices be connected before suspender lengths are altered.

For details of alterations see sheet E8AB and E8B.

PAINT, CONTACT SURFACES:

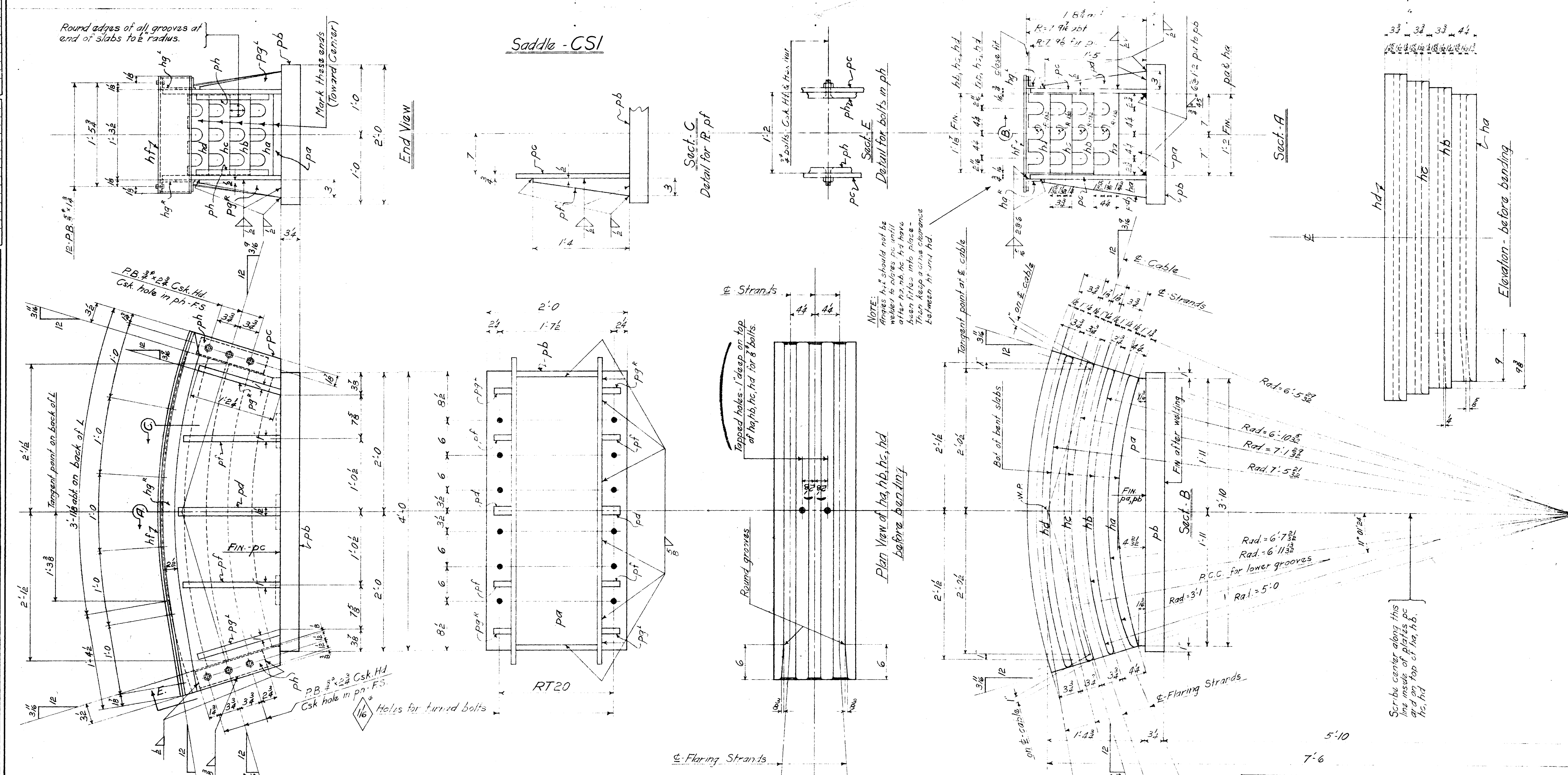
"AA001374"

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE - SECTION D.
Erection Diagram
UNITED STATES STEEL EXPORT COMPANY
XAB-7957A.

AISC
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E. B. Maloney
DRAW. MADE BY V. F. I. DATE 2-10-43
DRAW. CHECKED BY E.E.T. DATE 2-11-43

ORDER No. J31-A
SHEET No. E10



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1							25Y 24 x 5-2			
2			4-SADDLES CS1				weld	4855		
3		4	℞ 14 FIN. × 4 21/32 FIN.	3	10	pa	2172	855		5
4		4	℞ 24 × 3¼ FIN.	4	0	pb		1061		5
5		8	℞ 19⅞ FIN. × ¾	5	2¼ abt.	pc		526		5
6		8	℞ 3 × 1½	1	5	w. pd	2?2	4?		5
7		16	℞ 3 × 1"	1	4	w. pf				5
8		16	℞ 3 × 1"	1	2¼	w. 8-pg^R 8-pg^L	640	14?		5
9		16	Bars 3 × 1"	1	0	ph				5
10		4	℞ 14 FIN. × 4¼ FIN.	4	1¼ abt.	ha	2042	829		5
11		4	℞ 13⅞ FIN. × 3¾ FIN.	4	3½ abt.	hb	bent 2190			5
12		4	℞ 13⅞ FIN. × 3¾ FIN.	4	5¾ abt.	hc	2282	2317		5
13		4	℞ 13⅞ FIN. × 3¾ FIN.	4	8 abt.	hd	2389			5
14										
15										
16										
17										
18		4	℞ 20 × ⅜	5	3⅝ abt.	hf	bent	12?		5
19		8	L 2½ 2 5/16	5	3⅝ abt.	4-hg^R 4-hg^L	bent	4?		5
20		48	P.B. ⅝" × 1¾				H.H. & N.	4		A
21		48	P.B. ¾" × 2¾				Csk. Hd. & H.N.	6		A
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
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Rev. 2-3-43 V.F.I.
Tapped holes added in hb, hc, hd, ha

AA001372

NOTES:
Holes - as noted
⅝" Permanent bolts must not be tightened as they will be removed in field.
Paint - Yes
Contact surfaces welded in shop - No
Holes marked R.T. to be drilled to a metal templet.
All component parts of each saddle are to be assembled at shop, checked for fit, and matchmarked.

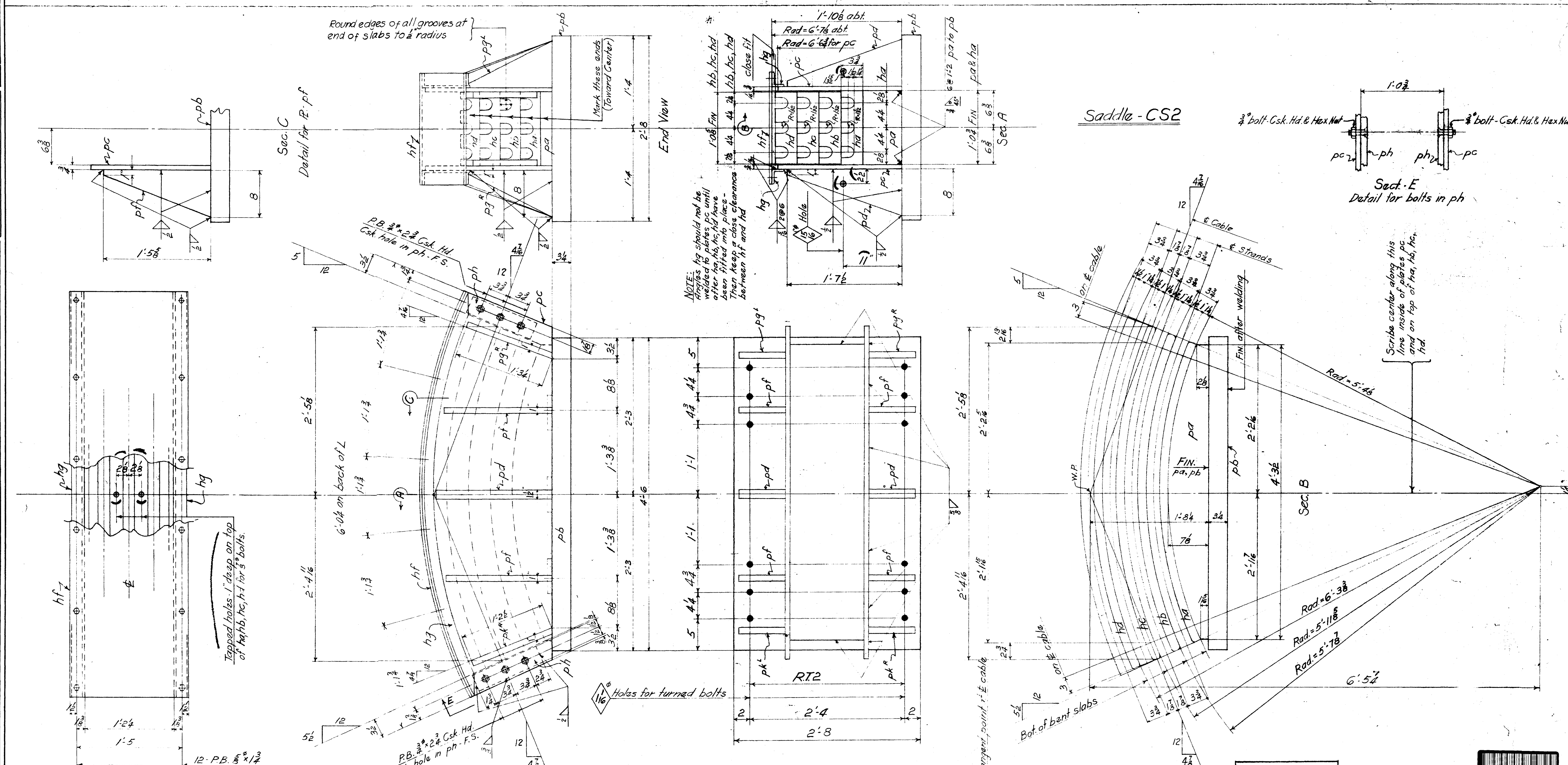
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
Cable Bent Saddles
UNITED STATES STEEL EXPORT COMPANY
XAB-7957D

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E. B. Maloney
DRAW. MADE BY V.F.I. DATE 1-21-43
DRAW. CHECKED BY T.J.K. DATE 1-23-43

ORDER No. J31D
SHEET No. 1

Adv. Bill pg. 14



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1							32X26X5-10			
2		4 SADDLES CS2					Weld	6193		
3		4	PL 12 3/4 FIN x 7 1/8 FIN	4	3 1/2	pa	232 C	1395	17-7	41
4		4	PL 32 x 3 1/4 FIN.	4	6	pb		1591		S
5		8	PL 21 3/4 FIN x 3/4	5	9 1/2 abt.	pc		642		S
6		8	PL 8 x 1/2	1	7 1/2	w. pd	63	123		S
7		16	PL 8 x 1"	1	5 5/8	w. pf				S
8		8	PL 8 x 1"	1	3 1/4	w. 4 pg, 4 pg	104	224		S
9		16	Bars 3 x 1"	1	0	ph		41		S
10		4	PL 12 3/4 FIN x 3 3/4 FIN	4	8 abt.	ha	238 C	751	132-44	
11		4	PL 12 5/8 FIN. x 3 3/4 FIN.	4	11 1/16 abt.	hb	bent 251 C			S
12		4	PL 12 5/8 FIN. x 3 3/4 FIN.	5	2 5/8 abt.	hc	264 C	2541		S
13		4	PL 12 5/8 FIN. x 3 3/4 FIN.	5	5 1/4 abt.	hd	277 C			S
14		8	PL 8 x 1"	1	2 1/2	w. 4 pk, 4 pk	30 C	1		S
15										
16										
17										
18		4	PL 20 x 3/8	6	0 1/4	hf	bent	154		S
19		8	L 2 1/2 2 5/16	6	0 1/4	hg	bent 20	54		S
20		48	P.B. 5/8" x 1 3/4				H.H. & N.	4		A
21		48	P.B. 3/4" x 2 3/4				Csk. Hd. & H.N.	6		it
22										
23								1461 C		
24										
25								6 1 P		
26										
27								6 1		
28										
29										
30										

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
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56										
57										
58										
59										
60										

Rev. 2-3-43 V.F.I.
Hole added in pd, & tapped holes added in hb, hc, hd, ha.

NOTES:
Holes - as noted
5/8" Permanent bolts must not be tightened as they will be removed in field.
Paint - Yes
Contact surfaces welded in shop - No
Holes marked R.T. to be drilled to a metal templet.
All component parts of each saddle are to be assembled at the shop, checked for fit and matchmarked.

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
Tower Saddles
UNITED STATES STEEL EXPORT COMPANY
XAB-7957D

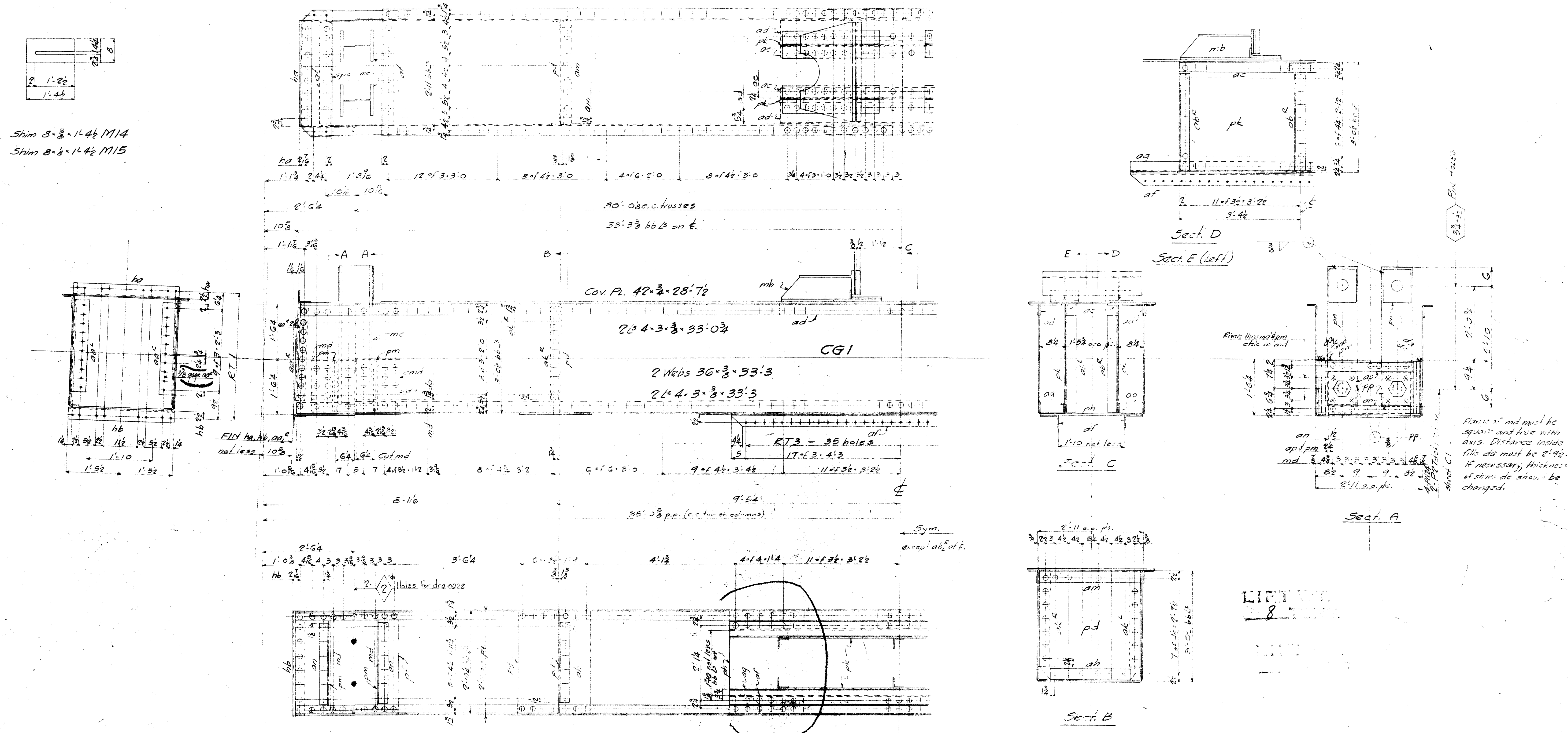
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Maloney
DRAW. MADE BY F.E. & V.F.I. DATE 1-9-43
DRAW. CHECKED BY TJK DATE 1-15-43

ORDER No. J31D | SHEET No. 2

Adv. Bill pg. 14

9 ~~12~~



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1			2-TOWER CROSS GIRDERS CG1					16100		
2			63 X 42 X 33-5							
3		4	Ls 4 3 3/8	33	3			1127		S
4		4	Ls 4 3 3/8	33	0¾					S
5		4	Pls 36 3/8	33	3			3057		S
6		2	Pls 42 3/4	28	7½			3065		S
7		4	Ls 5 3½ ½	2	7	aa^R		140		A
8		4	Ls			aa^L				A
9		4	Ls 4 4 ½	2	11	ha		144		A
10		4	Ls 4 4 ½	2	11	hb				A
11		4	Pls 10 3/4	3	6	pc		179		S
12		4	Pls 34 ½	2	10	pf		328		S
13		8	Ls 4 3 3/8	2	3	an		157		S
14		8	Ls 4 3 3/8	2	4½	ap				S
15		8	Pcs 33 CB 220	1	5¼	md		1265		S
16		8	Pls 13½ 3/8	2	5	da		166		S
17		8	Pls 17¼ 3/4	2	4½	pm		41		S
18		8	Pcs 10 CB	3	10	mc		1530	1-AA	25
19		16	Pls 9		11			84		S
20		16	Pls 9 5/8		11	pp		140		S
21		4	Pls 36 3/8	2	8¼	pd		246		S
22		4	Ls 4 3 3/8	2	2¾	ar				A
23		4	Ls 4 3 3/8	2	6¾	a^R		177		A
24		4	Ls			a^L				A
25		4	Ls 4 3 3/8	2	9	am				A
26		4	Pls 34 ½	2	0	pg		770		S
27		2	Pls 34 ½	9	4	ph				S
28		4	Ls 6 4 ½	9	4	af				S
29		4	Pls 35 3/8	6	9	pk		620		S
30		4	Ls 5 3½ 3/8	9	4	ag				A
31			~~[struck out]~~							A
32		6	Ls 3½ 3½ 3/8	2	8¼	ab^R		137		S
33		6	Ls			ab^L				S
34		4	Ls 7 4 ½	6	9	ad		242		S
35		4	Pcs			ma	detailed on sheet P1			
36		8	Pcs			mb				
37		4	Pls			pa		1086 Net		
38		16	Bars			pb				
39		16	Chk Hd Bolt							
40		16	Hex Nut							
41		8	Pins P27				detailed on sheet C1	258		
42		16	Pin Nuts PN24							
43		8	Ls 4 4 3/8	2	9	at		141		S
44		4	Ls 3½ 3½ 3/8	6	9	ac		115		S
45		8	Pls 17¼ 3/8	2	5	dc		71		A
46		8	5B 3/4					~~4~~		7
47								16161		
48										
49								161		
50		8	Pls 8 3/8	1	4½		M14	14		A
51		24	Pls 8 1/8	1	4½		M15	5		A
52										
53										
54										
55										
56										
57										
58										
59										
60										

Rev. 1-21-43 cwz
Changed length ph line 27 in bill.
Changed size aa line 7&8 in bill.
Omit db line 31 in bill. ckd EET

NOTES:-
Rivets: 7/8"
Holes: 15/16" unless noted.
Holes marked RT to be punched 11/16" and reamed to 15/16" to a metal template.

PAINT: Yes
CONTACT SURFACES: No
SHOP

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECT. D
Tower Cross Girders
XHS 7957-A

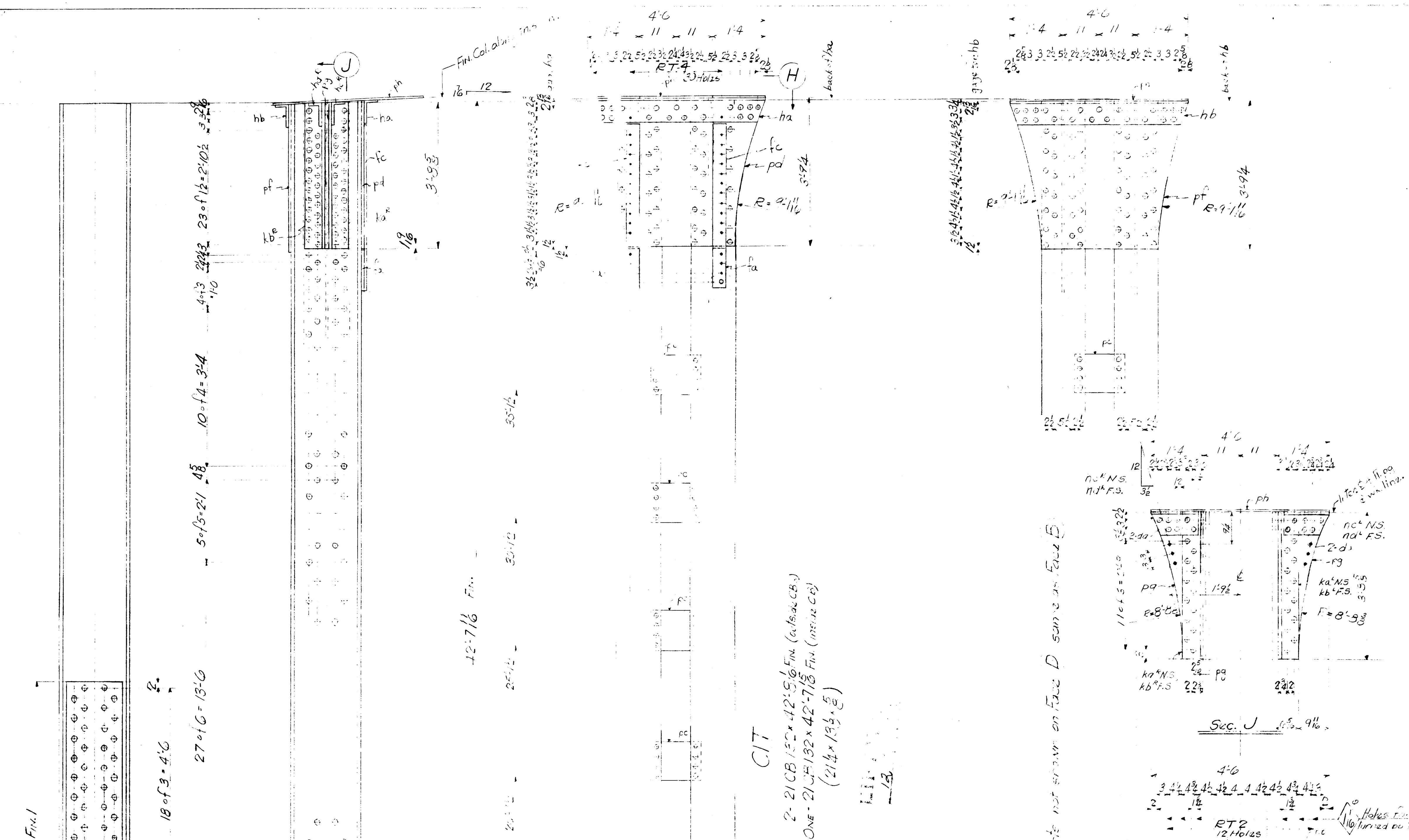
D824-M-8-41

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF
DRAW. MADE BY CWZ DATE 1-8-43
DRAW. CHECKED BY EET DATE 1-18-43

ORDER No. J31A
SHEET No. 3

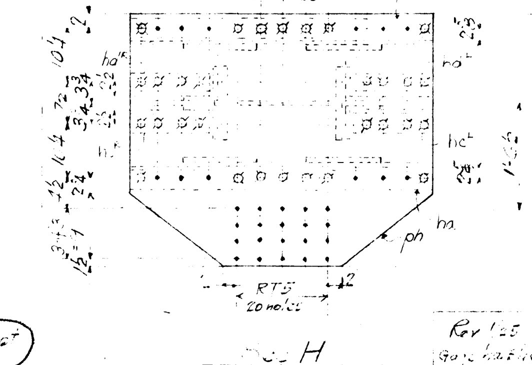
Advance Bill Pcs. 7&8



NOTES: Rivets 7/8"
Holes 15/16 Unless Noted

Main material over 3/4 thick to be punched 13/16 and reamed to 15/16 or drilled 15/16, except that if desired the 17x1 web pls. may be punched 13/16 except for holes marked RA.
Holes marked RA are to be punched or drilled 13/16 and reamed 15/16 while parts are assembled and match marked.
Holes marked RT are to be punched or drilled 13/16 and reamed 15/16 to a metal templet, except holes marked RT2 to be punched 13/16 and reamed 15/16 to a metal templet

Paint - Yes
Shop contact Surfaces - No



rev-3/5/44 chd note abt RT holes

Rev 2-3-43 Holes added in pg

AMERICAN BRIDGE COMPANY

Line	Total No. of Pcs. on Order	No. of Pcs. in Shop	Shape				Length Ft.	In.	Mark	Remarks	Ordered	Item	Calculated Weight for One Ship Piece
8		4	Columns				C1E			60 x 3 1/4 V	50-4		2396
9		8	21CB132				46	9 3/16		Fin.	48-11	15	
10		4	21CB132				45	9 1/16		Fin.		15	
11		8	Web Pl	17	1		48	8 13/16		Fin.	48-9 1/2	5	
12		16	Ls	7	4	3/4	1	1 1/4	sa	Fin.			
13		16	Ls						sa				
14		4	Ls	8	4	1	5	0	hf	bent			
15		4	Ls	8	4	1	5	0	hg	bent			
16		4	Gus Pl	60	3/4		3	8	pk	Fin.		5	
17		4	Gus Pl	60	3/4		3	8	pm	Fin.			
18	132	68	Pls		12	3/8	1	3	pc			5	
19		16	Pl		13	7/8	3	1	pb			5	
20		8	Pl		15	7/8	2	7	pa			5	
21		8	Fills		4	3/4	3	1 1/2	fL				64
22		16	L	7	4	3/4	1	1 1/4	sb[R]	Fin.			131
23		16	Ls						sb[L]			5	
24		8	Ls	3 1/2	3 1/2		1	7 1/2 abt.	hh[R]				72
25		8	Ls						hh[L]				
26													28116
27		4	Columns				C1T				42-9	22520	324
28		8	21CB132				42	8 1/16		Fin.	42-10	16	
29		4	21CB132				42	7 15/16		Fin.		16	32
30		8	Web Pl	17	1		22	8		Fin.			2620
31		64	Pls						pc				306
32		4	Pl		54	1/2	3	9	ph			5	34
33		4	Ls	6	6	3/4	3	8 3/8	ka[R]	Fin.		5	15
34		4	Ls						ka[L]				
35		4	Ls	6	6	3/4	3	8 5/8	kb[R]				
36		4	Ls						kb[L]				
37		8	Pls		15 1/4	1	3	8 5/8	pg	Fin.	12	5	6
38		16			C 3/4	3/4		9 1/4	d			5	3
39		4	L	7	4	3/4	1	2 7/16				5	
40		4	L								20		
41		4		7	4	3/4	1	2 7/16					
42		4	L										
43		4	Pl		54	3/4	3	7 1/4	pd	Fin.			
44		4	Pl		54	3/4	3	9 1/4	pf	Fin.	17		
45		4		7	4	3/4	4	6					6
46		4		7	4	3/4	4	6					
47		8	Fills		4	3/4	1	0 1/2				5	108
48		8	Fills		4	3/4	4	2 3/4				5	
49													
50													545
51													211
52													111
53													
54													
55													
56													
57													
58													
59													
60													
61													
62													
63		8	Pls		16	1	3	7	M3			5	
64													
65		16	Pls		5 1/2	7/8	2	7	M7			5	2
66													
67		4	Pls	39x3 1/2	Fin2		5	0	BP1	Scribe ℄ on 4 sides		1	454

AA001367

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE - SEC. D

TOWER COLUMNS

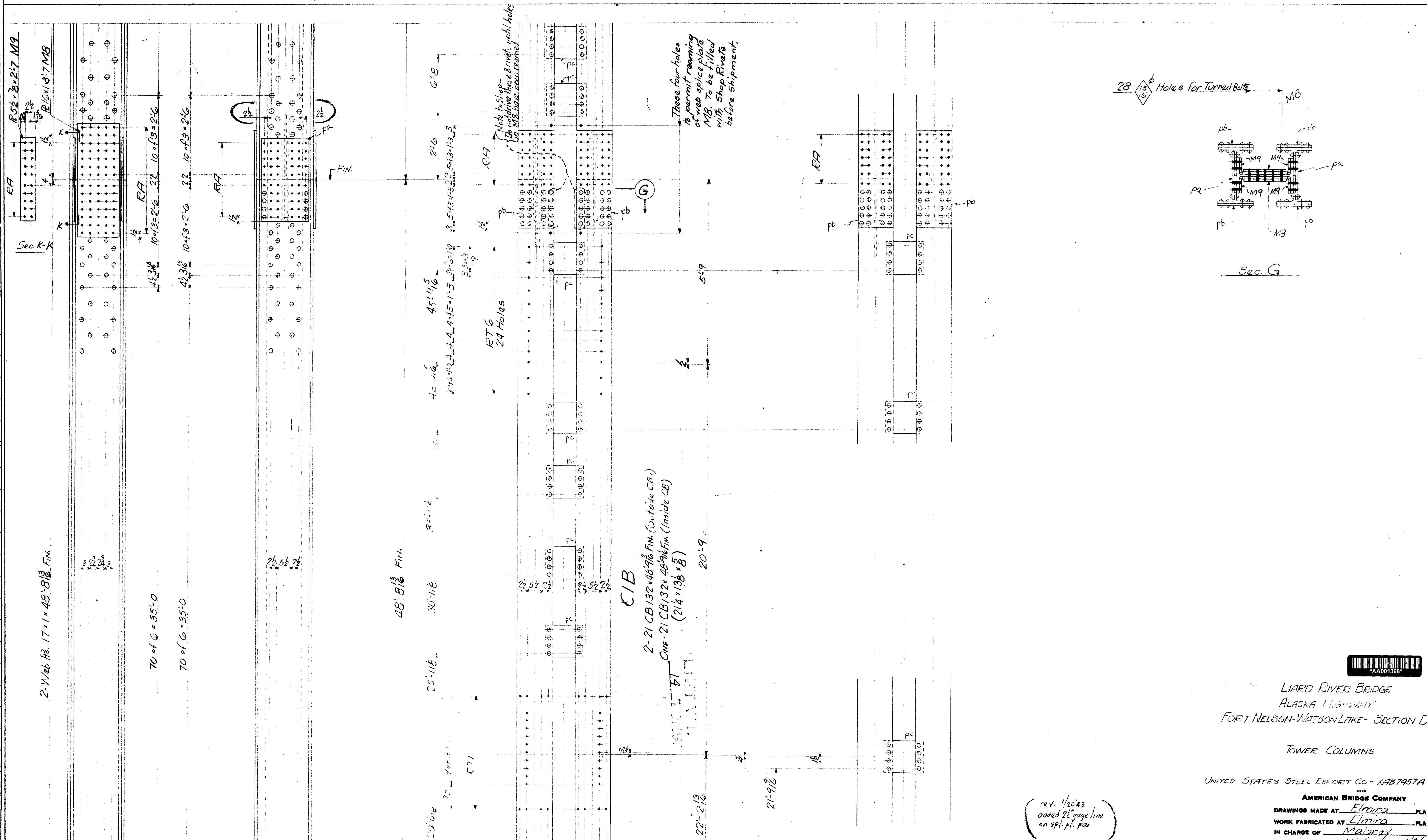
UNITED STATES STATE DEPT. CON. W-6-7957A

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF
DRAW. MADE BY DATE 1/11/43
DRAW. CHECKED BY DATE

PAINT.
CONTACT SURFACES.

ORDER No. J31H
SHEET No. 40



rev. 1/26/43
added 2½" gage line
on spl. pl. pa

~~PAINT,~~
CONTACT SURFACES:

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE- SECTION D

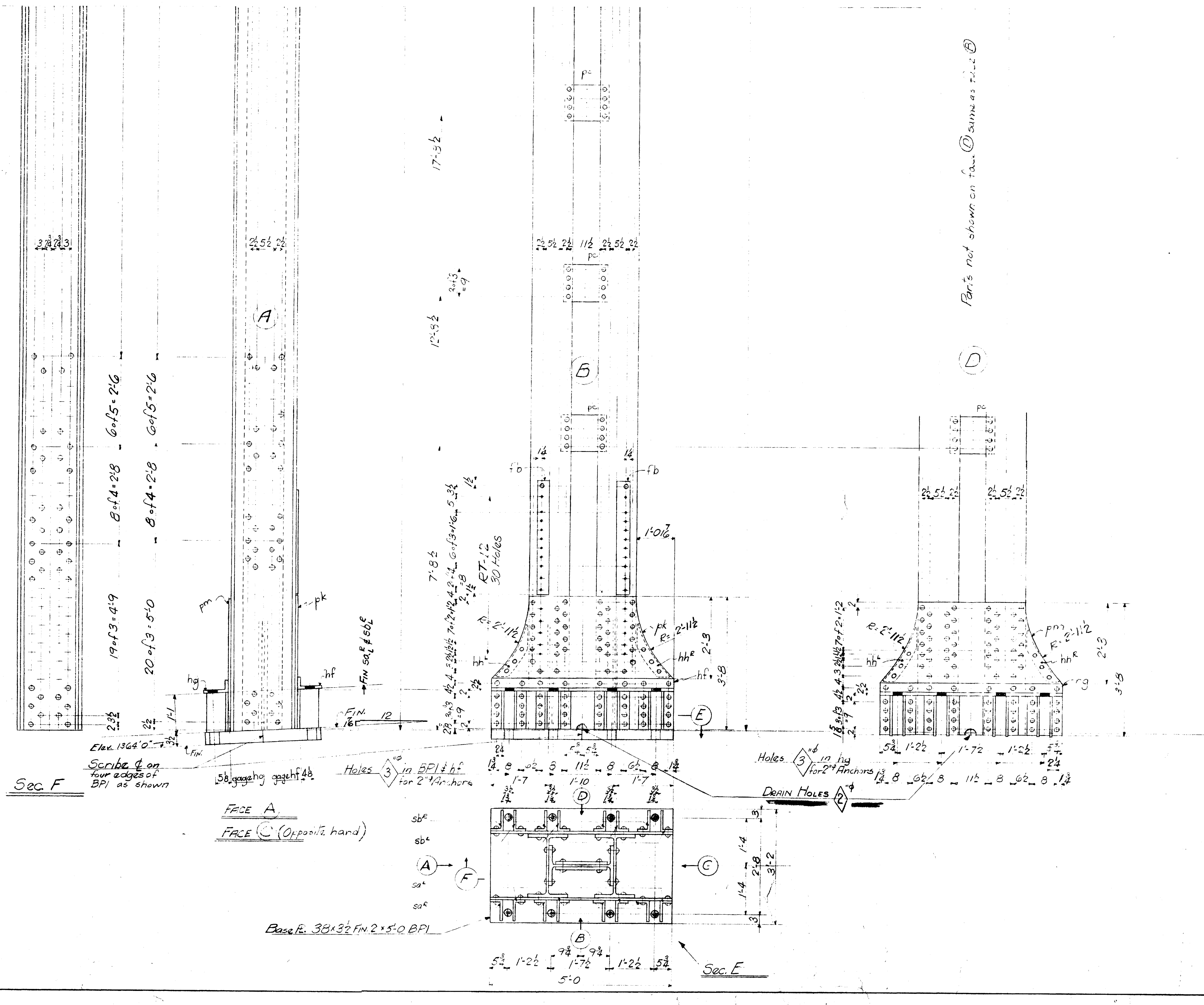
TOWER COLUMNS

UNITED STATES STEEL EXPORT CO. - XAB7957A

ABCO
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Maloney
DRAW. MADE BY J.H.Y. DATE 1/9/43
DRAW. CHECKED BY E.E.T. DATE 1-18-43

ORDER No.	SHEET No.
J31A	4BC



LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE - SECTION D

TOWER COLUMNS

UNITED STATES STEEL EXPORT CO - XAB 7957 A

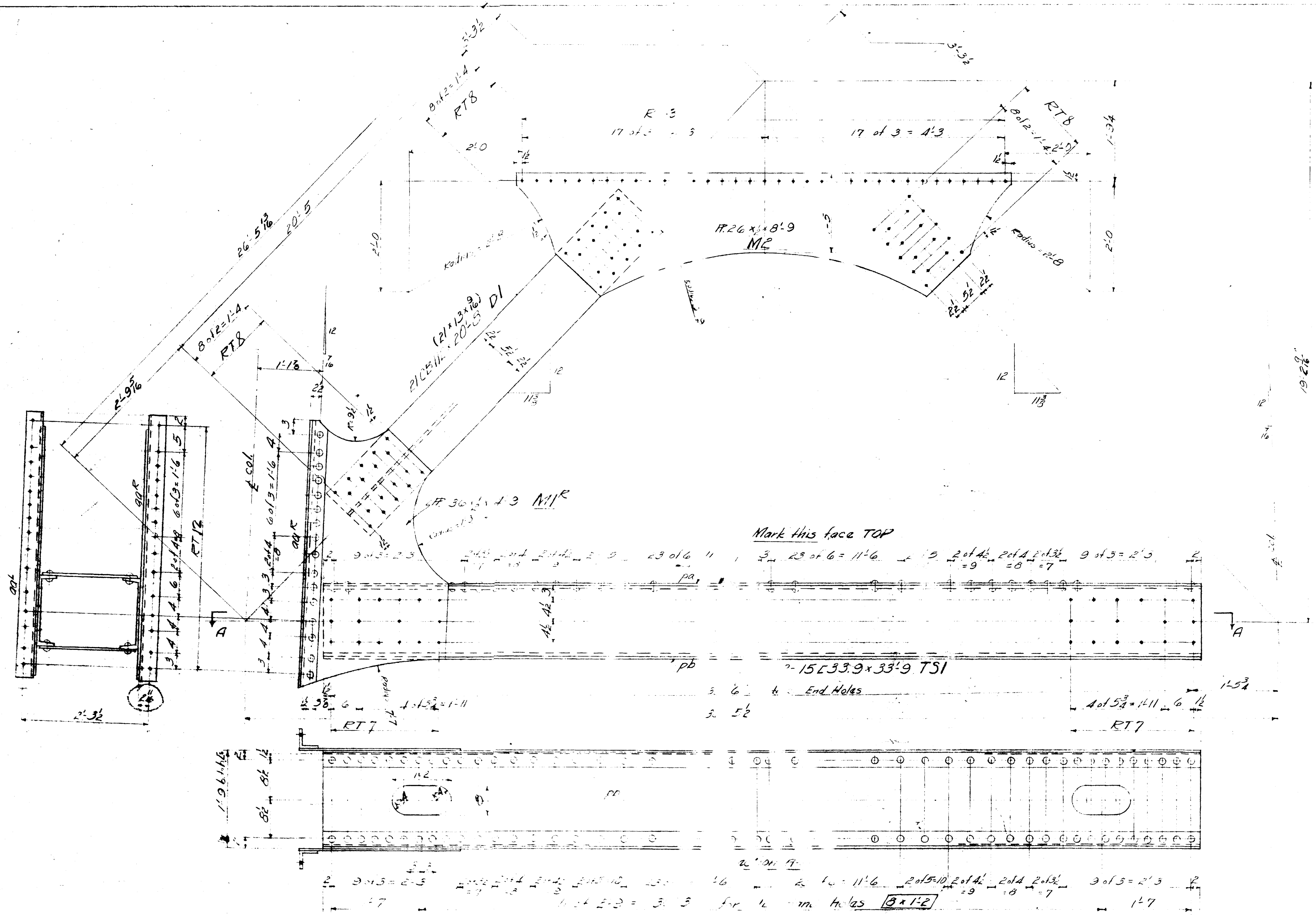
Revised 1/20/43
Added drain holes in pk & pm.

~~PAINT~~
~~CONTACT SURFACES~~

ABCO
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Maloney
DRAW. MADE BY J.H.Y. DATE 1/9/43
DRAW. CHECKED BY E.E.T. DATE 1-18-43

ORDER No.	SHEET No.
J31A	4A-C



Line	Total No. of Pieces on the Order	No. of Pcs. on Sheet	Shape	Length Feet	Length Inches	Assembling Mark	Remarks	Calculated Weight for One Ship. Piece	Ordered	Item
1		4	Plates M1R							
2		4	" M1L					297		
3		8	PL 36 ½	4	7½		37X5X4-4			5
4		4	L 4 4 ½	4	9	aaR				5
5		4	L			aaL				5
6										
7		4	Diagonals D1				21X13X21-8			
8		4	21 CB 112	20	8				20-8	2C
9										
10										
11		4	Plates M2					383		
12		4	PL 26 ½	3	9					5
13										
14										
15										

Rev. 2-3-43 Gage in Lank changed from 2¾ to 2 11/16
Rev. 1-20-43 TJK Size of hand holes Mark Top Flg TS1

NOTES

Holes Marked RT to be Drilled or Punched 11/16 ⌀ and Reamed 15/16 ⌀ to a Metal Templet.

Rivets – ⅞" ⌀
Holes – 15/16" ⌀ Unless Noted

PAINT: Yes
CONTACT SURFACES: No
SHOP

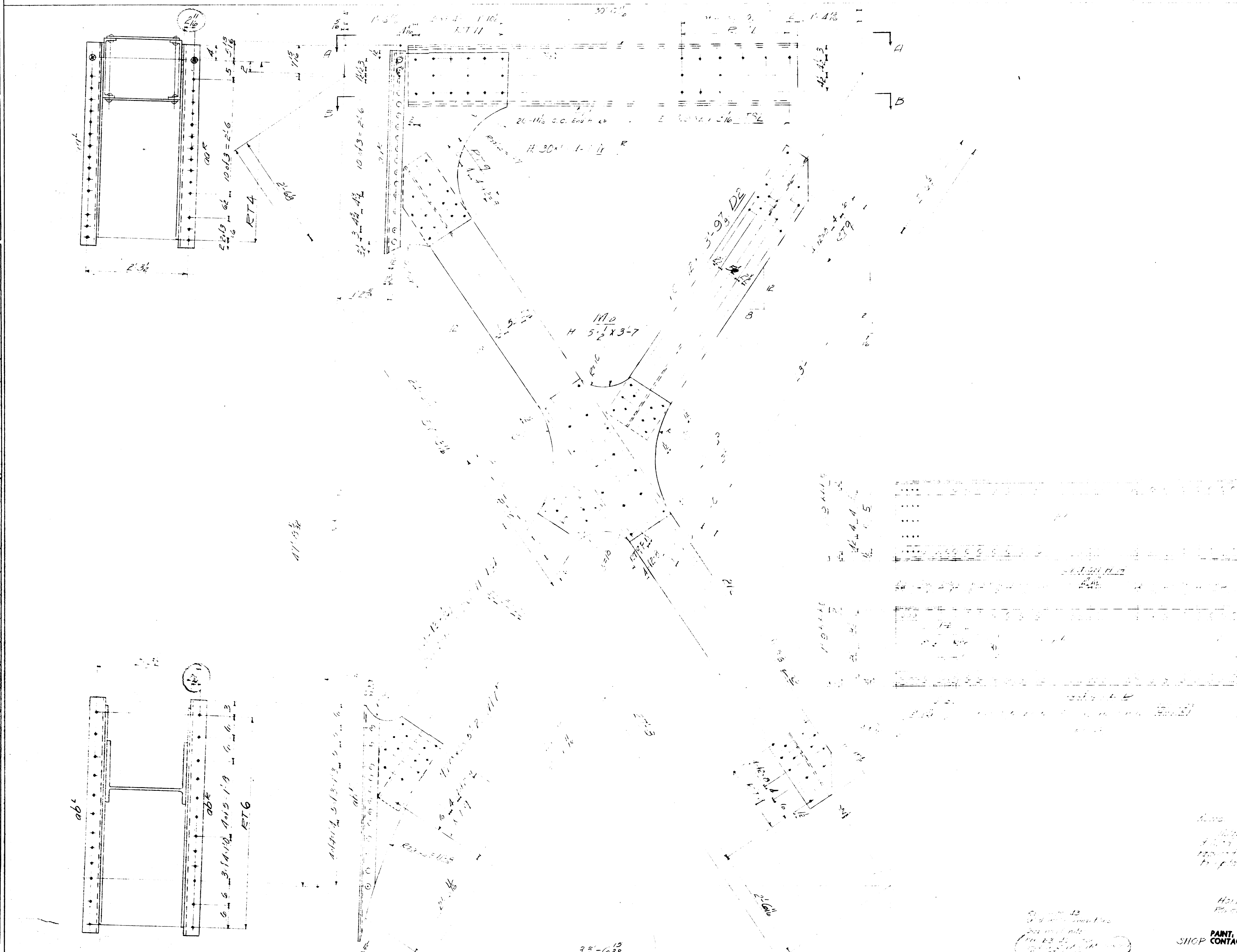
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE - SECT. D
TOWER BRACING
UNITED STATES STEEL EXPORT CO.
XAB-7957A

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Maloney
DRAW. MADE BY GLK DATE 1-6-43
DRAW. CHECKED BY E.L.T. DATE 1-18-43

ORDER No. J31A
SHEET No. 5

Advanced Bill - Sh 5,6



AMERICAN BRIDGE COMPANY

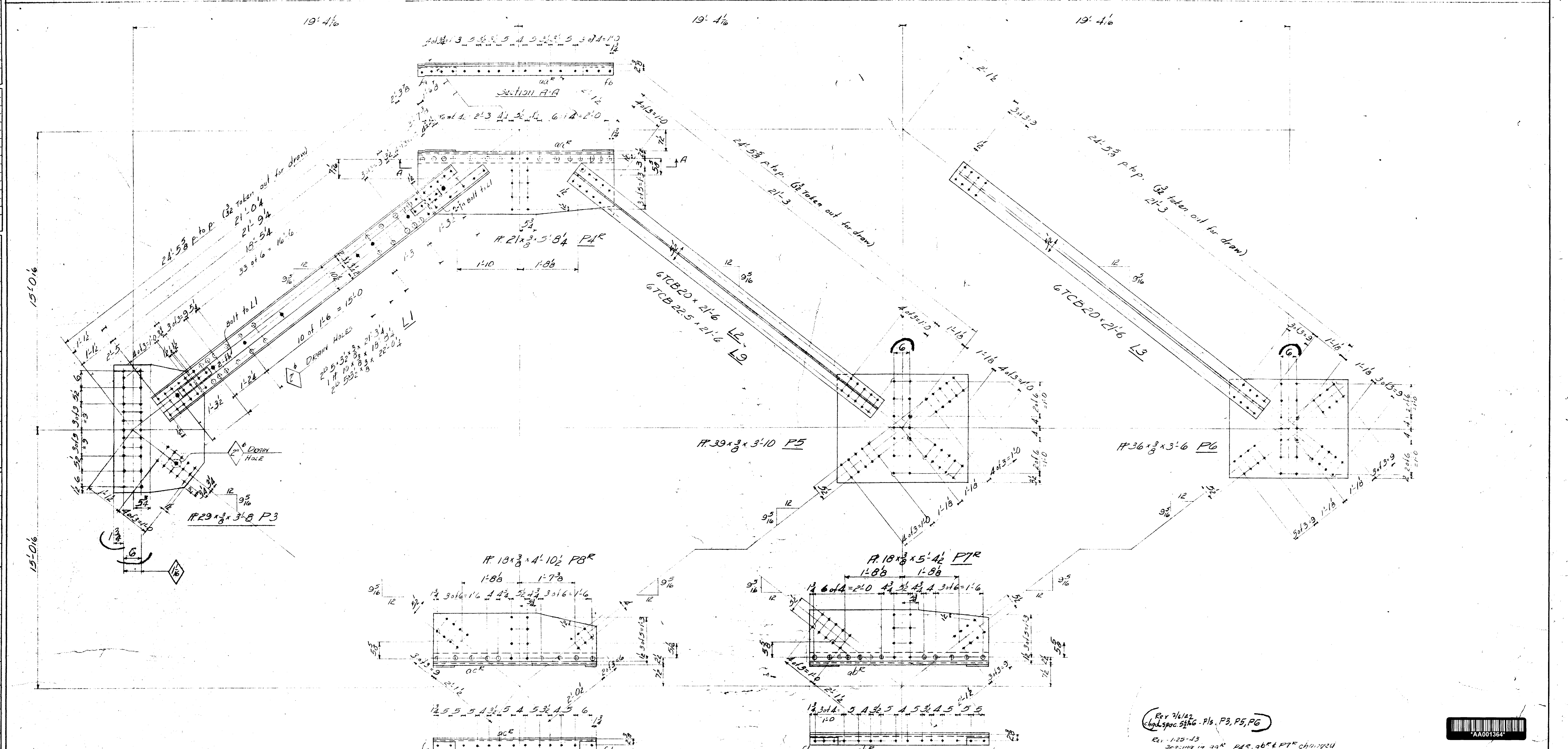
LINE	No.	SHAPE				LENGTH Feet	LENGTH Inches	ASSEM. BLDG. MARK	REMARKS	ORDERED	ITEM	CALCULATED WEIGHT
1		2	STACKS	TS2					2 ... X 27-3			3478
2	4	15	∠33.3			27	3 1/16			cut 27-3 1/16	5	1847
3	2	H3	20	7/16		27	3 1/16	pa			5	1623
4	2	H3	20	7/16		27	3 1/16	pb			5	
5												3470
6	4	PLATES	M5^R									
7	4	"	M5^L						2 1 x 5 x 4-6			247
8	8	H3	30	½		4	7			28	5	234
9	4	∠	4	4	½	4	5½	aa^R	for M5^R		5	57
10	4	∠						aa^L	for M5^L		5	
11												291
12	4	PLATES	M6									162
13	4	H3	35	½		3	7		52		5	
14												
15	4	PLATES	M7^R						2 1 ... 5-2			156
16	4	PLATES	M7^L									
17	8	H3	20	½		5	2				5	176
18	4	∠	4	4	½	5	2	ab^R	for M7^R		5	66
19	4	∠						ab^L	for M7^L		5	
20												242
21												
22	2	21	CB	112		23	9 7/8	D2	2 1 ... x 29-8	23 9 7/8	19	
23	2	21	CB	112		26	11	D4	" " 26-11	26 11	18	
24	2	21	CB	112		52	5 7/8	D3	" " 52-6	52 5 7/8	17	587
25												

PAINT: Yes
SHOP CONTACT SURFACES: No

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT [illegible] PLANT
WORK FABRICATED AT [illegible] PLANT
IN CHARGE OF [illegible]
DRAW. MADE BY GBK DATE 1-9-43
DRAW. CHECKED BY FET DATE [illegible]

ORDER No.	SHEET No.
J314	6



(Rev 2/6/42 chgd. spac. 5½ to 6 - Pls. P3, P5, P6)

Rev - 1-25-43
Spacing in aaR, P4R, abR & P7R changed
Rivets added P7R & P8R

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	Shape	Length Feet	Length Inches	Assembling Mark	Remarks	Calculated Weight for One Ship. Piece	Ordered	Item
1			8 LATERALS L1				11 X 10 X 22-0	1176		
2		16	Ls 5 3½ 3/8	21	3¼			900		S
3		16	Ls 5 3½ 3/8	22	0¼					S
4		8	Pls 10 3/8	18	8¼			236		S
5		32	Fils 3 3/8	1	0½	fh		16		A
6		32	S.B. 7/8φ					4		A
7			24 LATERALS L2				8X6X21-6	437		
8		24	6TCB20	21	6		c/c 12 @ 40	430	21'-6	S
9										
10			24 LATERALS L3				8X6X21-6			
11		24	6TCB20	21	6		c/c 12 @ 40	437	21'-6	S
12										
13			8 LATERALS L9				8X6X21-6	486		
14		8	6TCB22.5	21	6		c/c 12 @ 45	484	21-6	S
15									1-43-24	24
16			4 PLATES P3					130		
17		4	Pls 29 3/8	3	8			136		S
18										
19										
20			4 PLATES P4R					245		
21			4 PLATES P4L				23 X 4 X 5-8			
22		8	Pls 21 3/8	5	8¼			152		S
23		4	Ls 4 4 ½	5	8¼	aaR				S
24		4	Ls			aaL		73		S
25		8	Fils 4 ½	1	2¼	fa		15		A
26	20	8	Fils 4 ½		11½	fb				A
27		32	S.B. 7/8φ							A
28			8 PLATES P5							
29		8	Pls 39 3/8	3	10			191 / 190		S
30										
31			6 PLATES P6					167		
32		6	Pls 36 3/8	3	6			161		S
33										
34										
35			6 PLATES P7R					209		
36			6 PLATES P7L							
37		12	Pls 18 3/8	5	4½		20X4X5-5	123		S
38		6	Ls 4 4 ½	5	4½	abR				S
39		6	Ls			abL		69		S
40		12	Fils			fb		12		
41	24	12	Fils 4 ½		9½	fg				A
42		48	S.B. 7/8φ					4		A
43										
44										
45										
46			6 PLATES P8R					185		
47			6 PLATES P8L				20X4X4-11			
48		12	Pls 15 3/8	4	10½			113		S
49		6	Ls 4 4 ½	4	10½	acR				S
50		6	Ls			acL		62		S
51		12	Fils 4 ½		5½	fd		7		A
52		12	Fils			fg				
53		36	S.B. 7/8φ					3		A
54										
55										
56										
57										
58										
59										
60										

RIVETS - 7/8φ
HOLES - 15/16φ Unless Noted

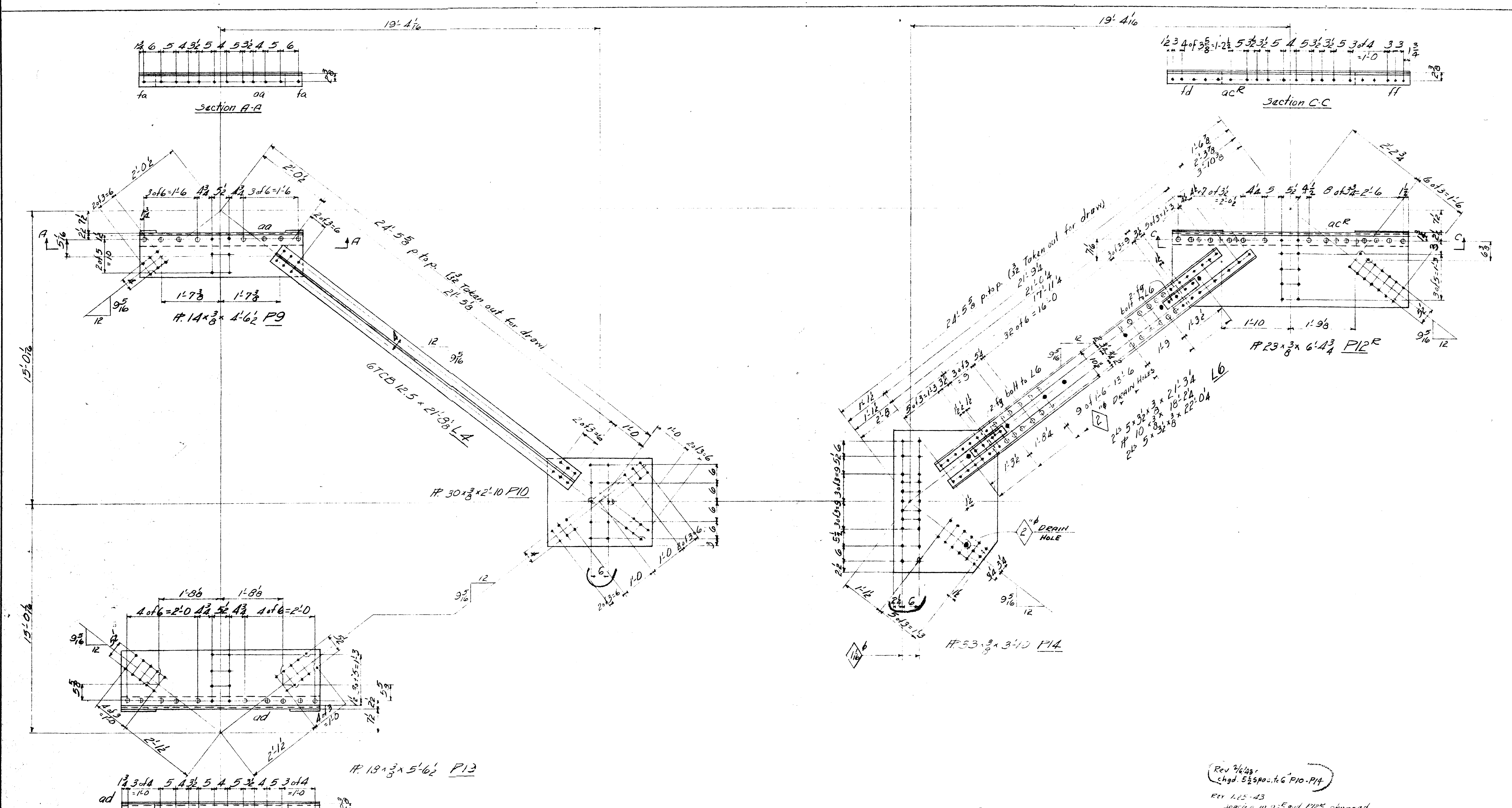
PAINT: Yes
CONTACT SURFACES: No. (SHOP)

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
LATERALS
UNITED STATES STEEL EXPORT COMPANY
xAB-7957A

AMERICAN BRIDGE COMPANY
DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Making
DRAW. MADE BY GUR DATE 1-11-43
DRAW. CHECKED BY GDA DATE 1-20-43
ORDER No. J31A
SHEET No. 7

Advance Bill sh. 3

AA001364



(Rev 2/6/43 chgd. 5 1/2 spac. to 6" P10-P14)

Rev 1-25-43 spacing in acR and P12R changed holes added P14

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1										
2			20-LATERALS L4				8×6×21-8	272		
3	20		6TCB12.5	21	8 1/8		12@15	271	21-8 1/8	S
4								1		
5										
6			4-LATERALS L6				11×10×21-3	1123		
7		8	Ls 5 3 1/2 3/8	21	3 1/4			442		S
8		4	Ps 10 3/8	18	2 1/4			[illegible]		S
9		8	Ls 5 3 1/2 3/8	22	0 1/4			438		S
10		16	fils 3 3/8	1	0 1/2	fg		16		A
11		16	S.B. 7/8ϕ					4		A
12										
13										
14										
15										
16			4-PLATES P9					151		
17		4	Ps 14 3/8	4	6 1/2		15×4×4-7	81		S
18		4	Ls 4 4 1/2	4	6 1/2	aa		5		S
19		8	fils 4 1/2		5 1/2	fa		6		A
20		8	S.B. 7/8ϕ							A
21								147		
22										
23			5-PLATES P10					104		
24		5	Ps 30 3/8	2	10			[illegible]		S
25								1		
26										
27										
28										
29										
30										
31			2-PLATES P12R				24×4×6-5	298		
32			2-PLATES P12L							
33		4	Ps 23 3/8	6	4 3/4			187		S
34		2	Ls 4 4 1/2	6	4 3/4	acR		82		S
35		2	Ls			acL				S
36		4	fils 4 1/2	1	4 3/4	fd		19		A
37		4	fils 4 1/2	1	5 1/2	ff				A
38		16	S.B. 7/8ϕ					4		A
39										
40										
41			2-PLATES P14					160		
42		2	Ps 33 3/8	3	10			161		S
43										
44										
45										
46			4-PLATES P13				19×4×5-7	220		
47		4	Ps 19 3/8	5	6 1/2			127		S
48		4	Ls 4 4 1/2	5	6 1/2	ad		71		S
49		8	fils 4 1/2		11 1/2	fb		13		A
50		16	S.B. 7/8ϕ					4		A
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										

Rivets - 7/8"ϕ
Holes - 15/16"ϕ Unless Noted

PAINT: Yes
SHOP CONTACT SURFACES: No.

Adv. Bill sh. 3

AA001363

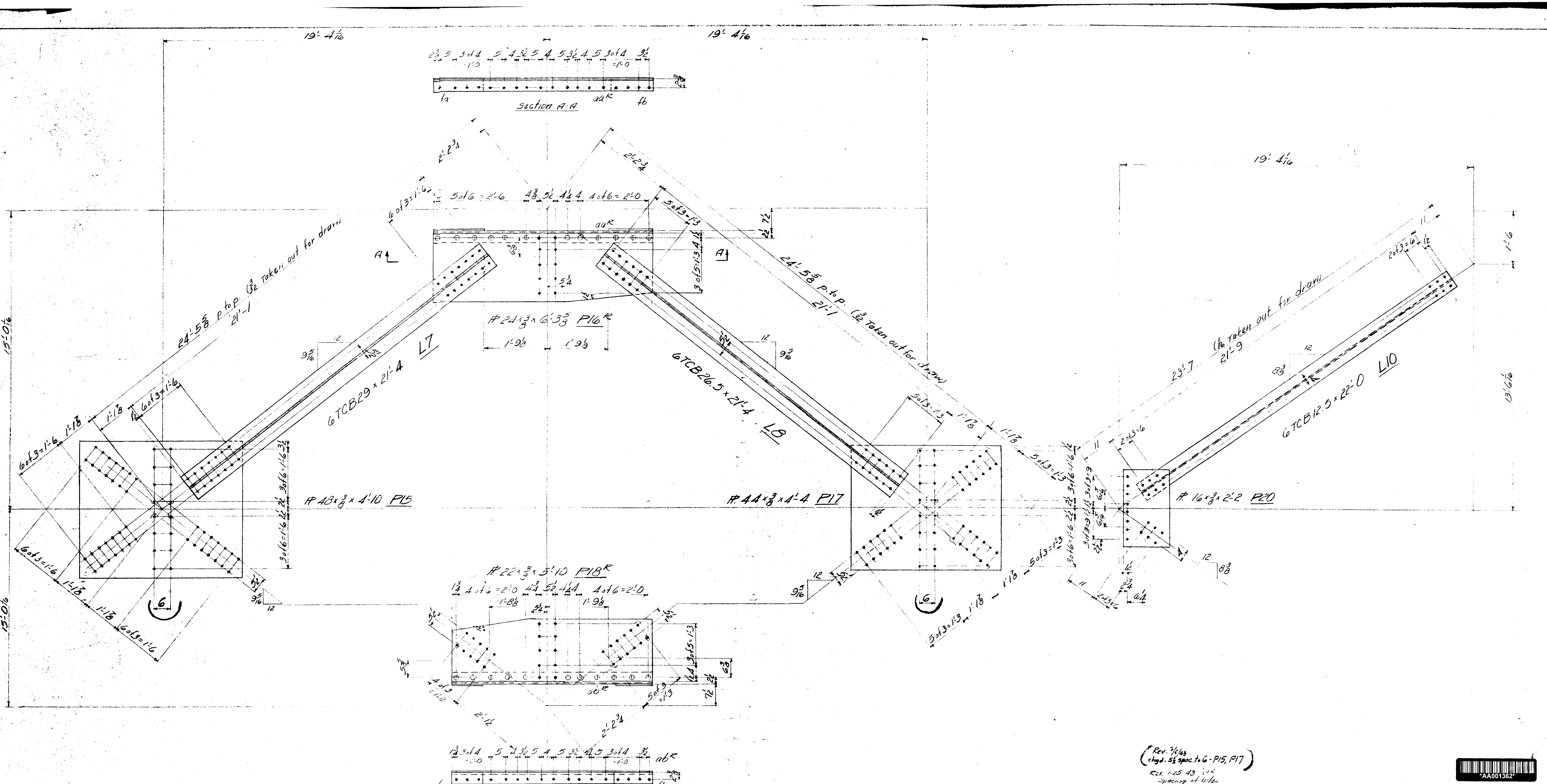
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE-SECTION D
LATERALS

UNITED STATES STEEL EXPORT COMPANY
XAB-7957-1

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Maloney
DRAW. MADE BY GWF DATE 1-13-43
DRAW. CHECKED BY YDA DATE 1-20-43

ORDER No. J3114 | SHEET No. 8



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1			8 LATERALS L7				10x6x21-4	~~622~~		
2		8	6TCB29	21	4		ct 12@58	614	ord. 42'9½ cut 21'4	23
3								3P		
4			8 LATERALS L8				10x6x21-4	~~568~~		
5		8	6TCB26.5	21	4		ct 12@53	565	21'-4	S
6								3P		
7			12 LATERALS L10				10x6x22-0	~~276~~		
8		12	6TCB18.5	22	0		ct 12@25	275	22'-0	S
9								1P		
10			2 PLATES P15					~~297~~		
11		2	PLs 48 3/8	4	10			296 P		S
12								1P		
13			2 PLATES P17					~~244~~		
14		2	PLs 44 3/8	4	4			243 P		S
15								1P		

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
16			2 PLATES P16R					~~296~~		
17			2 " P16L			25x¾x6-4				
18		4	PLs 24 3/8	6	3 5/8			193		S
19		2	Ls 4 4 ½	6	3 5/8	aaR				S
20		2	Ls			aaL		41		S
21		4	fils 4 ½	1	5	fa		14		A
22	8	4	fils 4 ½	1	3	fb				A
23		16	S.B. 7/8 ϕ					6 64		A
24			2 PLATES P18R							
25			2 PLATES P18L					~~257~~		
26		4	PLs 22 3/8	5	10	23x¾x5-10		164		S
27		2	Ls 4 4 ½	5	10	abR				S
28		2	Ls			abL		75		S
29		4	fils			fb		15		
30		4	fils 4 ½		11½	fc				A

16-SB ¾ϕ

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
31			6 PLATES P20							
32		6	PLs 16 3/8	2	2			44		S
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										

RIVETS – 7/8 ϕ
HOLES – 15/16 ϕ

PAINT: 1/2s
CONTACT SURFACES: No
SHOP

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE, SECTION D
LATERALS

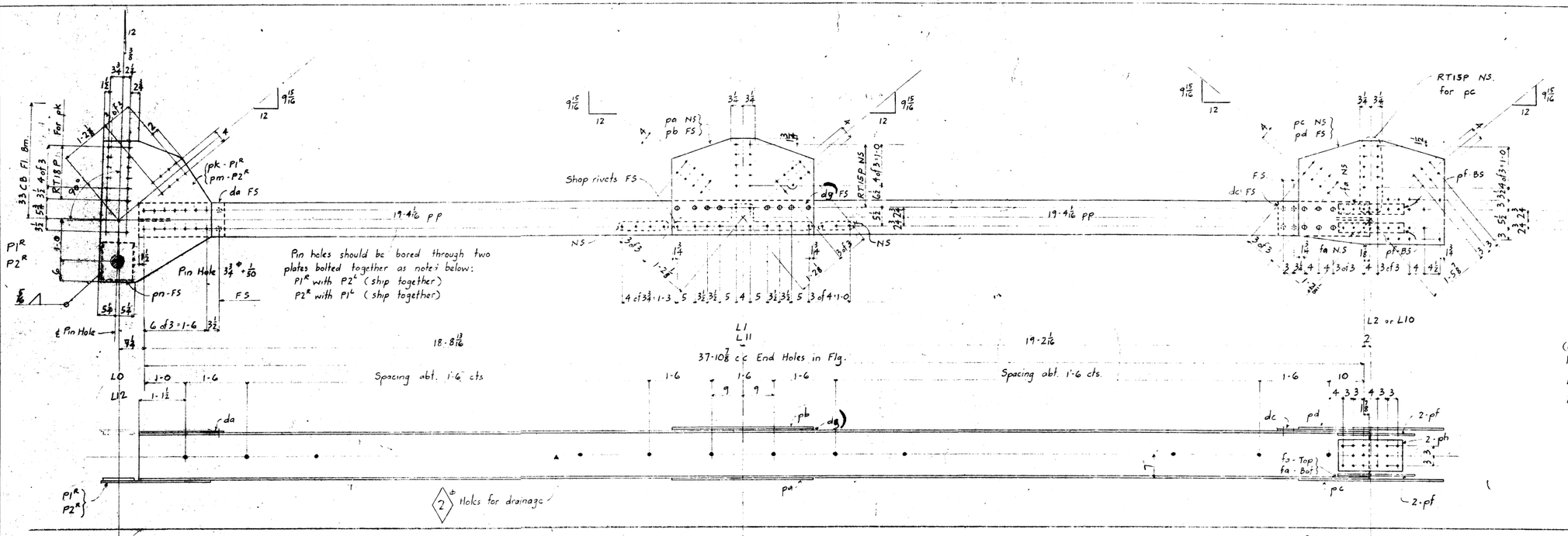
UNITED STATES STEEL EXPORT COMPANY
XAB-7857A

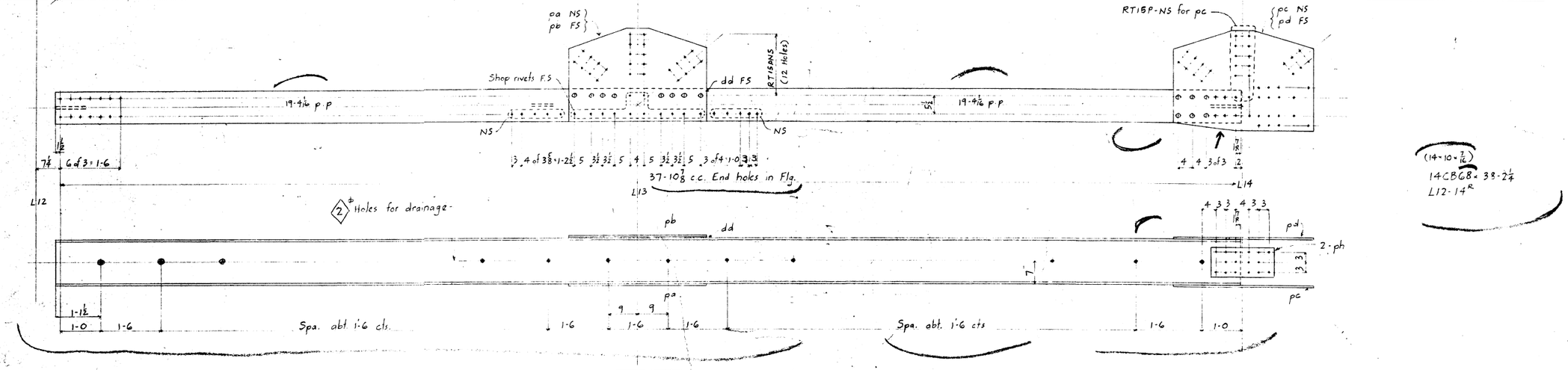
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Maloney
DRAW. MADE BY GUR DATE 1-14-43
DRAW. CHECKED BY YDA DATE 1-20-43

ORDER No.	SHEET No.
J319	9

Advance Bill No. 3





LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED ITEM
1		2	Bot. Chords			L0-2R			
2		2	"			L0-2L			
3		2	"			L10-12R			
4		2	"			L10-12L			
5		8	14 CB 61	38	2¼				
6		8	Fil 10 ¼	2	0½	da			S
7	12	8	Pl 28 ½	3	5½	pa			S
8	12	8	Pl 28 ½	3	5½	pb			S
9		8	Fil 10 ⅜	3	5½	dd			S
10	12	8	Pl 30 ½	3	6	pc			S
11	12	8	Pl 30 ½	3	6	pd			S
12		8	Fil 10 ⅜	2	2⅝	dc			A
13		32	Pl 3 ⅝	1	7	pf			A
14			" "						
15		16	Fil 3 1/16		7⅜	fa			A
16									
17	24	16	Pl 9 ⅜	1	7	ph			S
18		96	SB 7⅜						A
19									
20									
21		2	Plates			Pl C			
22		2	"			Pl L			
23		2	"			P2 R			
24		2	"			P2 L			
25		4	Pl 32 1/2	3	4⅞	pk	P1R		S
26		4	Pl 32 ½	3	4⅞	pm	P2R		S
27		8	Pl 9 ⅜		11	pn			S
28									
29									
30									
31		2	Bot. Chords			L12-14R			
32		2	"			L12-14L			
33		4	14 CB 68	38	2¼				
34									
35		4				pa			
36		4				pb			
37		4	Fil 10 ⅜	3	5½	dd			A
38		4				pc			
39		4				pd			
40									
41		8				ph			
42		8	SB 7⅜						A
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

Rev. 2-3-42
Fil. dd changed to dg
L12-14R changed
EET.

Rivets 7/8" Holes 15/16" unless noted
Holes marked RT to be punched 11/16" and reamed to 15/16" to a metal templet, except holes in CB's punched full size.

PAINT: Yes
CONTACT SURFACES: No

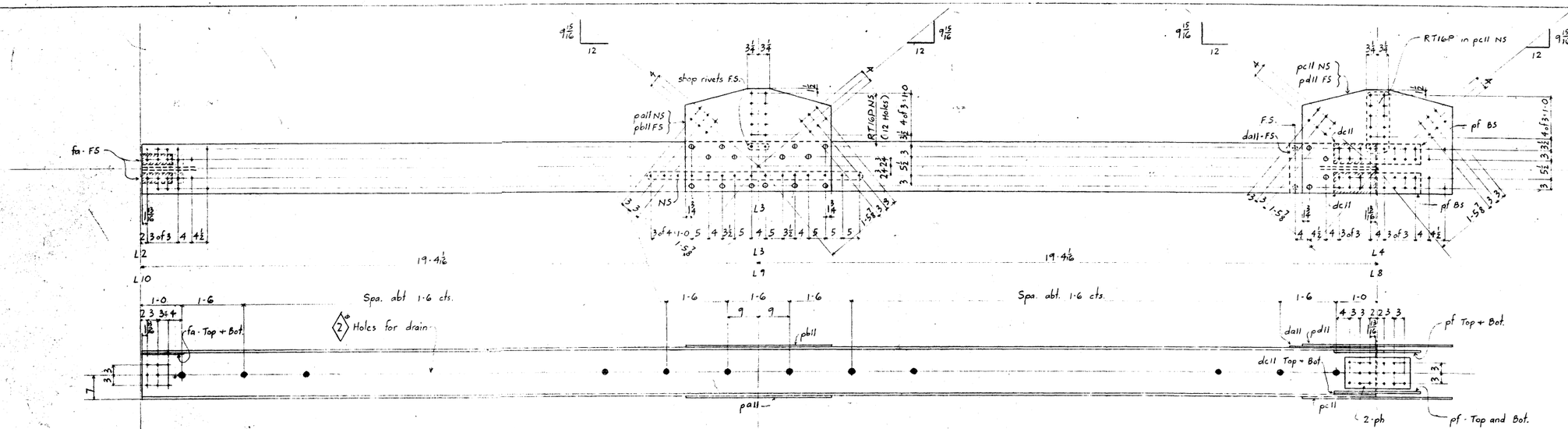
AA001361

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE, SECTION D
BOTTOM CHORDS
UNITED STATES STEEL EXPORT CO.
XAB-7957A

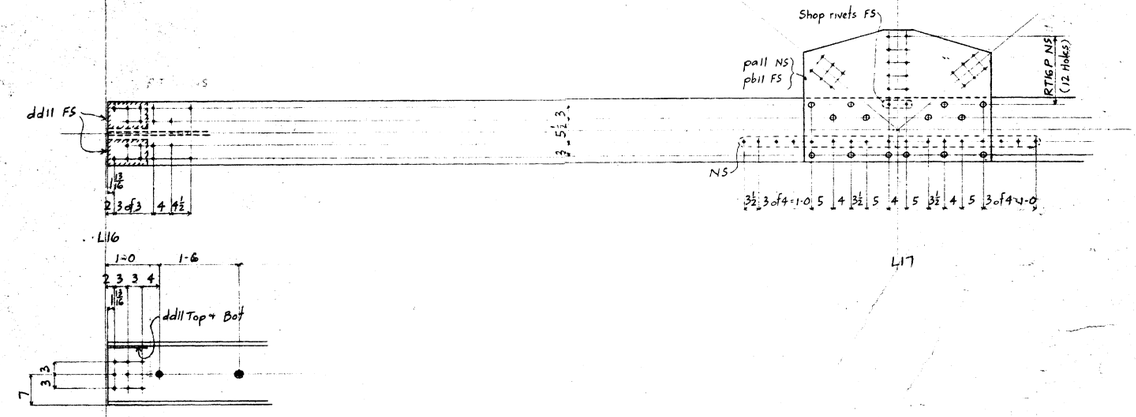
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.B.M
DRAW. MADE BY G.D.W DATE 1-7-43
DRAW. CHECKED BY [illegible] DATE 1-25-43

ORDER No. J31-A
SHEET No. 10



(14 1/4 × 14 5/8 × 1/2)
14CB103 × 38-7 3/4
L2-4R } Alike
L8-10R }



14CB103 × 38-7 3/4
L16-18R Parts not shown same as for L2-4R

LINE	Total No. of Pieces on the Order	MATERIAL: No. of Pos. on Sheet	SHAPE	LENGTH: Feet	LENGTH: Inches	ASSEM-BLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED: ITEM
1	2		BOT CHORD	12-4R			2 BOT CHORDS	18-10R	
2	2	"	"	12-4T			2 "	18-10T	
3	8	14	CB 103	38	7 3/4		A858	3780 38-7 3/4	30
4	16	Fil	3 3/16	1	9 1/2	fa		3	A
5	40	8	PL 30 1/2	3	6 1/2	pa11	30 X 15 X 40-5	361	5
6	44	8	PL 30 1/2	3	6 1/2	pb11		361	5
7	16	8	Fil 19 1/16 1/4	2	1	da11		26	A
8	30	8	PL 30 1/2	3	6 1/2	pc11		361	5
9	30	8	PL 30 1/2	3	6 1/2	pd11		361	5
10	48	32	PL 6 1/2	2	1	pf		86	5
11									
12									
13	48	16	Fil 6 1/8	1	0 1/2	dc11		5	A
14	24	16	PL 9 15/16	1	7	ph		47	A
15	112		SB 7/8 ø					1112	A
16		2	Bot. Chord	L15-18R					
17		2	"	L16-15T					
18		4	14 CB 103	38	7 3/4				30
19		4				pa11	30 X 15 X 40-5	361	
20		4				pb11			
21	16	8	Fil 6 1/8		12	dd11		4	A
22		4				da11		26	
23		4				pc11			
24		4				pd11		361	
25		16				pf		86	
26									
27									
28		8				dc11		5	
29		8				ph		47	
30		56	SB 7/8 ø					1112	A
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

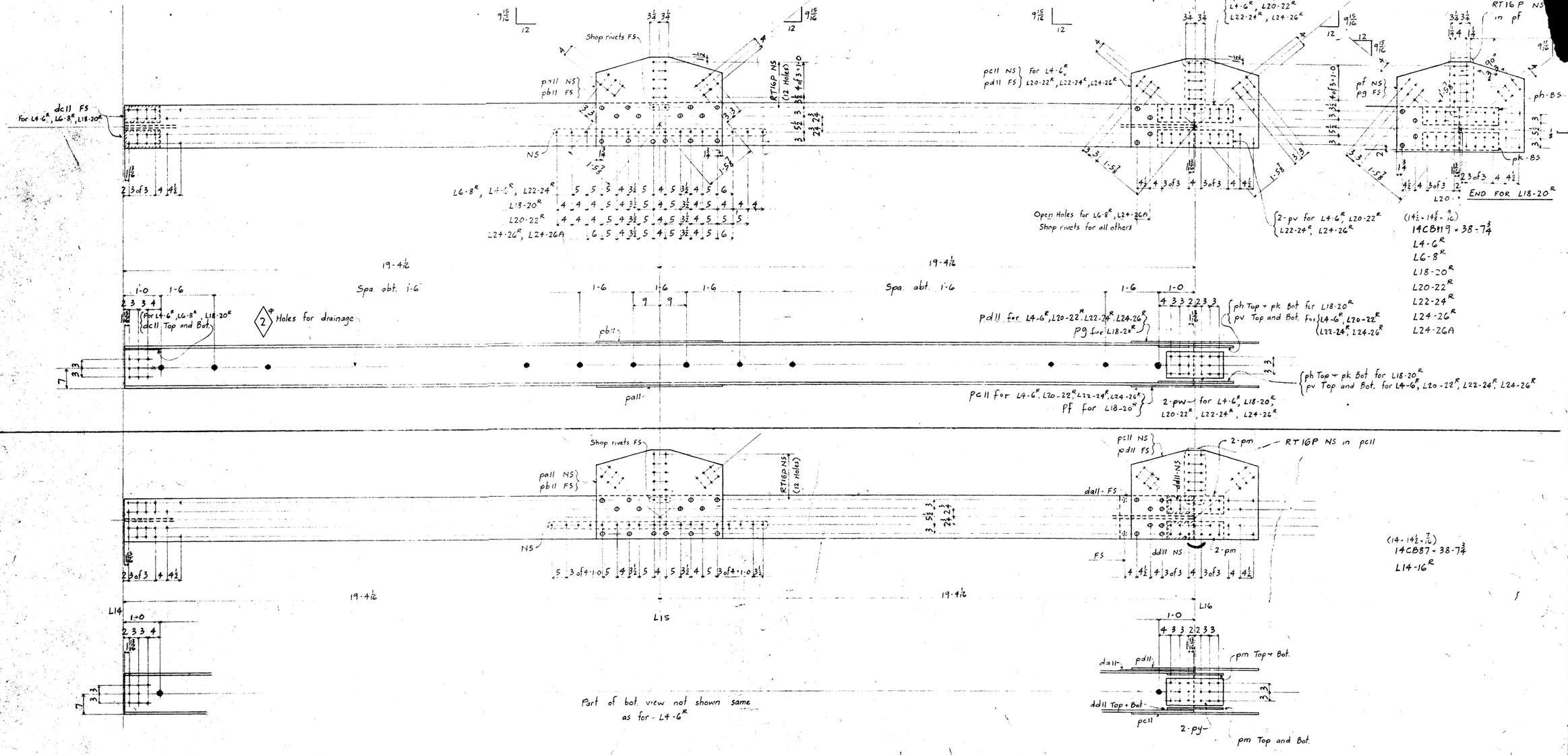
Main material over 3/4 thick to be punched 11/16 ø and reamed to 15/16 ø or drilled 15/16 ø.
Rivets 7/8 ø
Holes 15/16 ø unless noted.
Holes marked RT to be punched 11/16 ø and reamed to 15/16 ø to a metal templet.
PAINT. Yes
CONTACT SURFACES: No SHOP

AA001360

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
BOTTOM CHORDS
UNITED STATES STEEL EXPORT CO.
XAB-7957A
14-B-M-1880
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF EBM
DRAW. MADE BY GDW DATE 1-8-43
DRAW. CHECKED BY [illegible] DATE 1-25-43

ORDER No. J31-A
SHEET No. 11



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1	2	2	Bot. Chords		14-6	L4-6R	30x16x40-5	5465		
2	2	"	"		14-6	L4-6L				
3	2	"	"		16-8	L6-8R	30x16x38-8	4977		
4	2	"	"		16-8	L6-8L				
5	"	"	"							
6	"	"	"							
7	2	"	"		20-22	L20-22R				
8	2	"	"		20-22	L20-22L				
9	2	"	"		22-24	L22-24R		5460		
10	2	"	"		22-24	L22-24L	30x16x38-8			
11	1	"	"		24-26	L24-26L				
12	1	"	"		24-26	L24-26R				
13	1	"	"		24-26	L24-26A	30x16x38-8	4967		
14	"	"	"							
15	20		14 CB 119	38	7 3/4			45598	38-7 3/4	27

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
16	20		Pl 30 1/2	3	6 1/2	pa11		361		
17	20		Pl 30 1/2	3	6 1/2	pb11				
18	16		Fil 6 1/8	1	0 1/2	dc11	2 each for L4-6L, L6-8L	5		
19										
20	14		Pl 30 1/2	3	6	pc11	1 each for L4-6L, L20-22L, L22-24L, L24-26L			
21	14		Pl 30 1/2	3	6 1/2	pd11		361		
22										
23										
24							4 each for L4-6L, L20-22L, L22-24L, L24-26L			
25	56		Pl 6 5/8	2	1	pv		106	A	
26										
27	172		SB 7/8 #						R	
28										
29	36	28	Pl 9 1/2	1	7	pw	2 each for L4-6L, L20-22L, L22-24L	41	A	
30										

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
31	2	2	Bot. Chords		L18-20	R		5488		
32	2	"	"		L18-20	L	30x16x40-5	5488		
33	4		14 CB 119	38	7 3/4		cut 38-7 3/4	4376	26	
34	4					pa11				
35	4					pb11		361		
36	8					dc11		5		
37	4		Pl 30 1/2	3	7	pf		186	S	
38	4		Pl 30 1/2	3	7	pg		183	S	
39	8		Pl 6 5/8	2	1/2	ph		108	S	
40	8		Pl 6 5/8	2	1/2	pk			S	
41	8					pw		49		
42	56		SB 7/8 #					13	A	
43										
44								5543	C	
45										

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
46	2	2	Bot. Chords		L14-16	R				
47	2	"	"		L14-16	L	30x15x40-5	4189		
48	4		14 CB 57	38	7 3/4			3326	38-7 3/4	32
49	4					pa11				
50	4					pb11		361		
51	4					pc11				
52	4					pd11		361		
53	4		Fil 14 1/2	4	2	1 dall		26		
54	16		Pl 6 3/8	1	7	pm		48	S	
55										
56	8		Fil 6 1/8		9 1/2	dd11		2		
57										
58	8		Pl 9 1/8	1	7	py		136	S	
59	40		SB 7/8 #					9	17	
60								4201		

rev 3/1 - line 33 item & cutting Lgth

Rev. 2-20-43
Holes changed at L16

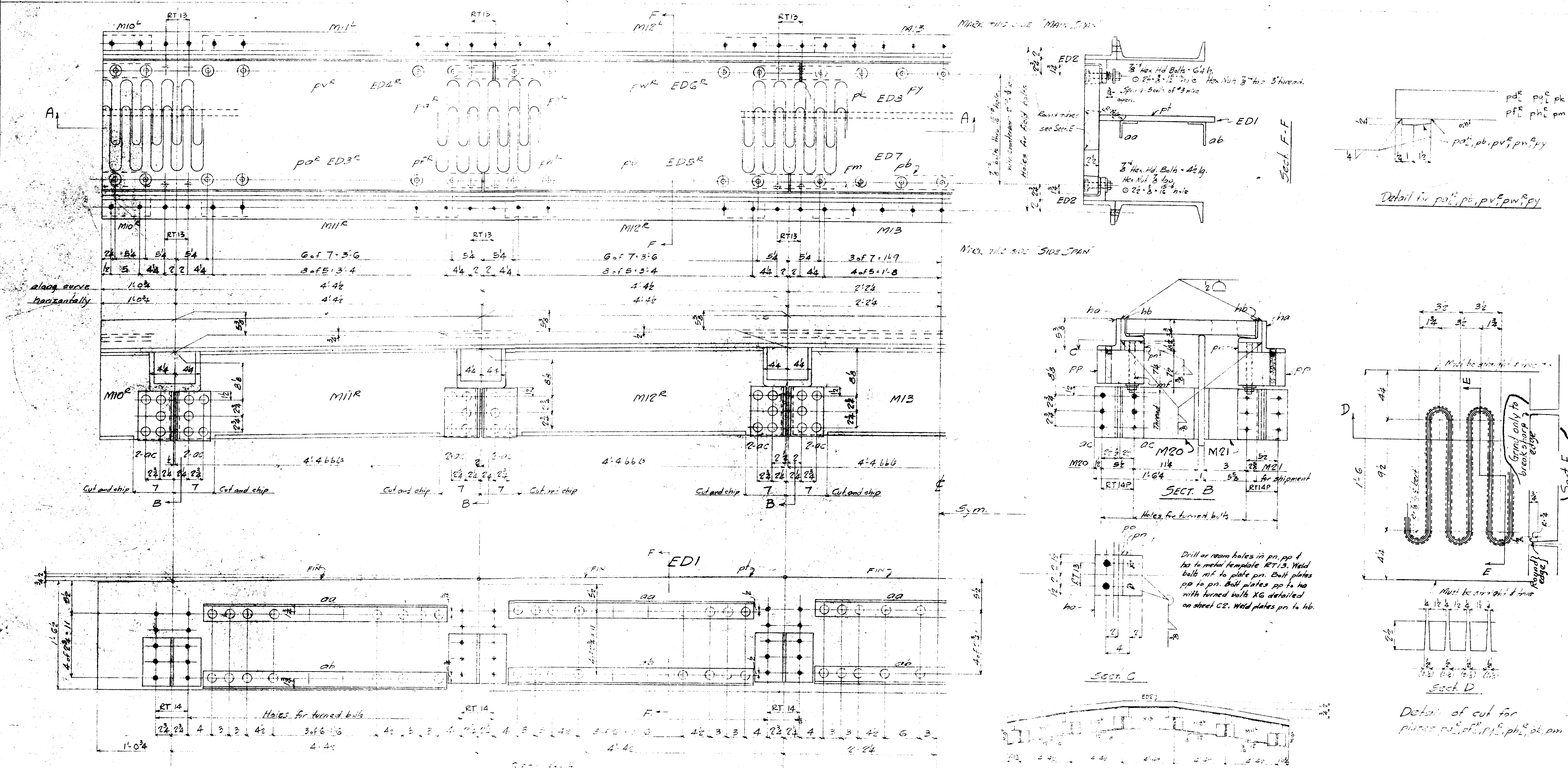
Main material over 3/4" thick to be punched 11/16" and reamed to 15/16", or drilled 15/16".
Rivets 7/8"
Holes 15/16" unless noted
Holes marked RT to be punched 11/16" and reamed to 15/16" to a metal templet.
PAINT: Yes
CONTACT SURFACES: No
SHOP

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
BOTTOM CHORDS
UNITED STATES STEEL EXPORT COMPANY
XAB-7957A

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF EBM
DRAW. MADE BY GDW DATE 1-9-43
DRAW. CHECKED BY [illegible] DATE 1-25-43

ORDER No. J31-A
SHEET No. 12



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1			2 End Dams ED1				20 X 5 X 24	1932		
2		2	Ps 19¾ (Fin 1) 1	24	0	pt		1617		5
3		10	Ls 3 3 ⅜	3	6	aa		126		5
4		10	Ls 4 3 ⅜	3	6	ab		149		5
5								1887		
6			4 Pieces M10R				12 X 9 X 1-3	369		
7			4 Pieces M10L					349		
8		8	15 ⊏ 33.9	1	0			34		5
9	96	16	Ls 6 4 ⅜		3½	ac		17		17
10								57		
11			4 Pieces M11R					174		
12			4 Pieces M11L							
13		3	15 ⊏ 33.9	4	3		15 X 9 X 4-4	144		5
14		32	Ls			ac		35		
15										
16			4 [illegible]					174		
17			4 Pieces [illegible]				15 X 9 X 4-4			5
18		8	15 ⊏ 33.9	4	[illegible]			144		5
19		32	Ls					[illegible]		5
20										
21			4 Pieces [illegible]					174		
22		4	15 ⊏ 33.9	4	[illegible]		15 X 9 X 4-4	144		
23		16	Ls					[illegible]		5
24										17
25			4 [illegible]				14 X 7 X [illegible]	1201		
26		4	Ls 5⅜ 4 [illegible]	2	[illegible]	ha	16	24	[illegible]	
27		4	Ls 4 3¾ [illegible]	2	[illegible]	hb	16	4	4-4	
28		24	Ps 3¼ 1⅝ (Fin)		7	pn		[illegible]		5
29		24	Ps 7 5 (Fin)		[illegible]	pp		[illegible]		
30		48	Rods ⅞		9⅝	mf	thread 7¼	1		
31		48	1½ x Nut ⅞ [illegible]					2		A
32		48	⊙ 2½ x ⅜				15/16 hole	5		A
33								[illegible]		5
34			2 End Dams ED3R				weld	3		
35			2 End Dams ED3L				weld	452	14 X 5 X 5-	
36			2 End Dams ED4R				weld			
37			2 End Dams ED4L				weld	463	15 X 6 X 5-	
38			2 End Dams ED5R				weld			
39			2 End Dams ED5L				weld	366	14 X 5 X 4-	
40			2 End Dams ED6R				weld			
41			2 End Dams ED6L				weld	361	15 X 6 X 4-4	
42			2 End Dams ED7				weld	268	14 X 5 X 4-	
43			2 End Dams ED8				weld	342	15 X 6 X 4-	5
44		4	Ps 14½ 2½	5	5⅛	2-pfR 2-pfL	ED3R ED3L	415		5
45		4	Ps 14½ 2½	5	6⅞	2-pdR 2-pdL	ED4R ED4L	426		5
46		4	Ps 14½ 2½	4	4¼	[illegible]	ED5R ED5L		18-4½	5
47		[illegible]	Ps 14½ 2½	4	4¼	[illegible]	ED6R ED6L	344		
48		2	Ps 14½ 2½	4	[illegible]	pm	ED7			
49		2	Ps 14½ 2½	4	[illegible]	pk	ED8	311		
50		4	Ps 2½ ½	5	5⅛	2-[illegible] 2-[illegible]	ED3R ED3L bevel	2	2C	5
51		6	Ps 2½ ½	4	4¼	pb	ED5R ED1	1	1C	5
52		78	⅞" Bolts		6¼		9-ED3R 7-ED1 ED8	13		A
53		78	⅞" bolts		4½		9-ED3L 7-ED5L ED7	10		A
54		156	Hex Nut ⅞ [illegible]				9-ED3R ED4R	4		A
55		156	⊙ 2½ x ⅜		15/16 hole		[illegible]	3		
56		78	Springs #3 wire				9-ED4R 7-ED6R ED8	2	[illegible]	
57		4	Ps 2½ ½	5	6⅞	2-[illegible] 2-[illegible]	ED4R ED4L	24	2C	5
58		4	Ps 2½ ½	4	4¼	2-pwR 2-pwL	ED6R ED6L bevel	18	1C	5
59		2	Ps 2½ ½	4	0¾	py	ED8	17	1C	5
60		12	Pcs 24 CB 74		[illegible]		9 x 5 x 16 M120	34		A
61		12	Pcs 24 CB 74		82		9 x 5 x 8 M121	22		A

rev. 2/6/4
line 30 - add 7¼" thread

(rev 2/9/43 Sec E chgd)

Notes:-

Rivets: ⅞"
Holes: 15/16" unless noted
Holes marked RT to be sub-[illegible] and reamed to 15/16" [illegible] template [illegible] as otherwise noted for RT13
Holes in 2½ thick plates to be [illegible] from the solid.
Pieces detailed on this sheet make two complete end dams which are to be shop assembled and bolted for shipment. Use M120 and M121 for this purpose.

PAINT: Yes
CONTACT SURFACES: [illegible]

AA001358

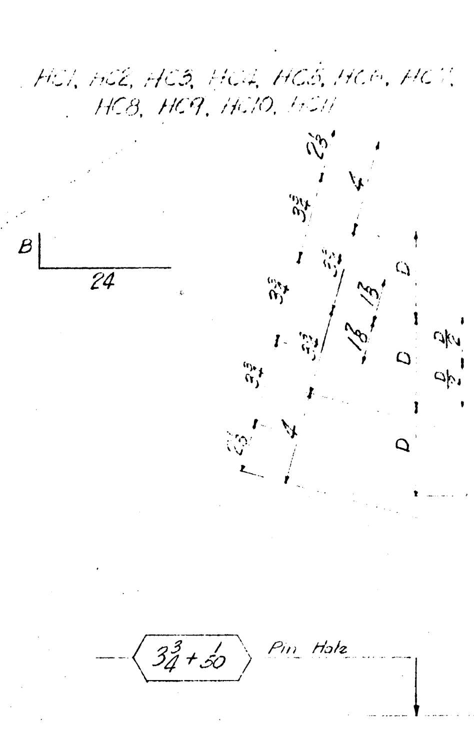
Liard River Bridge
Alaska Highway
Fort Nelson - Watson Lake, Sect. D
Tower End Dams
United States Steel Export Co.
[illegible] 7757 A

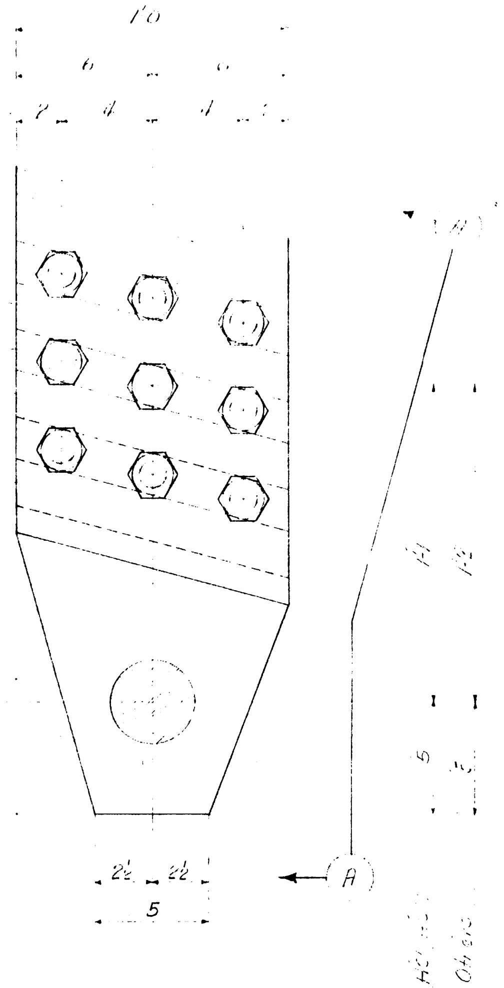
IA-B-M-A26G

American Bridge Company

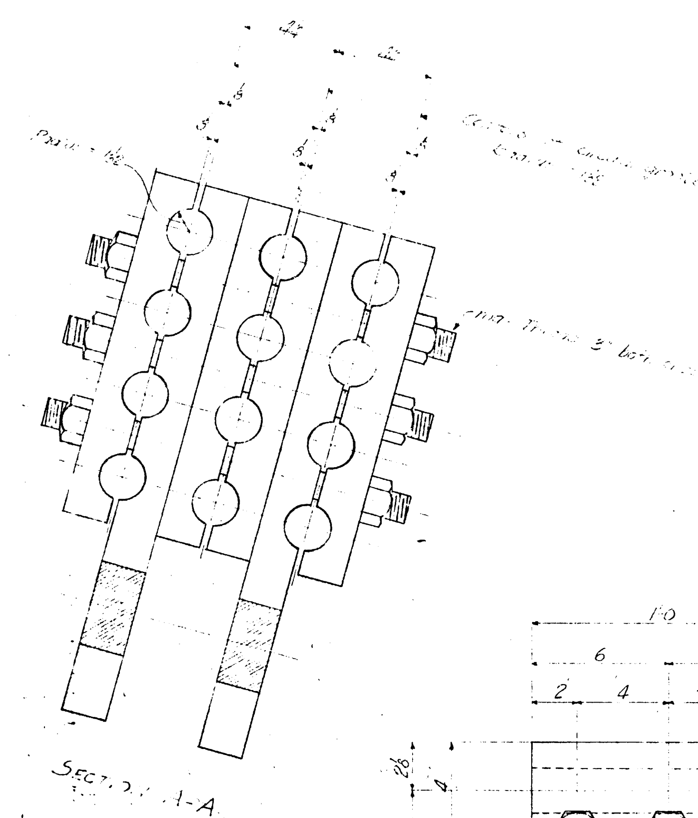
DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.B. Maloney
DRAW. MADE BY CVZ DATE 1/4/43
DRAW. CHECKED BY TJK DATE 1-19-43

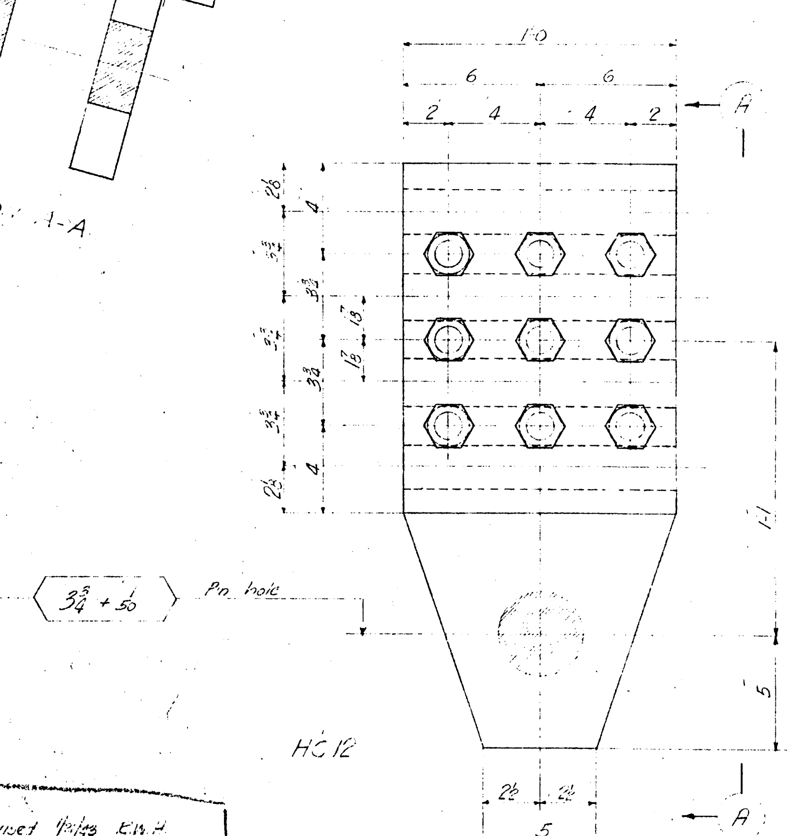
ORDER No. J31 A
SHEET No. 13





Mark	b	D
HC1	(3 11/16)	(3 25/32)
HC2	(5 1/16)	3 27/32
HC3	6 3/4	3 3/8
HC4	(7 25/32)	3 1/16
HC5	(9 5/32)	(4)
HC6	8 7/32	3 31/32
HC7	6 27/32	3 29/32
HC8	5 25/32	3 27/32
HC9	4 3/8	3 13/16
HC10	2 3/4	3 25/32
HC11	1 3/8	3 3/4





HC12

Notes:
The ends and edges of the 1 5/8" Rad. [illegible] are to be [illegible]
The holes for the 1¼ϕ rods [illegible] are to be drilled 1 3/16ϕ and reamed to 1 5/16ϕ while parts are assembled
[illegible] holes are to be [illegible] after pieces are completely assembled
Paint [illegible]
Surfaces bolted in contact [illegible] shop [illegible]

Revised 1/29/43 [illegible]
Bevels and dimensions for HC1, HC2, HC4, and HC5 changed

Line	Total Pcs. on Order	No. of Pcs. on Sheet	Material: Shape	Length Ft.	Length Ins.	Assembling Mark	Remarks	Ordered	Item	Calculated Weight for One Ship Piece	
1											
2			4 Hanger Clamp				HC1	[illegible] × 12 ×	2-3	640	
3			4 "			"	[illegible]	10 × 12 ×	2-4	611	
4			4 "			"	[illegible]	" " ×	2-5	627	
5			4 "			"	[illegible]	" " ×	2-5	648	
6			4 "			"	HC5	" " ×	2-6	666	
7			4 "			"	HC6	" " ×	2-[illegible]	654	
8			4 "			"	HC7	" " ×	2-5	627	
9			4 "			"	HC8	" " ×	2-4	620	
10			4 "			"	HC9	" " ×	2-4	633	
11			4 "			"	HC10	" " ×	2-4	61[illegible]	
12			4 "			"	HC11	" " ×	2-7	626	
13			2 "				HC12	" " ×	2-[illegible]	74[illegible]	
14											
15		16	pl 12 2	1	5 9/16	[illegible]	[illegible]		5	8.4	292
16		8	pl 12 2	2	2 13/16	[illegible]		19-8	10		
17		[illegible]	pl 12 2	1	6 5/16	[illegible]			5	[illegible]1	325
18		8	pl 12 2	2	4 5/16	[illegible]	HC2	19-8	10		
19		16	pl [illegible] 2	1	7[illegible]		HC3		5	41[illegible]	345
20		9	pl 12 2	2	4[illegible]	[illegible]	[illegible]	19-8	10		
21		16	[illegible] 12 2	1	[illegible]	pl	HC4		5	947	362
22		9	[illegible] 12 2	2	5 3/8	[illegible]	HC4	19-8	10		
23		[illegible]	[illegible] 2	1	9 3/8		HC5		5	[illegible]77	374
24		9	pl 12 2	2	5 9/16	[illegible]	[illegible]	19-8	10		
25		16	pl [illegible] 2	1	8[illegible]	[illegible]	[illegible]		5	[illegible]	365
26		8	pl 12 2	2	5¼	[illegible]	HC6	19-8	10		
27		16	pl 12 2	1	7[illegible]	[illegible]	HC7	14-9	11	[illegible]	250
28		9	pl 12 2	2	4[illegible]	[illegible]	HC7	19-8	10		
29		16	pl 12 2	1	[illegible]		HC8		5	[illegible]	335
30		8	pl 12 2	2	4[illegible]	[illegible]	HC8	19-8	10		
31		[illegible]	pl 12 2		5		[illegible]		5	[illegible]	294
32		8	pl 12 2	2	[illegible]	[illegible]	[illegible]	19-8	10		
33		16	pl 12 2	1	5		[illegible]	14-0	12	[illegible]	285
34		8	pl 12 2	2	3[illegible]	[illegible]	HC10	22-0	9		
35		16	pl 12 2	1	[illegible]	[illegible]	[illegible]	14-0	12	7.[illegible]	160
36		8	pl 12 2	2	[illegible]	[illegible]	[illegible]	22-0	9		
37		8	pl 12 2	1	[illegible]		[illegible]	14-0	12	772	86
38		4	pl 12 2	2	1[illegible]			22-0	9		
39		[illegible]	[illegible]	1	4	[illegible]			5	50	
40		[illegible]	[illegible]					[illegible]	5	1[illegible]	
41											
42											
43											
44											
45											
46											
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65											
66											
67											

Liard River Bridge
Alaska Highway
Fort Nelson-Watson Lake Section D
Hanger Clamps

United States Steel Export Co
X43 [illegible]

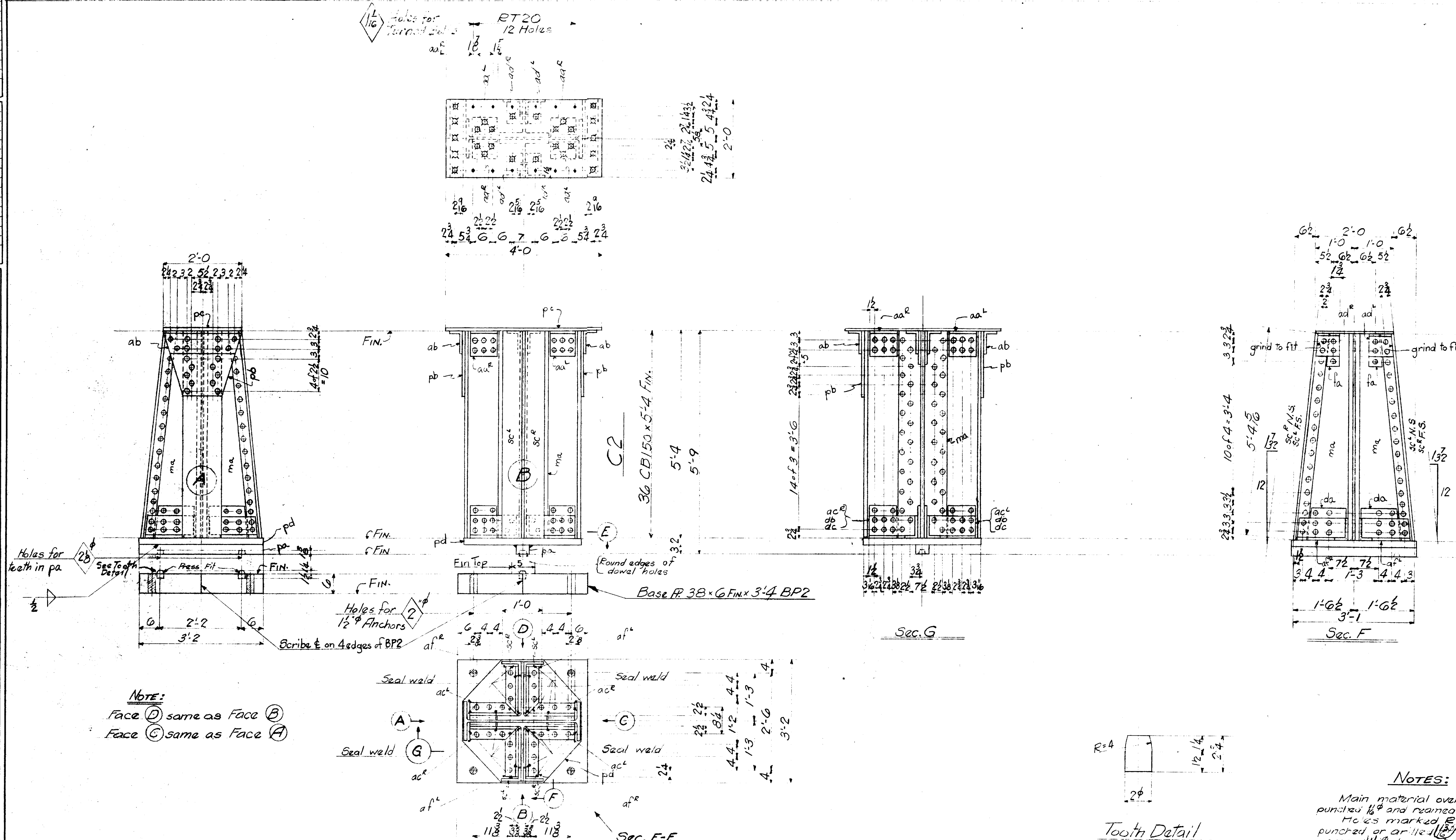
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF [illegible]
DRAW. MADE BY RWH DATE 1/4/43
DRAW. CHECKED BY TJK DATE 1-16-43

PAINT CONTACT SURFACES

ORDER No. J31-D
SHEET No. 14

13



Note:
Face Ⓓ same as Face Ⓑ
Face Ⓒ same as Face Ⓐ

Tooth Detail

Notes:

Main material over 3/4" thickness punched 11/16 ϕ and reamed 15/16 ϕ or drilled 15/16 ϕ.
Holes marked RT are to be punched or drilled 3/4 ϕ and reamed 1 1/16 ϕ to a metal templet

Line	Total No. of Pieces on the Order	No. of Pcs. on Sheet	Shape	Length Feet	Length Inches	Assembling Mark	Remarks	Calculated Weight for One Ship. Piece	Ordered	Item
1		4- Cable Bent Posts - C2						4589		
2		4	36 CB 150	5	4		Fin.	800	5-4-4	5
3		8	Pcs. 30 CB 210	5	4	ma	Fin. - 1130	2241	5-4-4	5
4		8	∠s 6 4 3/4	5	4 3/4	sc^R	Fin.	509		5
5		8	∠s			sc^L				5
6										
7		8	∠s 7 4 3/4	2	0	ab				5
8		8	∠s 7 4 3/4	1	3 1/4	ac^R	abt. 8c			5
9		8	∠s			ac^L		436		5
10		8	∠s 7 4 3/4		7 3/16	ad^R	Grind to fit.			[illegible]
11		8	∠s			ad^L				[illegible]
12		8	∠s 7 4 3/4	1	3 3/4	af^R	abt. 8c			5
13		8	∠s			af^L				5
14		16	fils 10 3/4	1	0	da		102		5
15		16	fils 10 7/8		8 1/2	db		84		5

Line	Total No. of Pieces on the Order	No. of Pcs. on Sheet	Shape	Length Feet	Length Inches	Assembling Mark	Remarks	Calculated Weight for One Ship. Piece	Ordered	Item
16		16	fils 10 7/16		8 1/2	dc		4[illegible]		5
17		4	Bars 4×3 Fin. 1	3	2	pa	[illegible]	[illegible]		5
18		4	℞ 36 2	3	2	pd	1634	776	130	[illegible]
19		8	℞ 24 3/4	1	8 1/4	pb	Fin. 1 26[illegible]	[illegible]		5
20		4	℞ 24 1	4	0	pc		226		5
21		16	fils 4 3/4		10 1/4	fa	[illegible]	[illegible]		A
22		8	∠s 8 6 3/4		8 1/2	aa^R				5
23		8	∠s			aa^L		96		5
24										
25			48 × 2 = ×		5-10			[illegible]		
26								[illegible]		
27								[illegible]		
28										
29										
30										

Line	Total No. of Pieces on the Order	No. of Pcs. on Sheet	Shape	Length Feet	Length Inches	Assembling Mark	Remarks	Calculated Weight for One Ship. Piece	Ordered	Item
31		4- Base Plates - BP2						2598	38-6-4	
32		4	℞ 38×6 Fin.	3	4		Fin. 5 × 3'-2" Top; Fin. 3'-2" × 3'-4" Bot.	2531	13 5	7
33		8	Teeth 2ϕ Fin.		2 1/4		Press. Fin. fit.	4		5
34								[illegible]		
35							38 × 7 × 3-4	[illegible]		
36–45										

Line	Total No. of Pieces on the Order	No. of Pcs. on Sheet	Shape	Length Feet	Length Inches	Assembling Mark	Remarks	Calculated Weight for One Ship. Piece	Ordered	Item
46–60										

Holes 15/16 ϕ Unless Noted
Rivets 7/8 ϕ

(rev 2/5/43. Holes marked RT)

PAINT: Yes
CONTACT SURFACES: No
SHOP

AA001355

Liard River Bridge
Alaska Highway
Fort Nelson - Watson Lake - Sec. D

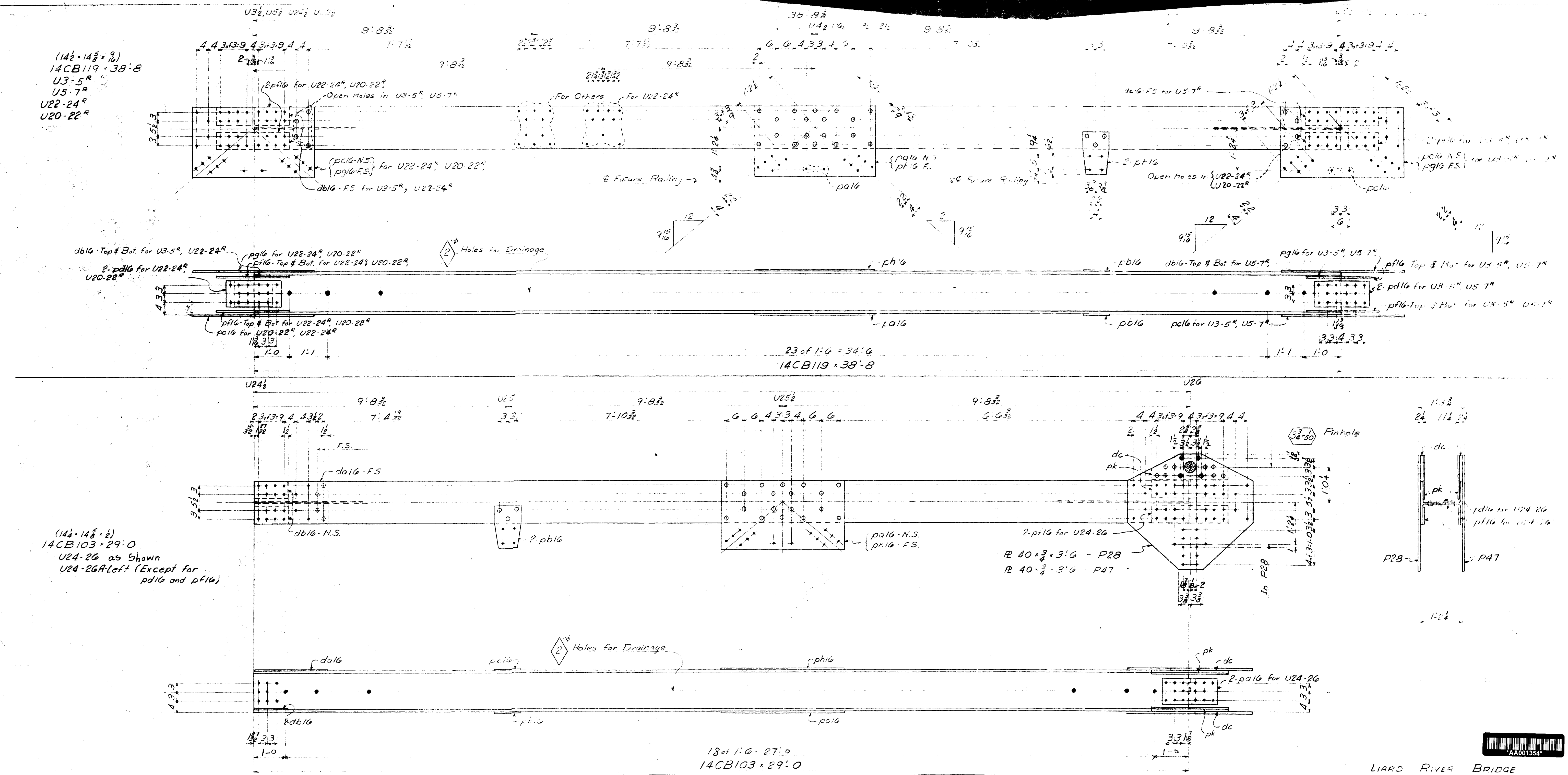
Cable Bent Posts

United States Steel Export Co. - XAB 7957 D

American Bridge Company

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Maloney
DRAW. MADE BY J.H.Y. DATE 1/15/43
DRAW. CHECKED BY E.E.T. DATE [illegible]

ORDER No. J31D SHEET No. 15



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1	2		TOP CHORDS U3-5R							
2	2		TOP CHORDS U3-5L					5212		
3	2		TOP CHORDS U5-7R				24×16×4-5			
4	2		TOP CHORDS U5-7L							
5		8	14CB119	38	8			4602	38'8	26
6	40	8	℞s 24 ⅜	3	6	pa16		214		5
7	40	8	℞s 24 ⅜	3	6	ph16				5
8	90	16	℞s 9 ⅜	1	2½	pb16		28		5
9	28	8	℞s 24 ½	3	6	pc16		286		5
10	28	8	℞s 24 ½	3	6	pg16				5
11	116	32	℞s 6 ½	2	1	pf16		45		5
12	92	16	℞s 9 ⅜	1	7	pd16		36		5
13	64	16	Fils 6 ⅛	1	0	db16		5		A
14		112	S.B.s ⅞"					19		A
15								5214		
16		2	TOP CHORDS U22-24R							
17		2	TOP CHORDS U22-24L							
18		2	TOP CHORDS U20-22R				24 … 4-5	5302		
19		2	TOP CHORDS U20-22L							
20										
21										
22		8	14CB119	38	8			46[illegible]	38'8	26
23		8	℞s			pa16				
24		8	℞s			ph16				
25		16	℞s			pb16				
26		8	℞s			pc16		286		
27		8	℞s			pg16				
28		32	℞s			pf16				
29		16	℞s			pd16		36		
30		8	Fils			db16	For U22-24L			
31		30	S.B.s ⅞"					9		A
32										
33			2 PLATES P47							
34			2 PLATES P28				×2×3-6	570		
35		4	℞s 40 ¾	3	6			357		5
36		4	Fils 9 ⅞	2	1	dc		56		5
37		4	℞s 16 ⅝	2	1	pk		71		A
38										
39								99		
40										
41										
42										
43										
44										
45										
46		2	TOP CHORDS U24-26				24×1…	3…		
47		2	TOP CHORDS U24-26A				" "	3263		
48		4	14CB103	29	0				58' Cut 27'0	28
49		4	℞s			pa16				
50		4	℞s			ph16				
51		8	℞s			pc16		2…		
52	20	4	Fils 14½ ¼	2	1½	da16				A
53		8	Fils			db16		5		
54		4	℞			pd16	For U24-26	36		
55		4	℞s			pf16	" "	45		
56		28	S.B.s ⅞"					7		A
57										
58										
59										
60										

Notes-
Main material over ¾" thick to be sub-punched 11/16" and reamed to 15/16" or drilled to 15/16"
Rivets - ⅞"
Holes - 15/16" Unless Noted.

PAINT: - Yes
CONTACT SURFACES: - No
SHOP

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D

Top Chords - Stiffening Trusses

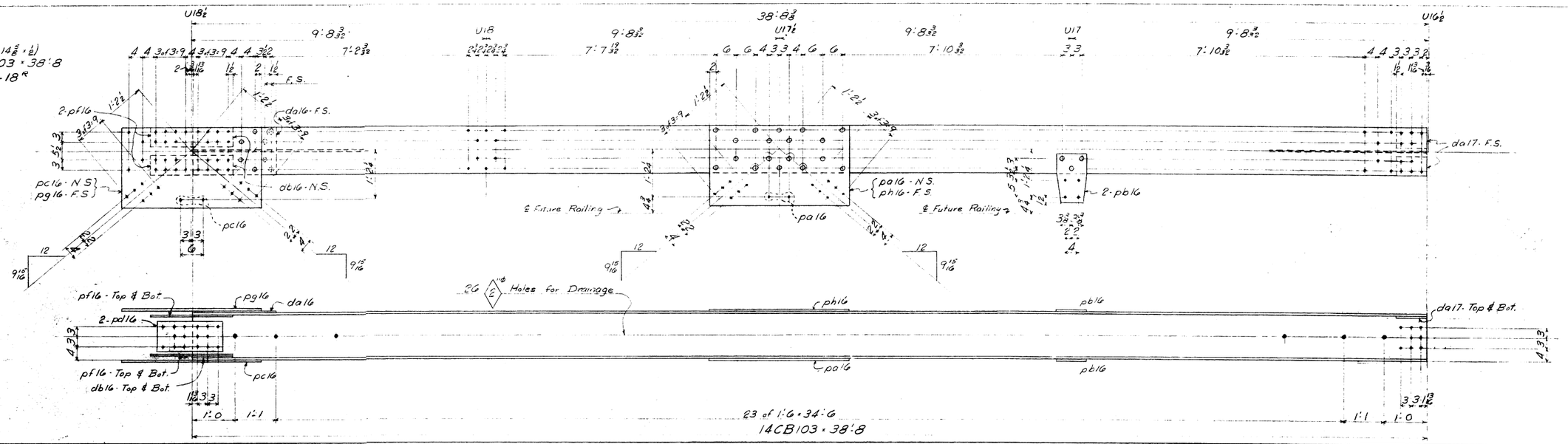
UNITED STATES STEEL EXPORT COMPANY
XAB-7957A

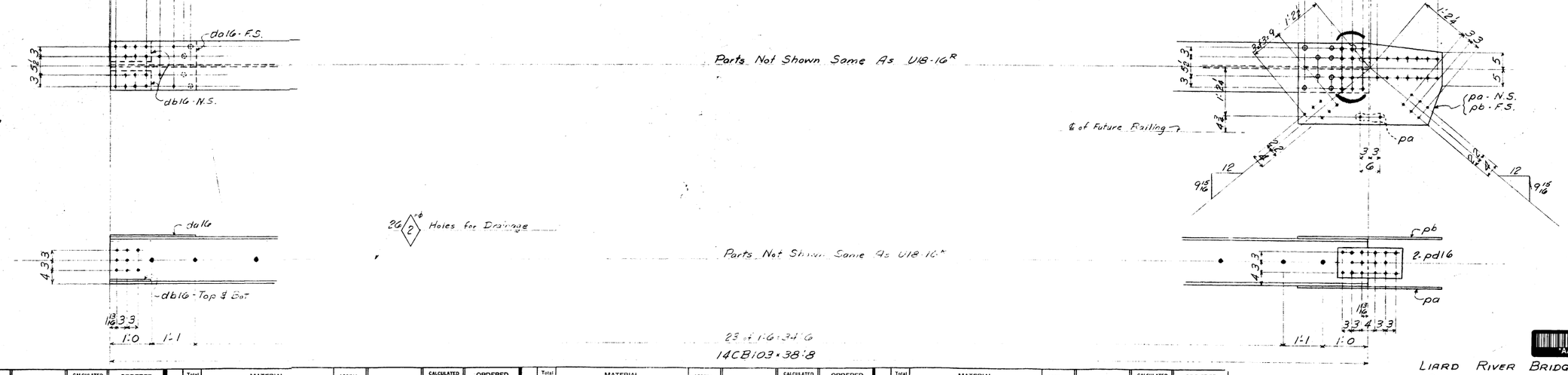
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.H. Minaneu
DRAW. MADE BY K.R.B. DATE 1-18-43
DRAW. CHECKED BY EBT- DATE 1-27-43

ORDER No. J31A

SHEET No. 16





LINE	Total No. of Pieces on the Order	MATERIAL: No. of Pcs. on Sheet	SHAPE	LENGTH: Feet	LENGTH: Inches	ASSEM-BLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED: ITEM
1		2	Top CHORDS			U16-18R			
2		2	Top CHORDS			U16-18L			
3		4	14CB103	38	8				
4		4	Pls	24	3	pa16			
5		4	Pls	24	3	ph16			
6		8	Pls	9	3	pb16			
7		4	Pls	24	3	pc16			
8		4	Pls	24	3	pg16			
9		16	Pls	6	2	pf16			
10		8	Pls	9	7	pd16			
11		4	Fils	14	4	da16			
12		8	Fils	6	10	db16			
13	16	8	Fils	6	9	da17			A
14		56	S.B.'s						A
15									
16		2	Top CHORDS			U7-9R			
17		2	Top CHORDS			U7-9L			
18		4	14CB103	38	8				
19		4	Pls			oa16			
20		4	Pls			ph16			
21		8	Pls			pb16			
22		8	Fils			da16			
23		4	Fils			oa16			
24		8	Pls			pd16			
25		4	Pls	24	3	pa			
26		4	Pls	24	3	pb			
27		32	S.B.'s						A
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
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Revised 2-3-43 (KRB)
Changed Rivs to open holes in gusset and 14CB138 at U9½.

Notes -
Main material over ¾" thick to be sub-punched 1⅛" ⌀ and reamed to 1 5/16" ⌀ or drilled to 1 5/16" ⌀
Rivets - ⅞" ⌀
Holes - 15/16" ⌀ Unless Noted

PAINT. - Yes
CONTACT SURFACES: - No SHOP

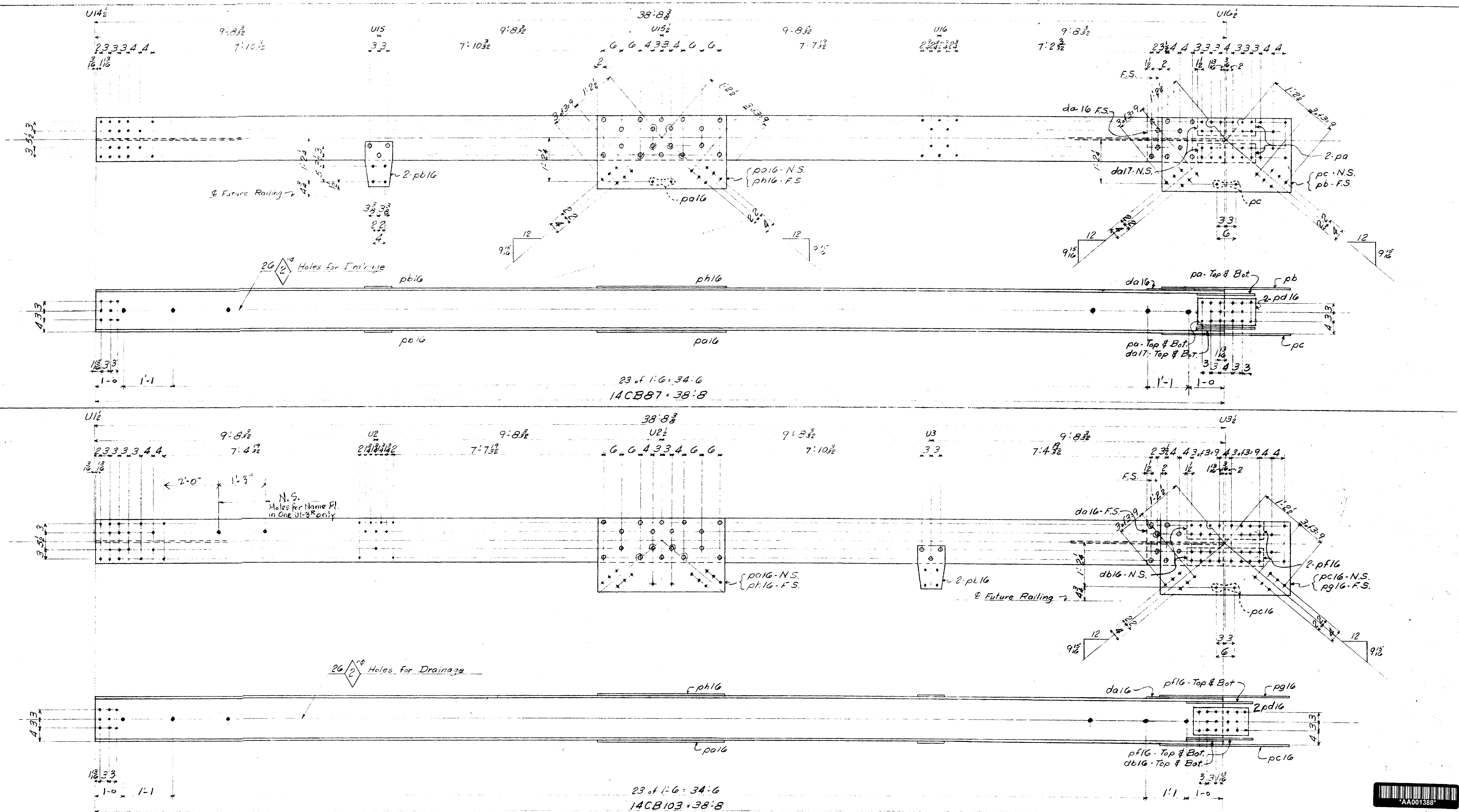
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
Top Chords - Stiffening Trusses
UNITED STATES STEEL EXPORT COMPANY
XAB 7957A

AMERICAN BRIDGE COMPANY
DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.B. Maloney
DRAW. MADE BY K.R.B. DATE 1-20-43
DRAW. CHECKED BY EET DATE 1-21-43

ORDER No. J31A
SHEET No. 17

Adv. B.11 page 11, 12

11



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE			LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1		2	Top Chords		U14-16R					4056		
2		2	Top Chords		U14-16L				24×15×40-5			
3		4	14CB87			38	8			[illegible]	38'-8	31
4		4	Pls	24	3/8	3	6	pa16		107		
5		4	Pls	24	3/8	3	6	ph16		107		
6		8	Pls	9	3/8	1	2½	pb16		28		
7		4	Pls	24	½	3	6	pc		[illegible]		S
8		4	Pls	24	½	3	6	pb	10	[illegible]		S
9		16	Pls	6	3/8	1	7	pa		48		S
10		4	Fils	14½	¼	2	1½	da16		[illegible]		
11		8	Fils	6	⅛		9	da17		4		
12		8	Pls	9	3/8	1	7	pd16		[illegible]		
13		40	S.B's	7/8"φ						[illegible]		A
14										[illegible]		
15												
16		2	Top Chords		U1-3R					[illegible]		
17		2	Top Chords		U1-3L				24×15×40-5			
18		4	14CB103			38	8			[illegible]	38-8	29
19		4	Pls					pa16		[illegible]		
20		4	Pls					ph16		[illegible]		
21		8	Pls					pb16		[illegible]		
22		4	Pls	24	½	3	6	pc16				
23		4	Pls	24	½	3	6	pg16		[illegible]		
24		16	Pls	6	½	2	[illegible]	pf16		[illegible]		
25		8	Fils	6	⅛	1	0	db16		5		
26		4	Fils	14½	¼	2	1½	da16		6		
27		8	Pls					pd16		[illegible]		
28		40	S.B's	7/8"φ								17
29										[illegible]		
30												
31												
32												
33												
34												
35												
36												
37												
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Note –
Main material over ¾" thick to be punched 11/16"φ and reamed 15/16φ or drilled 15/16φ

Notes –
Rivets – 7/8"φ
Holes – 15/16"φ Unless Noted

PAINT: – Yes
CONTACT SURFACES: – No
SHOP

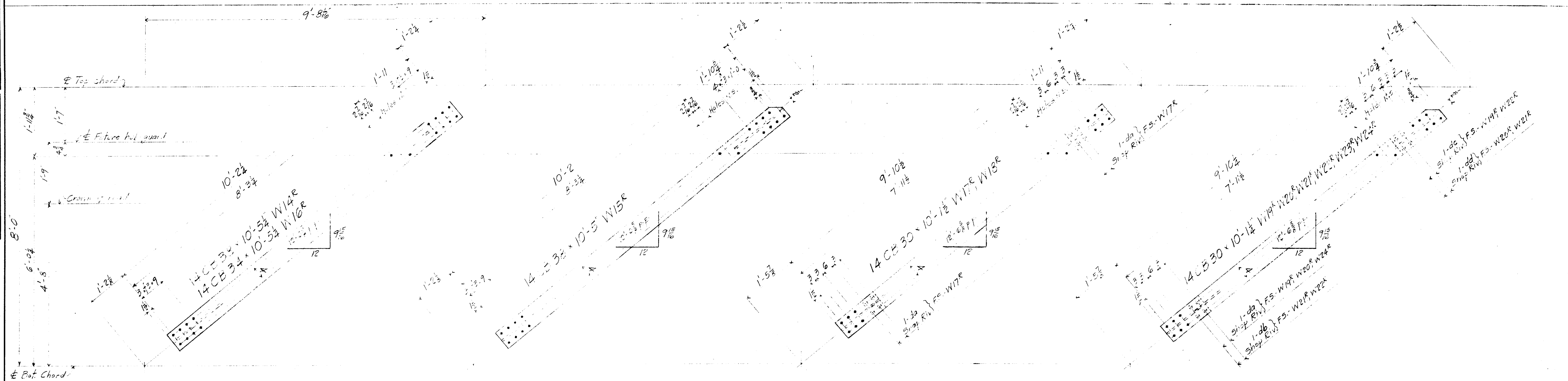
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE, SECTION D
Top Chords – Stiffening Trusses
UNITED STATES STEEL EXPORT COMPANY
XAB 7957A

1A-6-M-A260
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.B. Maloney
DRAW. MADE BY K.R.B. DATE
DRAW. CHECKED BY GDA / ECT DATE 1-26-43

ORDER No.	SHEET No.
J31A	18

AA001388



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1			14-DIAGONAL	W	14R			349		
2			14 "	W	14L		14x7x10-5			
3	28		14 CB 38	10	5 1/4			397	AA 4	39
4								2P	55 8	3 2
5										
6			2-DIAGONAL	W	15R			397		
7			2 "	W	15L					
8	4		14 CB 38	10	5		14x7x10-5	396	43 4	40
9								2P		
10										
11			8-DIAGONAL	W	16R			357		
12			8 "	W	16L		14x7x10-5			
13	16		14 CB 34	10	5 1/4			355		S
14								2P		
15										
16			2-DIAGONAL	W	17R			325		
17			2 "	W	17L		14x7x10-2			
18			2 "	W	18R			305		
19			2 "	W	18L		" "			
20		8	14 CB 30	10	1 1/2			304		S
21		8	Fil. 6 3/4 (1/4)	1	6	da	For W17R/L	17	W18R/L	S
22							321 3R		304	
23										
24										
25			14-DIAGONAL	W	19R			31[illegible]		
26			14 "	W	19L		14x7x10-1			
27			2 "	W	20R			324		
28			2 "	W	20L					
29			46 "	W	21R			342		
30			46 "	W	21L					
31			8-DIAGONAL	W	22R			322		
32			8 "	W	22L		14x7x10-1			
33			4 "	W	23R			303		
34			4 "	W	23L		"			
35			2 "	W	24R			314		
36			2 "	W	24L		"			
37		152	14 CB 30	10	1 1/4			303		S
38		36	Fil. 6 3/4 (1/4)	1	6	da	1 ea. W19R/L, W20R/L, W24R/L	9	10 Ordered 1P Revised	S
39										
40		108	Fil. 6 3/4 (1/2)	1	6	db	1 ea. W21R/L, W22R/L	17		S
41										
42		44	Fil. 6 3/4 (1/4)	1	9	dc	1 ea. W19R/L, W22R/L	10		S
43										
44		96	Fil. 6 3/4 (1/2)	1	9	dd	1 ea. W20R/L, W21R/L	20		S
45										
46										
47										
48										
49										
50										
51										
52										S
53										S
54										
55										S
56										
57			W19R W20R W21R W22R W23L W24R							S
58			322 33[illegible] 340 3[illegible] 303 312							
59										S
60										

REVISION: 2-2-43
Changed thickness of fillers, da and dc from 3/8" to 1/4", db and dd from 5/8" to 1/2".
C.M.N.

NOTES:
Rivets 7/8
Holes - 15/16

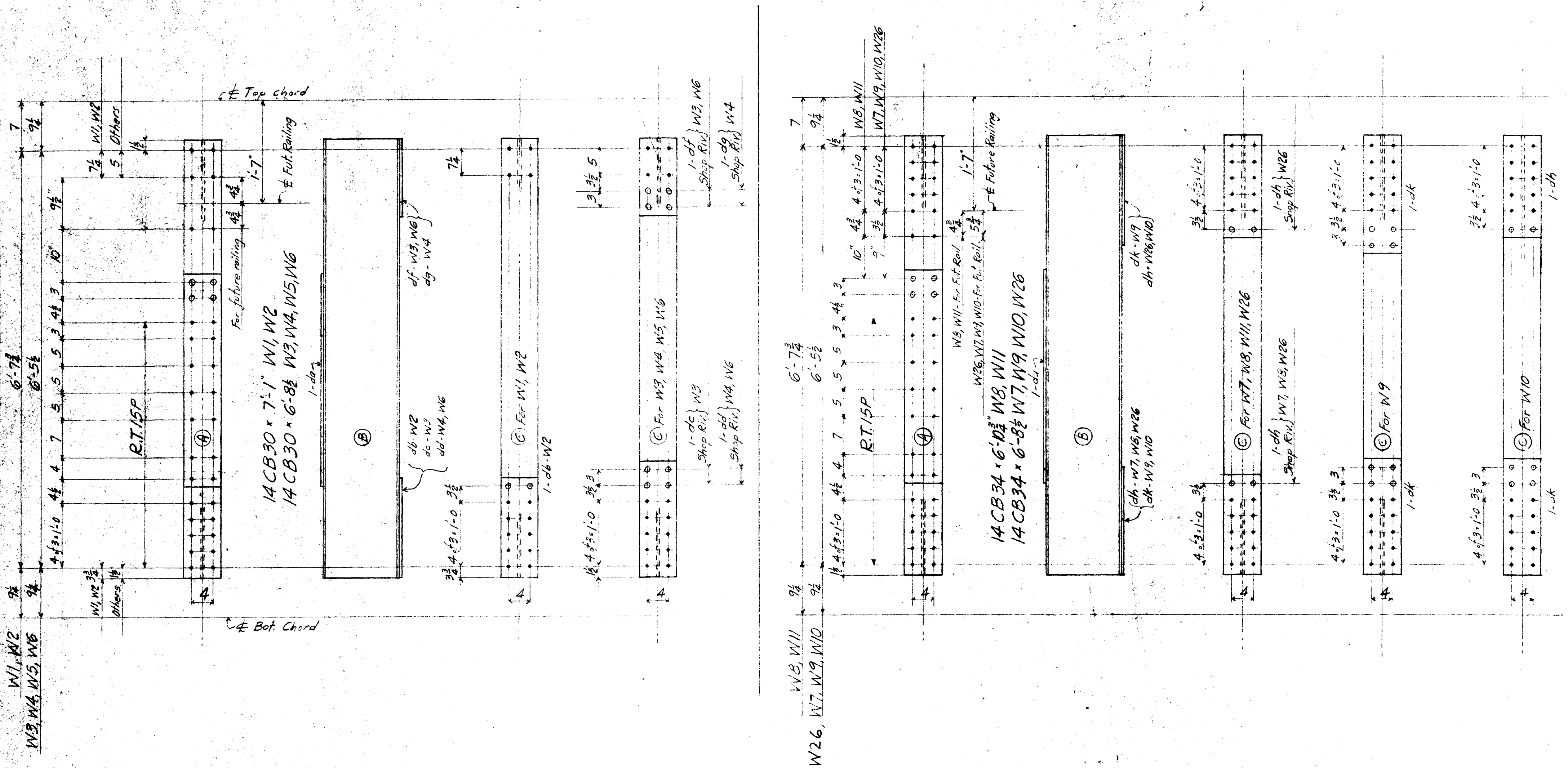
PAINT: Yes
CONTACT SURFACES: No
Shop

[illegible] River Bridge
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE, SECTION D
DIAGONALS
UNITED STATES STEEL EXPORT COMPANY
XA3-7957A

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.B. Malone[illegible]
DRAW. MADE BY C.M.N. DATE 1-16-43
DRAW. CHECKED BY TJK DATE 1-23-43

ORDER No. J31-A
SHEET No. 19



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL: SHAPE	LENGTH: Feet	LENGTH: Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1			4-VERTICAL W1					258		
2			8- " W2				14X8X7-1	264		
3		12	14CB30	7	1			212		S
4	98	12	Fil. 6¾ ½	3	3½	da		38	1P 1R	A
5		8	Fil. 6¾ ¼	1	8¾	db	W2 / 260	10		S
6						W1 / 250				
7										
8										
9			12-VERTICAL W3					258		
10			20 " W4					278		
11			4 " W5				14X7X6-9	240		
12			4 " W6					271		
13		40	14CB30	6	8½			201		S
14		12	Fil. 6¾ ¼	1	9½	dc	W3	10		S
15		24	Fil. 6¾ ½	1	9½	dd	1ea.-W4, W6	21		S
16		16	Fil. 6¾ ¼	1	2½	df	1ea.-W3, W6	7		S
17		20	Fil. 6¾ ½	1	2½	dg	W4	14		S
18		40				da		38		
19							W-3 W4 W5 W6 / 256 274 239 267		1P 1R	
20										
21			4-VERTICAL W8				14X7-6-11	280		
22			4- " W11					275		
23		8	14CB34	6	10¾			235		S
24		8				da		38		
25	26	4	Fil. 6¾ ⅛	1	6½	dh	W8 W11	4		S
26							277			
27							1P 1R / 2R 1R			
28										
29										
30										
31			4-VERTICAL W7					272		
32			20 " W9					302		
33			10 " W10					290		
34			4 " W26					278		
35		38	14CB34	6	8½		16X9X6-9	228		S
36		38				da		38		
37		22				dh	1ea.-W7, W10 / 2ea.-W26	4		
38		50	Fil. 6¾ ⅜	1	9½	dk	2ea.-W9 / 1ea.-W10	16		S
39										
40							W7 W9 W10 W26 / 270 297 285 275			
41							1R 1P 1R			
42										
43										
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REVISION: 2-2-43
Changed thickness of fillers, dc and df from ⅜" to ¼", dd and dg from ⅝ to ½, dh from ¼ to ⅛, and dk from ½ to ⅜.
C.M.N.

NOTES:-
Rivets - ⅞"φ
Holes - 15/16"φ
Holes marked R.T. to be punched or drilled 11/16"φ and reamed to 15/16"φ to a metal templet.

PAINT: Yes
CONTACT SURFACES: No
SHOP

AA001335

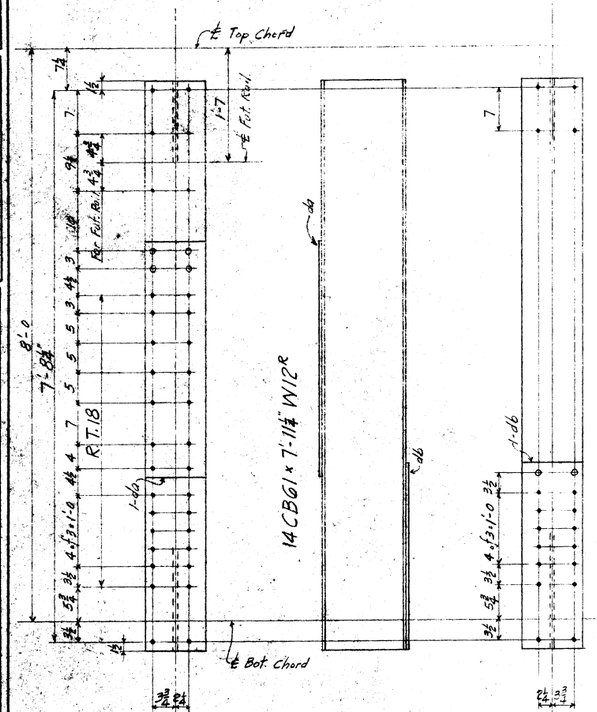
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE, SECTION D
VERTICALS

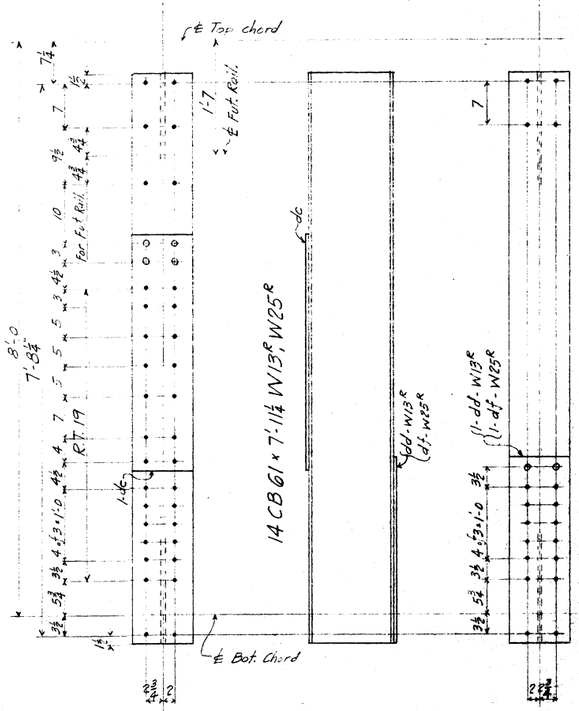
UNITED STATES STEEL EXPORT COMPANY
XAB-7957A

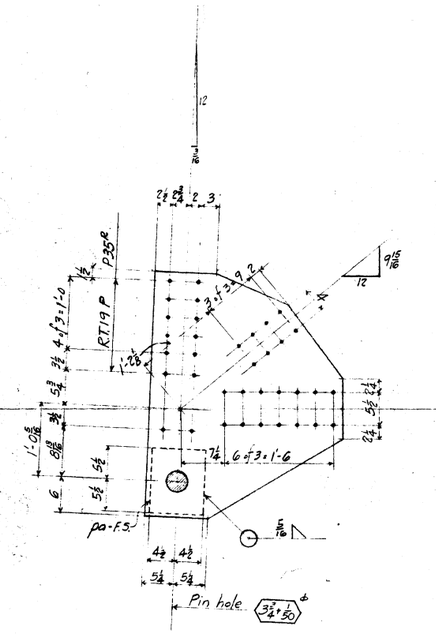
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.B. Maloney
DRAW. MADE BY C.M.N. DATE 1-18-43
DRAW. CHECKED BY TJK DATE 1-23-43

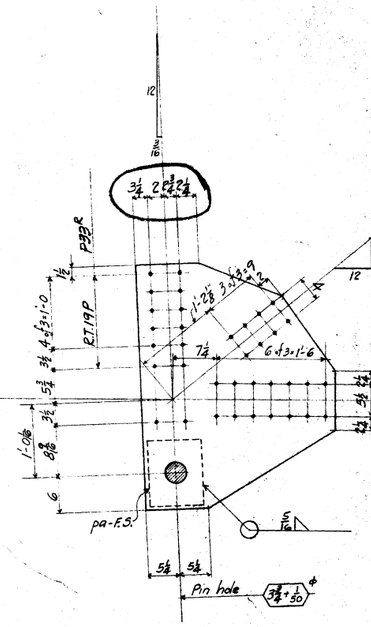
ORDER No. J31-A
SHEET No. 20







Pl. 32 × ½ × 3'-5 5/16" P35R, P36R



Pl. 32 × ½ × 3'-4 13/16" P33R, P34R

Pin-holes should be bored through two plates bolted together as noted below.
P33R with P34L - Ship together
P33L with P34R - Ship together
P35R with P36L - Ship together
P35L with P36R - Ship together

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEM-BLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED ITEM
1			2-VERTICAL		W12R				
2		2	"		W12L		15X10X3-11		
3		4	14 CB61	7	11½				
4		4	Fil.	10	½ 3	3½	dd		A
5		4	Fil.	10	½ 2	7½	dd		5
6									
7									
8			2-VERTICAL		W13R				
9		2	"		W13L		15X10-7-11		
10		4	14 CB61	7	11½				5
11	3	4	Fil.	10	½ 3	3½	dc		A
12		4	Fil.	10	½ 2	7½	dd		5
13									
14									
15									

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEM-BLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED ITEM
16			2-VERTICAL		W25R				
17		2	"		W25L		15X10X7-11		
18		4	14 CB61	7	11¼				5
19		4				dc			
20		4	Fil.	10	⅛ 2	7¼	dd		5
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEM-BLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED ITEM
31			2-GUSSET		P33R				
32		2	"		P33L		32Y2Y5-5		
33		2	"		P34R				
34		2	"		P34L				
35	8	Pl.	32	½ 3	3 4 13/16		Weld		S
36	16 8	Pl.	9	⅞	11	pa	"		S
37									
38			2-GUSSET		P35R				
39		2	"		P35L		32Y2Y5-5		
40		2	"		P36R				
41		2	"		P36L				
42	8	Pl.	32	½ 3	5/16		Weld		S
43	8	Pl.				pa	"		
44									
45									

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEM-BLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED ITEM
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

Revised 2-1-43
Changed dimensions
2¾, 2¾, 2¾ at Top of P33R
P34R to 3¾, 2, 2¾, 2¾ respectively.
C. M. N.

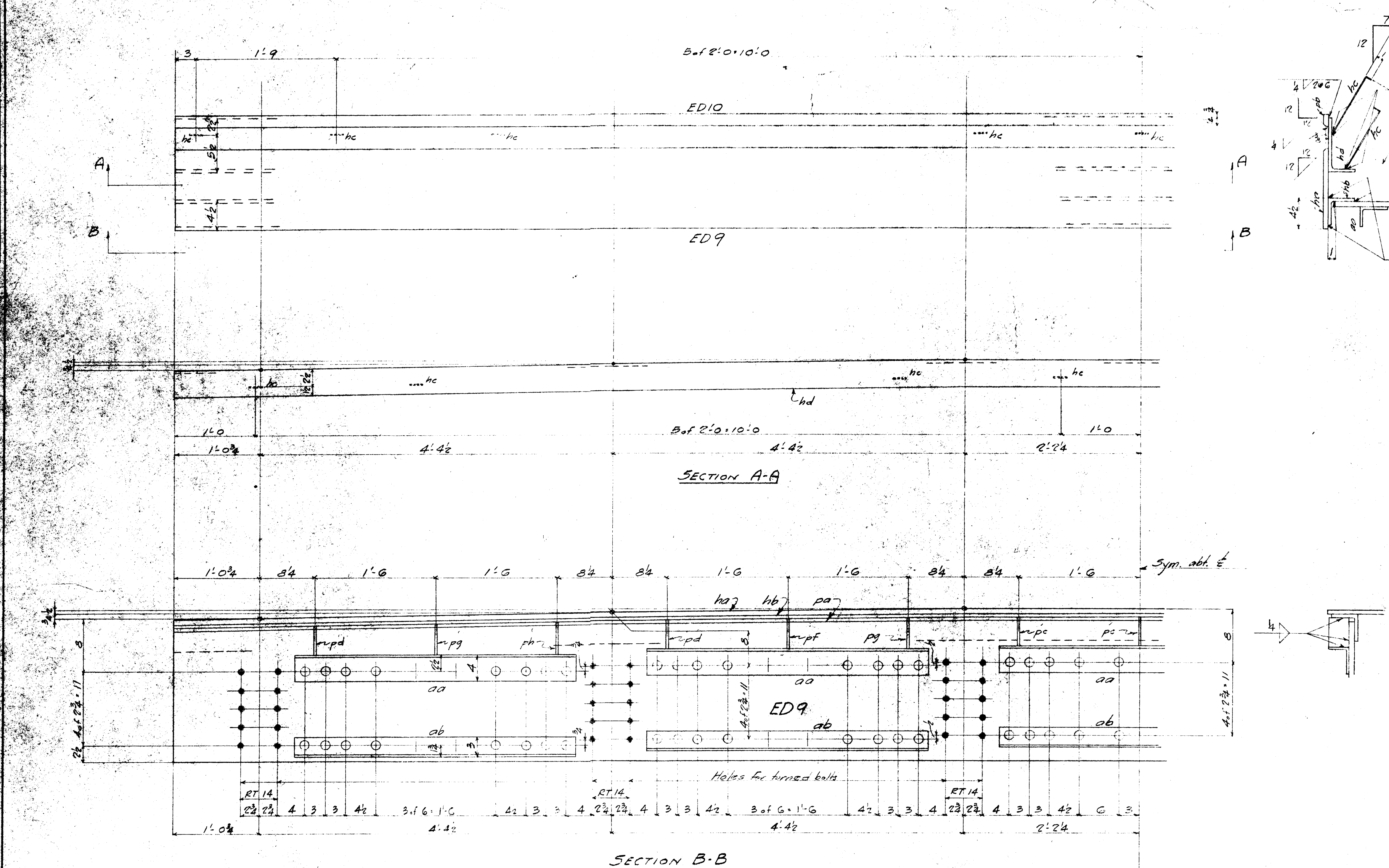
NOTES:-
Rivets - ⅞" ϕ
Holes - 13/16" unless noted.
Weld as noted.
Holes marked R.T. to be punched or drilled 11/16" and reamed to 13/16" to a metal templet.
PAINT. Yes
CONTACT SURFACES: No SHOP

AA001334

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
VERTICALS, GUSSETS
UNITED STATES STEEL EXPORT COMPANY
XAB-7957A
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.B. Maloney
DRAW. MADE BY C.M.N. DATE 1-14-43
DRAW. CHECKED BY T.J.K. DATE 1-21-43

ORDER No. J31-A
SHEET No. 21



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1			2 END DAMS				ED9	weld		
2							23x12x24-0	2701		
3		2	Pls 12 ¾	24	0	ha	bevelled	734		S
4		2	Ls 4 4 ½	24	0	hb		307		S
5		2	Pls 21 ¾	24	0	pa		1285		S
6		10	Ls 4 3 ⅜	3	6	aa				S
7		10	Ls 4 3 ⅜	3	6	ab		298		S
8		6	Bars 3 ½		4⅜W	pc				A
9		8	Bars 3 ½		4¼W	pd				
10		4	Bars 3 ½		4⅜W	pf		28		
11		8	Bars 3 ½		4½W	pg				
12		4	Bars 3 ½		4¾W	ph				
13								265 P		
14								3 R		
15								3 T		
16			2 END DAMS				ED10 weld	634		
17							15x9x24-0			
18		2	Ls 8 4 ½	24	0	hd		470		S
19		50	Bars 2 ¼		11	hc		39		S
20		2	Bars 2 ¾	24	0	pb	bevelled	122		S
21								631		
22								3 P		
23										
24										
25										
26										
27										
28										
29										
30										
31–60										

27

NOTES:-
Rivets: ⅞"ø
Holes: 15/16"ø unless noted.
Holes marked RT to be punched 11/16"ø and reamed to 15/16"ø to a metal template
PAINT: Yes
CONTACT SURFACES: No
SHOP

AA001333

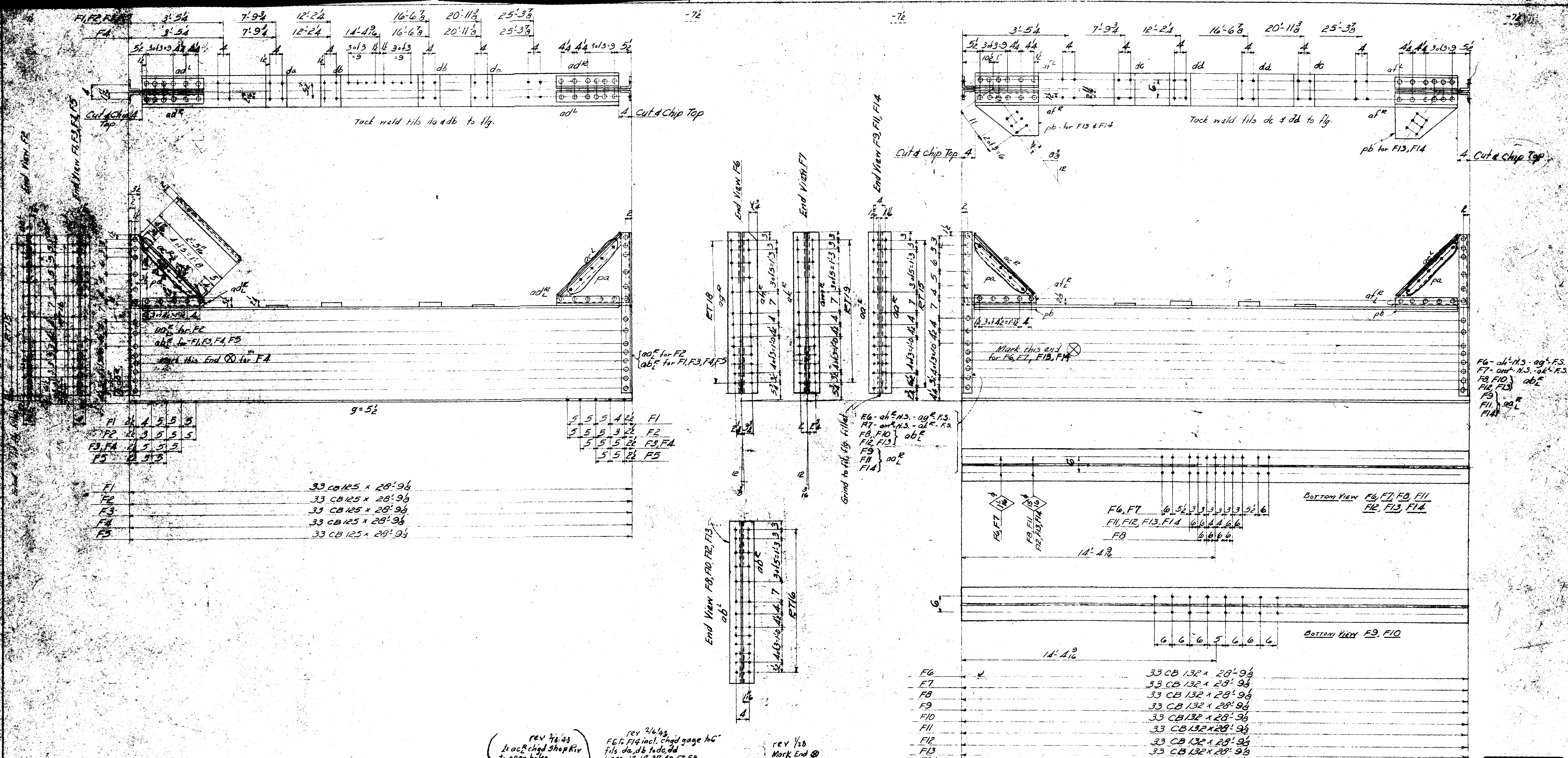
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECT. D.
ABUTMENT END DAMS
United States Steel Export Co.
XAB-7957 A

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF EBMALONEY
DRAW. MADE BY CWZ DATE 1-20-43
DRAW. CHECKED BY TJK DATE 1-27-43

ORDER No. J31 A | SHEET No. 22

2139-SF
12



rev 2/8/43 Ls ac^R_L chgd Shop Riv to open holes Add S.B lines 18, 41, 54

rev 2/6/43 F6 to F14 incl. chgd gage to 6" fils. da, db to dc, dd lines 13, 14, 39, 40, 52, 53

rev 1/28 Mark End ⊗ For F13, F14

Line	Total No. of Pieces on the Order	No. of Pcs. on Sheet	Shape	Length Feet	Length Inches	Assembling Mark	Remarks	Calculated Weight for One Ship. Piece	Ordered	Item
1			4 FLOOR BEAMS F1				58 × 12 × 28-9	4120		
2			6 FLOOR BEAMS F2					4120		
3			8 FLOOR BEAMS F3							
4			6 FLOOR BEAMS F4					4120		
5			2 FLOOR BEAMS F5							
6		26	33 CB 125	28	9⅛		26c	3579	28'-8½	14
7	74	40	Ls 3½ 3½ ½	4	7	ab^R	F1, F3, F4, F5	203		S
8	74	40	Ls			ab^L				S
9	24	12	Ls 3½ 3½ ½	4	8½	ao^R	for F2	201		S
10	24	12	L			ao^L				S
11		52	Ls 4 3½ ½	1	8½	ad^R		81		A
12		52	Ls			ad^L				A
13		52	fils 7 ¾		11½	da		34		S
14		52	fils 7 1¼		11½	db		57		S
15	110	52	Ps 24 $\frac{9}{16}$	2	0	pa	92c	184		S
16	55	26	Ls 3½ 2 ½	2	3¾	ac^R	2c	51	3½ 3½	S
17	55	26	Ls			ac^L	6c			S
18		104	SB ⅞				F1 F3 F4 F5 4199	F2 4206		
19							126c	125c		
20							40 4	80	26 R	
21			2 FLOOR BEAMS F6				58 × 15 × 28-9	4368		
22			4 FLOOR BEAMS F7					4337		
23			5 FLOOR BEAMS F8					4322		
24			2 FLOOR BEAMS F9					4328		
25			2 FLOOR BEAMS F10					4322		
26			2 FLOOR BEAMS F11					4328		
27			6 FLOOR BEAMS F12					4322		
28		23	33 CB 132	28	9⅛		26c	3790	28'-8½	13
29		4	Ls 5 3½ ½	4	7	2-ag^R 2-ag^L	for F6	219		A
30		4	Ls 5 3½ ½	4	7	2-ah^R 2-ah^L	for F6			A
31		8	Ls 4 3½ ½	4	7	4-am^R 4-am^L	F7	218		S
32		8	Ls 4 3½ ½	4	7	4-ak^R 4-ak^L	F7			S
33		52	Ls			26-ab^R 26-ab^L	F8, F10, F12	203		
34		16	Ls			8-ao^R 8-ao^L	F9, F11	204		
35										
36	58 58	92	Ls 4 3½ ½	1	8½	46-af^R 46-af^L		81		S
37		46	Ps			pa	F6 F7 4446 4915	184	c 97 c 6	
38		46	Ls			23-ac^R 23-ac^L		51		
39	58	46	fils 7 ¾		11½	dc	F8 F10 F12 4400	34		S
40	58	46	fils 7 1¼		11½	dd		57		S
41		92	SB ⅞				F9 F11 4406		126c	
42			4 FLOOR BEAMS F13				58 × 24 × 28-4	4379		
43			2 FLOOR BEAMS F14					4385		
44		6	33 CB 132	28	9⅛		26c	3790	28'-8½	13
45		16	Ls			8-ab^R 8-ab^L	F13	203		
46		8	Ls			4-aq^R 4-aq^L	F14	209		
47										
48		12	Ps 16 ⅜	1	6½	pb	13c	70		S
49		24	Ls			12-af^R 12-af^L		81		
50		12	Ps			pa	92c	184		
51		12	Ls			6-ac^R 6-ac^L	2c 6c	51		
52		12	fils			dc		34		
53		12	fils			dd		57		
54		24	SB ⅞				F13 F14 4470 4476			
55										
56										
57										
58							129			
59									28'-8½	13
60										

Rev 1-26-43
Cope of Top Flg. chgd to Cut and chip
Added lines 39, 40, 52, 53 in bill
Chgd Ls ac^R_L from 3 × 2 × ⅜ to 3½ × 2 × ½
chgd gage from 1¾ to 2¼

End Conn. Ls to be square and true and to exact length.

Holes marked RT to be punched or drilled $\frac{11}{16}$ ⌀ and reamed to $\frac{15}{16}$ ⌀ to a metal templet.

Holes in main material over ¾" thick to punched $\frac{11}{16}$ ⌀ and reamed $\frac{15}{16}$ ⌀ or drilled $\frac{15}{16}$ ⌀

RIVETS - ⅞ ⌀
HOLES - $\frac{15}{16}$ ⌀ Unless Noted

PAINT: Yes
CONTACT SURFACES: No
SHOP

AA001332

LOWER LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE-SECT. D
FLOOR BEAMS

UNITED STATES STEEL EXPORT COMPANY
XAB-7957A

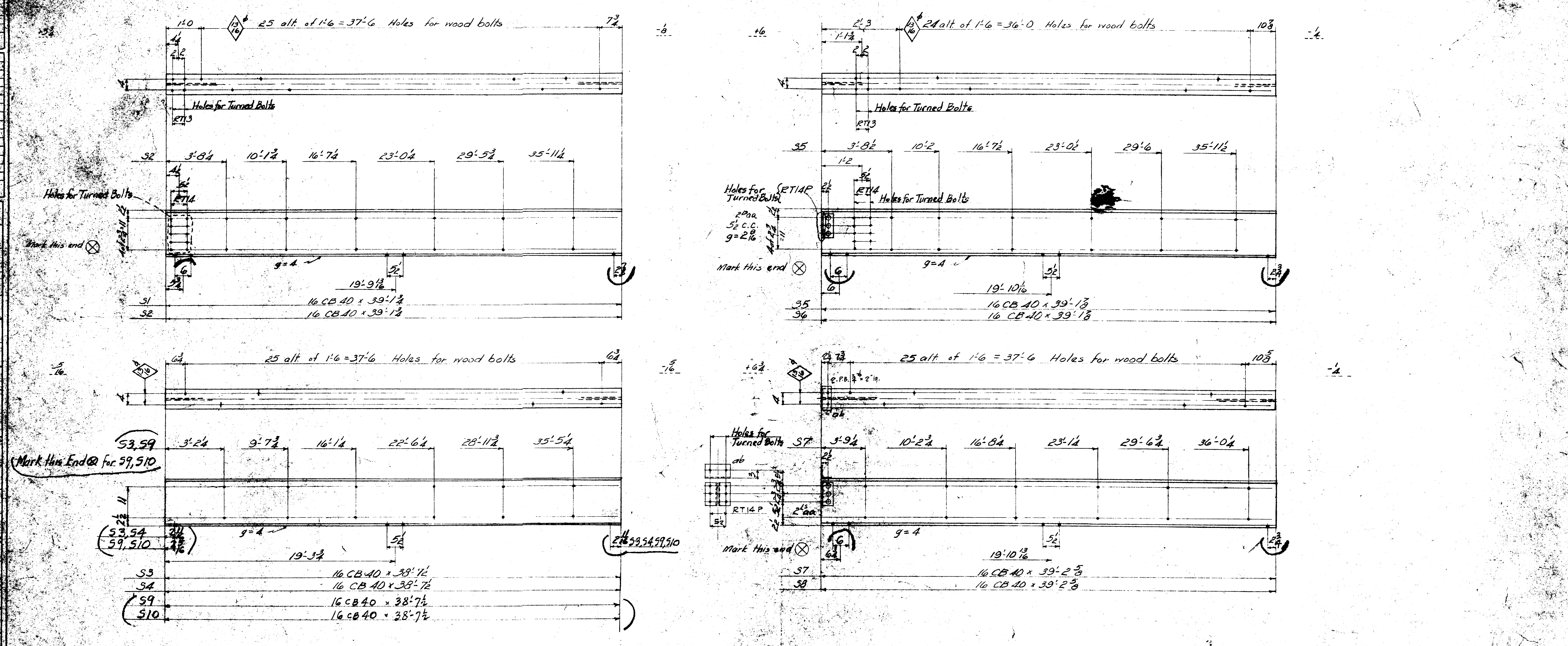
AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Malonay
DRAW. MADE BY GUR DATE 1-18-43
DRAW. CHECKED BY EET DATE 1-23-43

ORDER No. 131A
SHEET No. 23

Advanced Bill Sh. 2

2139-825



Line	Total No. of Pieces on the Order	No. of Pcs. on Sheet	Shape	Length Feet	Length Inches	Assembling Mark	Remarks	Calculated Weight for One Ship. Piece	Ordered	Item
1			8 STRINGERS S1					1574		
2			4 STRINGERS S2				[illegible]			
3		12	16 CB 40	39	1 3/4			1566	39'-1 3/4	21
4										
5										
6			36 STRINGERS S3 - 4 STRINGERS S9					1553		
7			72 STRINGERS S4 - 8 STRINGERS S10				[illegible]		27-	5
8		120	16 CB 40	38	7 1/2			1545	38'-7 1/2	22
9										
10										
11										
12										
13										
14										
15										

Line	Total No. of Pieces on the Order	No. of Pcs. on Sheet	Shape	Length Feet	Length Inches	Assembling Mark	Remarks	Calculated Weight for One Ship. Piece	Ordered	Item
16			4 STRINGERS S5					1598		
17			8 STRINGERS S6							
18		12	16 CB 40	39	1 7/8			1566	39'-1 3/4	21
19	48	24	Ls 4 4 3/8		8 1/2	aa		18		A
20								1584		
21										
22			4 STRINGERS S7							
23			8 STRINGERS S8					1600		
24		12	16 CB 40	39	2 5/8			1566	39'-1 3/4	21
25		24	Ls			aa		18		
26		12	L 5 3 1/2 3/8		8 1/2	ab		7		A
27		24	P.B. 3/4		2		HHN	1		A
28								1592 7/8		
29										
30								1600		

Rev. 2/1/43 Spec. Bot. Flg. added S9, S10

Rev. 1-26-43 Size of holes in webs changed

Rev. 1-27-43 Added L ab to S7 & S8 chkd EET Line 26 & 27 in bill.

NOTES:
Holes marked RT to be punched 11/16 ϕ and reamed 13/16 ϕ to a metal templet.

Rivets - 7/8 ϕ
Holes - 15/16 ϕ Unless Noted

PAINT: Yes
CONTACT SURFACES: No
SHOP

LOWER

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE-SECT. D
STRINGERS

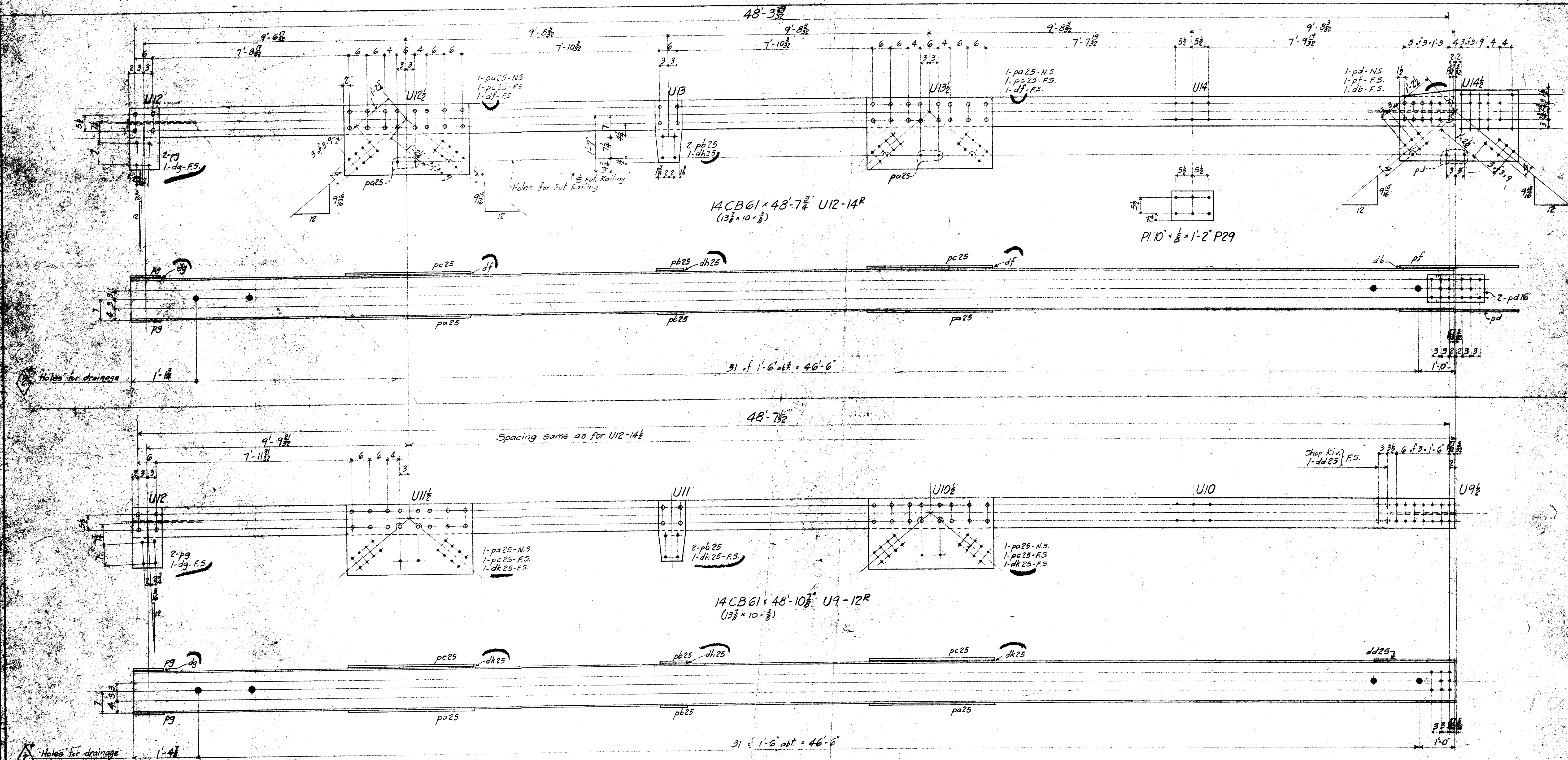
UNITED STATES STEEL EXPORT COMPANY
XAB-7957A

AMERICAN BRIDGE COMPANY
DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF Maloney
DRAW. MADE BY GUR DATE 1-19-43
DRAW. CHECKED BY EET DATE 1-23-43

ORDER No. J31A
SHEET No. 24

Advance Bill sh. 2

[illegible]-8 5 H[illegible]



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE				LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1			2-TOP CHORD				U12-14R			24×15×60-5	4045		
2			2	"		"	U12-14L						
3		4	14 CB61				48	7¾			2967	ord 49-6 cut 48'-7¾	33
4	20	8	Pl.		24	½	3	6	pa25		286		S
5	20	8	Pl.		24	½	3	6	pc25	SC	286		S
6	24	8	Pl.		9	⅜	1	8¾	pb25		40		S
7		4	Pl.		24	½	3	3½	pd		134		S
8		4	Pl.		24	½	3	3½	pf		134		S
9	16	8	Pl.		10	⅜	1	6	pg		38		A
10		8	Fil.		10	(¼)	3	6	df		60		A
11		4	Fil.		10	⅜	1	6 5/16	db		7		A
12		8	Pl.		9	⅜	1	7	pd16		36		
13	8	4	Fil.		10	⅜		10	dg	←	4		A
14	8	4	Fil.		10	⅜		9	dh25	←	5		A
15		8	S.B.		⅞" ϕ					←	2	3997	A

5
3992
20 P
33 R

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE				LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
16			2-TOP CHORD				U9-12R			24×15×48-11	3807		
17			2-	"		"	U9-12L						
18		4	14 CB61				48	10⅞			[illegible]	Ord. 49'-6 Cut 48'-10⅞	33
19		8	Pl.						pa25		286		
20		8	Pl.						pc25		286		
21		8	Pl.						pb25		40		
22		8	Pl.						pg		38		
23	12	8	Fil.		10	(⅜)	3	6	(dk25)		89		A
24	8	4	Fil.		10	⅜	2	3 13/16	dd25		30		A
25		4	Fil.						dg	←	4	3757 / 148 / 268	
26													
27			8-SHIMS-P29										
28		8	Pl.		10	⅛	1	2			5		A
29													
30													

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	MATERIAL SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										

REVISION: 2-3-43
Made numerous changes on U12-14R and U9-12R
C.M.N

NOTES:-
Rivets - ⅞"ϕ
Holes - 15/16"ϕ unless noted.

PAINT: Yes
CONTACT SURFACES: No
SHOP

AA001330

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D.
TOP CHORDS

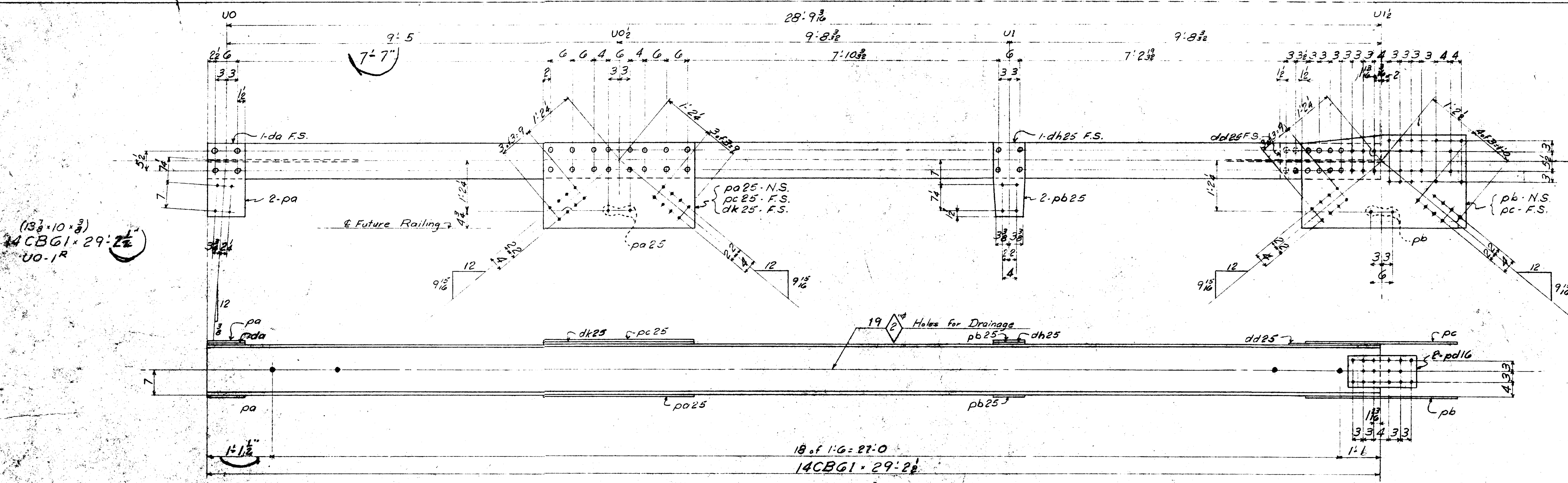
UNITED STATES STEEL EXPORT COMPANY
XAB-7957A

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.B. Maloney
DRAW. MADE BY C.M.N. DATE 1-22-43
DRAW. CHECKED BY E.E.T. DATE 1-28-43

ORDER No. J31-A
SHEET No. 25

2139-84



Rev 2/17/43
29'-2¼ ch'gd to 29'-2¼
7'-6¾ " " 7'-7"
1'-1¼ " " 1'-1½

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE			LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1		2	Top	Chords	U0-1R					2637		
2		2	Top	Chords	U0-1L				26×15×34			
3		4	14CBG1			29	2¼			1782	Ord 30-0 Cut 29'-2¼	36
4		8	Pls	10	3/8	1	9	pa		45		A
5		8	Pls	9	3/8	1	8¾	pb25		40		
6		4	Fils	10	3/8	2	3 13/16	dd25		30		
7		4	Pls	24	½	3	6	pa25		143		
8		4	Pls	24	½	3	6	pc25		143		
9		4	Pls	26	½	3	9	pb		166		A
10		4	Pls	26	½	3	9	pc		166		A
11		8	Pls	9	3/8	1	7	pd16		36		
12		4	Fils	10	3/8	3	6	dk25		45		
13		4	Fils	10	1/8		10	da		4		A
14		4	Fils	10	1/8		9	dh25		3		
15		8	S.B.'s	7/8" ϕ						2		A

2605 c
5 c
1606 3 P

Revised 2-3-43 KRB
Added dh25, da
Changed dc25 to dk25
Changed Rivs. to open holes in pb, pc and 14CBG1

Note~
Rivets - 7/8" ϕ
Holes - 15/16" ϕ Unless Noted

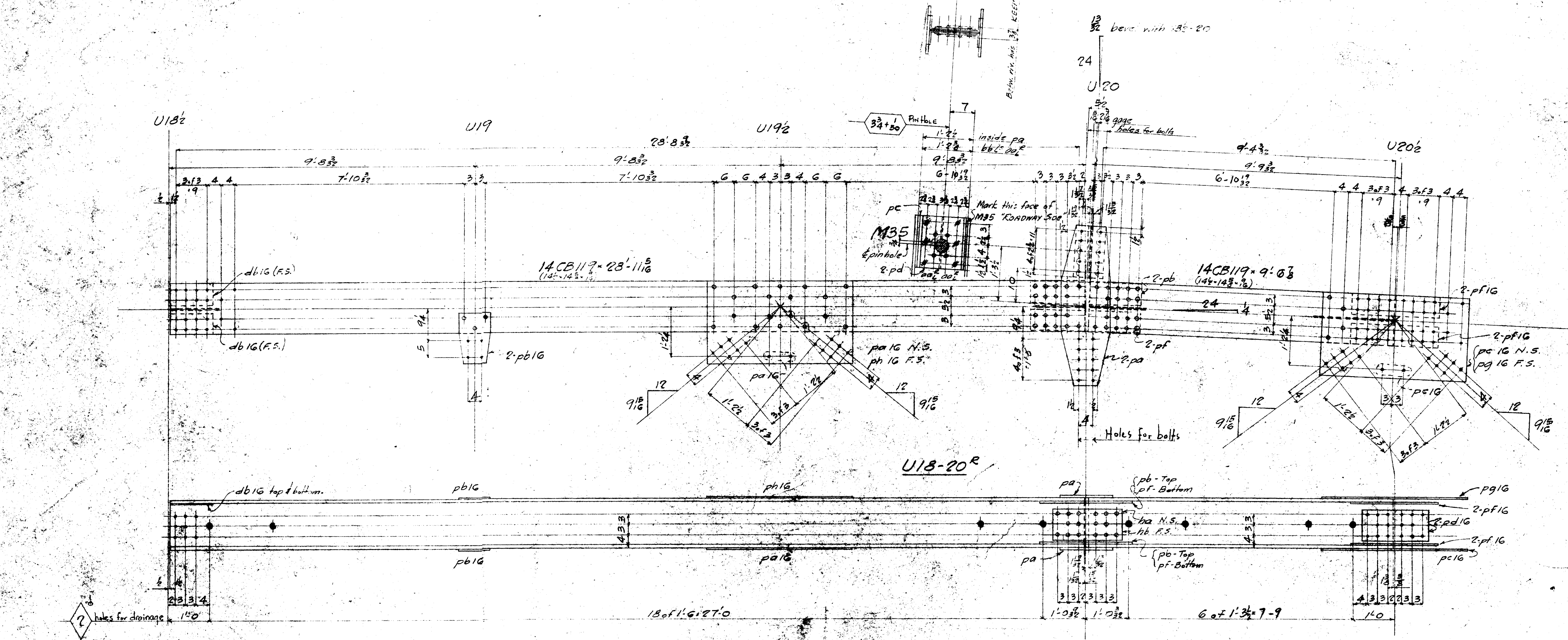
PAINT: - Yes
CONTACT SURFACES: - No
SHOP

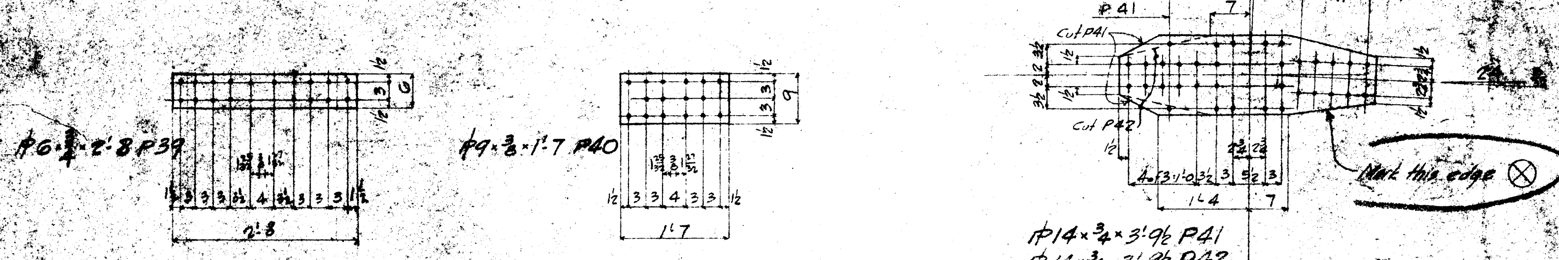
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
Top Chords - Stiffening Trusses
UNITED STATES STEEL EXPORT COMPANY
XAB 7957A

AMERICAN BRIDGE COMPANY
DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF E.B. Maloney
DRAW. MADE BY K.R.B. DATE 1-22-43
DRAW. CHECKED BY E.E.T. DATE 1-25-43

ORDER No. J31A
SHEET No. 26

2139-86





NOTE:-
Plates P39, P40, P41 and P42 are not to be used when bridge is first erected, but are to be stored at the bridge site until timber deck is replaced by concrete.

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1			2 Top Chords			U18-20R		[illegible]		
2			2 Top Chords			U18-20L				
3							4½ × 16 × 40-6			
4		4	CB 14 · 119	23	11 5/16		cut together	3445	ord 38'-7½ cut 28'-11⅝	27
5		4	CB 14 · 119	9	6 7/8			1139	ord 38'-7½ cut 9'-6⅞	27
6		8	Ps 9 × 3/8	1	2½	pb 16		28		
7		4	Ps 24 × 3/8	3	6	pa 16		107		
8		4	Ps 24 × 3/8	3	6	ph 16		107		
9		4	Ps 24 × ½	3	6	pc 16		143		
10		4	Ps 24 × ½	3	6	pg 16		143		
11		8	Ps 9 × 3/8	1	7	pd 16		37		
12		16	Bars 6 × ½	2	1	pf 16		85		
13		4	Ps 9 × 3/8	1	8	ha		19		S
14		4	Ps 9 × 3/8	[illegible]	8	hb		19		S
15		8	Bars 6 × [illegible]	2	9	pb	3c	84		A

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
16		8	Bars 6 × 3/4	2	9	pf		47		A
17		8	Ps 15 × 3/4	3	9½	pa	5 2c	110		S
18		56	S.B. 7/8					13		A
19		8	Bars 6 × 3/8	1	0	db16		5	5748, 55	
20									5690, 28 R	
21		16	Bars 6 × 3/4	2	8		P39	41		A
22										
23		8	Ps 9 × 3/8	1	7		P40	18		S
24										
25		4	Ps 14 × 3/4	3	9½		P41	135	13 C P	S
26										
27		4	Ps 14 × 3/4	3	9½		P42	135	19 C P	S
28										
29										
30										

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
31			4 Pieces			M35		180		
32							14 × 9 × 1-2			
33		4	Ps 14 × 5/8	1	2	pc	web	35		S
34		8	Ps 12 × 5/8	1	2	pd		59		S
35		8	Ls 7 × 4 × ½	1	2	aaR		84		S
36		8	Ls			aaL				S
37								178		
38										
39										
40										
41										
42										
43										
44										
45										

LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										

Rev. 2-1-43 CWZ
Changed edge distances and lengths of main material of U18-20, lines 4 & 5 in shop bill
chkd EET.

Rev. 2-4-43
P41, P42
Omit 4 Holes

Rev. 2-26-43
⊗ added to P41, P42.

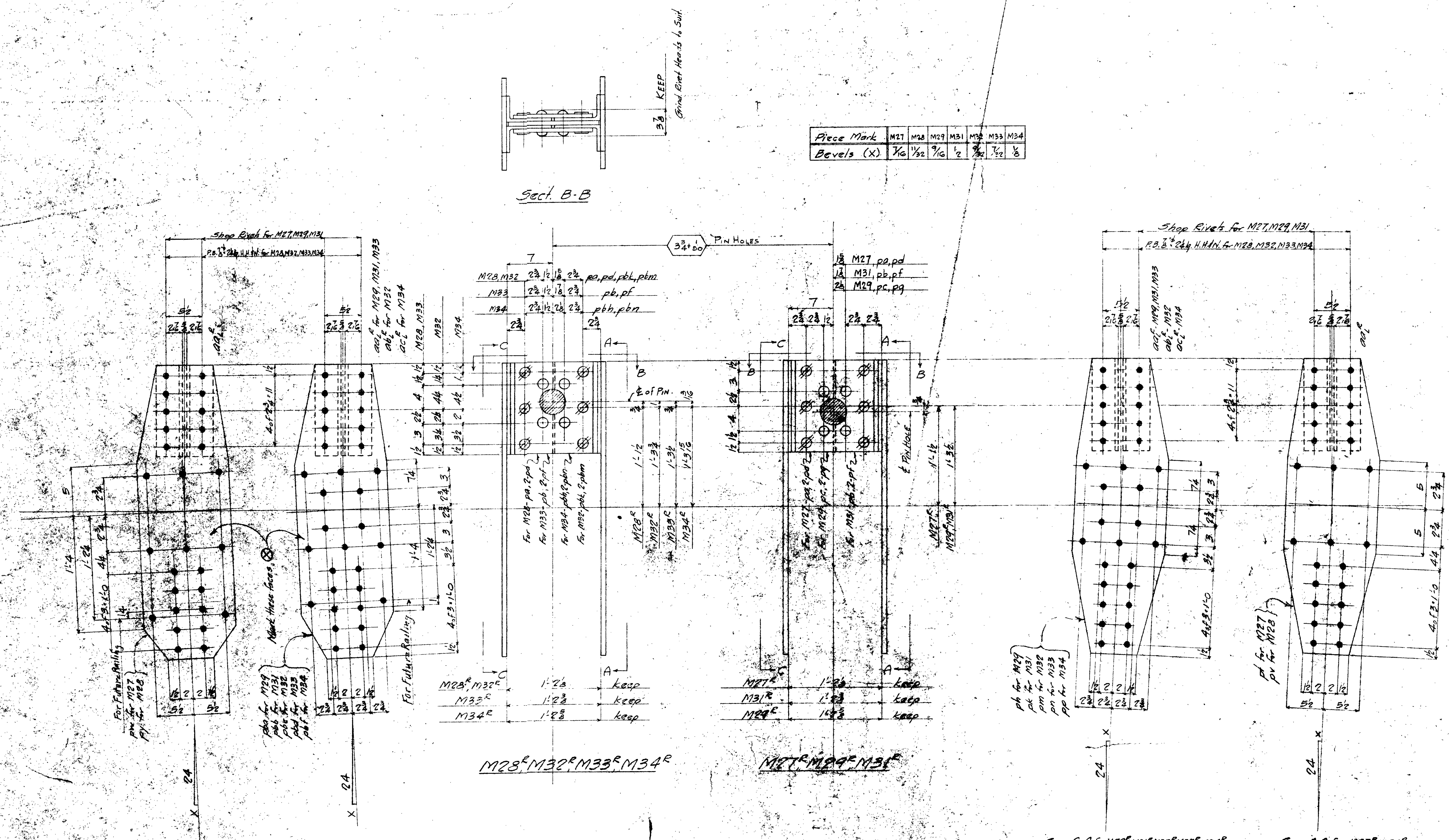
NOTES:-
Rivets: 7/8"
Holes: 15/16" unless noted.
Holes in material over [illegible] thick to be punched 11/16" & reamed to 15/16" or drilled 15/16" from the solid.
PAINT: Yes
CONTACT SURFACES: No
Shop

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECT.
Top Chords
United States Steel Export Co.
XAB 7957-A

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF EB Maloney
DRAW. MADE BY CWZ DATE 1-23-43
DRAW. CHECKED BY [illegible] DATE 1-28-43

ORDER No. 931 A
SHEET No. 27



LINE	Total No. of Pieces on the Order	No. of Pcs. on Sheet	SHAPE	LENGTH Feet	LENGTH Inches	ASSEMBLING MARK	REMARKS	CALCULATED WEIGHT FOR ONE SHIP. PIECE	ORDERED	ITEM
1		2	PIECES M27^R				16 X 14 X 3-5	[illegible]		
2		2	" M27^L							
3		2	" M28^R				" " X 3-5	[illegible]		
4		2	" M28^L							
5		4	" M29^R				" " X 3-9	[illegible]		
6		4	" M29^L							
7		2	" M31^R				" " X 3-9	[illegible]		
8		2	" M31^L							
9		2	" M32^R				" " X [illegible]	[illegible]		
10		2	" M32^L							
11		2	" M33^R				" " X 3-10	[illegible]		
12		2	" M33^L							
13		2	" M34^R				" " X 3-10	[illegible]		
14		2	" M34^L							
15		8	Ps 14 5/8	1	2	pa	M27, M28	35		S
16		8	Ps 14 5/8	1	2	pb	M31, M33	35		S
17		8	Ps 14 5/8	1	2	pc	M29	35		S
18		4	Ps 14 5/8	1	2	pbk	M32	35		S
19		4	Ps 14 5/8	1	2	pbh	M34	35		S
20		16	Ps 12 5/8	1	2	pd	M27, M28	59		S
21		16	Ps 12 5/8	1	2	pf	M31, M33	59		
22		16	Ps 12 5/8	1	2	pg	M29	59		
23		8	Ps 12 5/8	1	2	pbm	M32	59		
24		8	Ps 12 5/8	1	2	pbn	M34	59		
25		48	L 7 4 1/2	1	2	aa^R	M27, M28, M29, M31, M33	46		S
26		48	Ls			aa^L				S
27		8	L 7 4 1/2	1	2	ab^R	M32	34		S
28		8	Ls			ab^L				S
29										
30										
31		8	Ls 7 4 1/2	1	2	ac^R	M34	84		S
32		8	Ls			ac^L				S
33		4	Ps 14 3/4	3	5 1/16	pa	M27	244		S
34		4	Ps 14 3/4	3	5 1/16	pb				
35		4	Ps 14 3/4	3	5 1/16	py	M28	244		
36		4	Ps 14 3/4	3	5 1/16	pv				
37		8	Ps 14 3/4	3	9 3/8	pba	M29	270		
38		8	Ps 14 3/4	3	9 3/8	ph				
39		4	Ps 14 3/4	3	9 5/16	pbb	M31	270		
40		4	Ps 14 3/4	3	9 5/16	pk				S
41		4	Ps 14 3/4	3	9 9/16	pbc	M32	271		S
42		4	Ps 14 3/4	3	9 9/16	pm				S
43		4	Ps 14 3/4	3	9 5/16	pbd	M33	270		S
44		4	Ps 14 3/4	3	9 9/16	pn				
45		4	Ps 14 3/4	3	9 3/4	pbf	M34			
46		4	Ps 14 3/4	3	9 3/4	pp	M34	272		S
47		320	7/8"φ R.B.		2 1/4		HH&N			A
48										S
49–60										

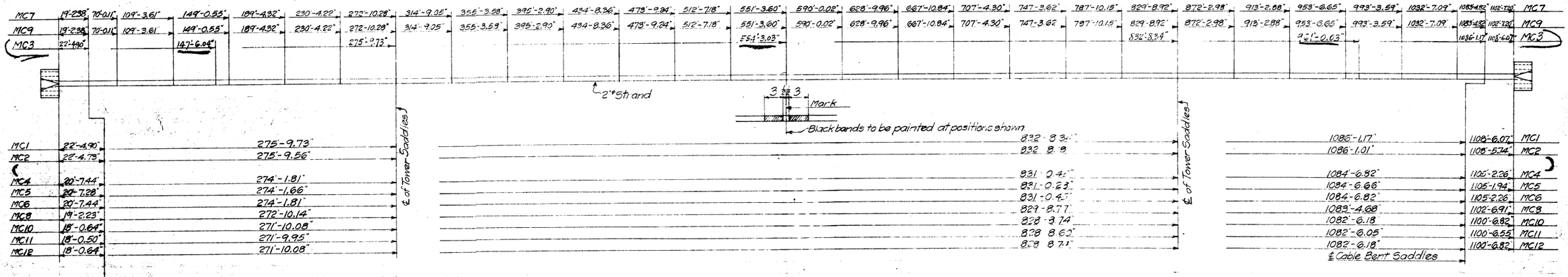
M27 380 — M28 386 — M29 414 — M31 40[illegible]
M32 465 — M33 440 — M34 46[illegible]

NOTES:-
Rivets: 7/8
Holes: 15/16 unless noted.
PAINT: Yes
CONTACT SURFACES: No
SHOP

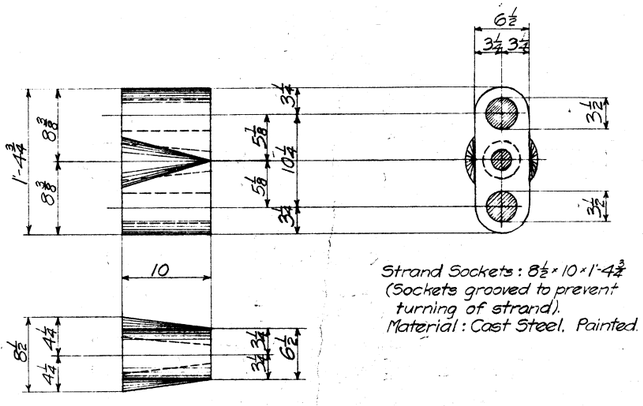
LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECT. D
HANGER GUSSETS
United States Steel Export Co.
XAB 7957-A

AMERICAN BRIDGE COMPANY

DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Elmira PLANT
IN CHARGE OF EB Maloney
DRAW. MADE BY CWZ DATE 1-25-43
DRAW. CHECKED BY YDA DATE 1-26-4[illegible]
ORDER No. J31A
SHEET No. 28



REQUIRED		
No.	Description	Mark
2	Cable Strand	MC1
2	" "	MC2
2	" "	MC3
2	" "	MC4
2	" "	MC5
2	" "	MC6
2	" "	MC7
2	" "	MC8
2	" "	MC9
2	" "	MC10
2	" "	MC11
2	" "	MC12
48	Sockets	



Strand Sockets: 8½ × 10 × 1'-4¾
(Sockets grooved to prevent turning of strand).
Material: Cast Steel. Painted.

Sockets: All strands are to have a prestressed socket painted white on one end and an unstressed socket painted black on the other end. All white sockets are to be reeled either first or last. The socket reeled first is to be so securely attached to the reel that manual skill and effort will be required to release it. (A safety precaution)

NOTES:

Material: A.S.& W.Co's 2" dia. Galv. Steel Bridge Strand 91 Wire.
Specifications: A.S.& W.Co. Std. for Bridge Strands.
Measuring Stress: Each Strand to be prestressed to from 45% to 50% of its breaking strength. Breaking strength not less than 245 tons per strand.
While under a stress of 104,100# all strands are to be measured and marked for their correct lengths.
All cable strands are to be marked for cable bent saddle & tower saddle positions.
Lengths given are at a temperature of 52.3° Fahrenheit.
Striping: A red stripe shall be painted on each strand for its full length and while it is under tension and in position to be measured.
Marks: Strands are to be marked at the points indicated on sketches with a scribe mark top & bottom lightly scratched in the zinc coating only. The marks are to be so covered that they will be preserved during shipping and handling.
Reeling: Only one strand shall be shipped on one reel.

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON - WATSON LAKE, SECTION D
Strands & Sockets
UNITED STATES STEEL EXPORT COMPANY
XAB-7957 B.

AMERICAN BRIDGE COMPANY
DRAWINGS MADE AT Elmira PLANT
WORK FABRICATED AT Purch. Dept. PLANT
IN CHARGE OF Maloney
DRAW. MADE BY Hall DATE 1-5-43
DRAW. CHECKED BY CWZ DATE 1-27-43

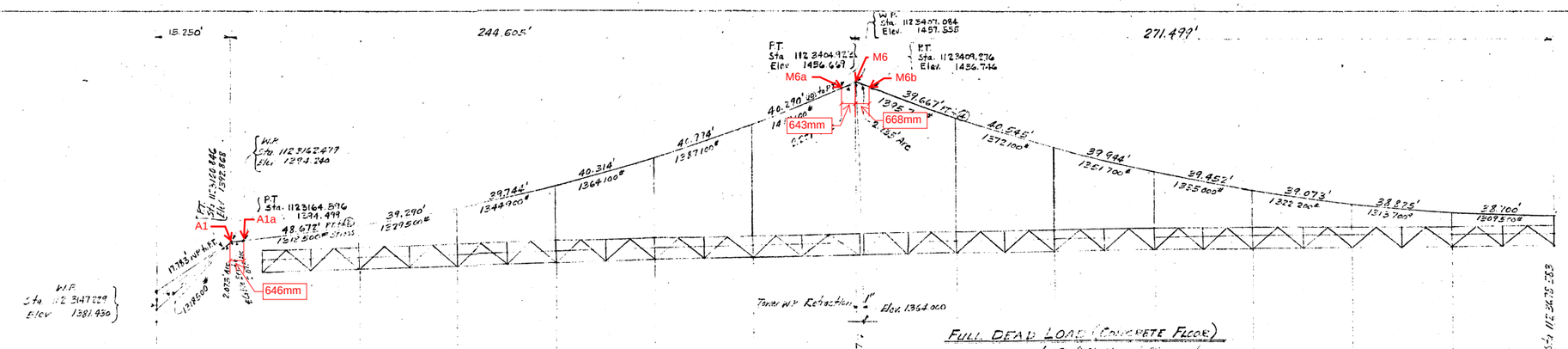
ORDER No. J31-B
SHEET No. SC1

Ref. C53.5-Elmira.

(rev. 2/24/43 - Sag Point marks added for strands MC3)

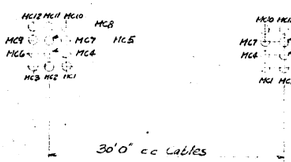
"AA001326"

[redacted]



FULL DEAD LOAD (CONCRETE FLOOR) at 30° F Normal Temperature

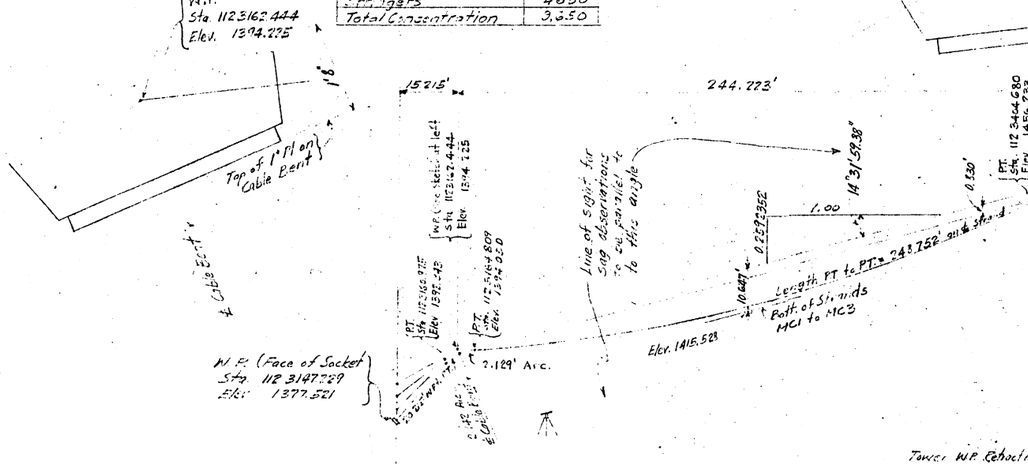
	2	4	6	8	10	14	16	18	20	22	24	26
Cable	4,400#	4,000#	4,250#	4,100#	4,350#	4,250#	4,350#	4,200#	3,950#	3,900#	3,950#	3,900#
Suspenders, Saddles and Pins	300	350	400	450	550	550	450	400	350	300	300	250
Stiffening Truss	10,950	12,800	13,300	12,500	10,100	9,550	11,150	12,500	13,300	13,300	13,000	12,500
Bracing	3,000	2,500	1,800	2,400	3,350	3,700	3,100	2,350	2,250	2,250	1,650	1,550
Concentration Constant	9,650	9,650	9,650	9,650	9,650	9,650	9,650	9,650	9,650	9,650	9,650	9,650
2% for Paint and Contingencies	600	600	600	600	600	600	600	600	600	600	600	600
Total Steel	29,900	30,200	30,800	29,700	28,300	28,100	29,100	30,000	30,700	30,000	29,100	28,400
Wood Floor and Railing	29400	29400	29400	29400	29400	29400	29400	29400	29400	29400	29400	29400
Total - Temporary Floor	58300	59600	59200	59100	57700	57500	58500	59400	60100	59400	58500	57800
Elev. of ℄ Cable at ℄ Cable Clamps									1414.725			1405.332
Total Steel - See above	28,400	30,200	29,800	29,700	28,300	28,100	29,100	30,000	30,700	30,000	29,100	28,400
Steel Railing	1100	1100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100
Concrete Deck	44000	44000	44000	44000	44000	44000	44000	44000	44000	44000	44000	44000
Total Permanent Floor	74,000	75,300	74,900	74,800	73,400	73,200	74,200	75,100	75,800	75,100	74,200	73,500
Elev. of ℄ Cable at ℄ Cable Clamps	1400.427	1407.359	1416.517	1427.889	1441.472	1442.981	1430.821	1420.874	1413.135	1407.627	1404.398	1403.272



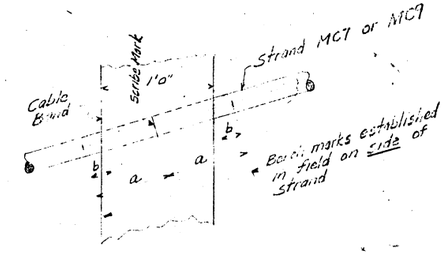
30'0" cc Cables

NUMBERING OF STRANDS

Concentration Constant	
Cable Clamps	550
Floor beams and Brackets	4350
Stringers	4650
Total Concentration	9,650



3 BOTTOM STRANDS MC1 to MC3 at 30° F. Normal Temperature



BENCH MARKS FOR CABLE BAND LOCATION

NOTE TO ERECTOR:-

The cable bents are to be supported in the positions shown and the towers pulled back to the positions shown before the placing of the strands.

Refer to Sag Variation charts for changes from normal span and from normal temperature.

Strands MC3 have markings for sag observation for the three spans. Special care has been taken in marking Strands MC3. The saddle point markings on Strands MC1 and MC2 should be used only as a check on MC3.

LIARD RIVER BRIDGE
ALASKA HIGHWAY
FORT NELSON-WATSON LAKE SECTION D
Dead Load Concentrations and Cable Positions and Stresses

Inquiry No Y-7030BA.
Order No- J31-B
X48-7957-5

U.S. STEEL PRODUCTS Co.
American Bridge Company
New York Office
30 Church St., Jan 15 1943
DRAWING NO B-2110

Revised 2/20/43

Appendix C - Preliminary Hazard Assessment Form

Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

PRELIMINARY HAZARD ASSESSMENT FORM

Project Number:	
Location:	
Date:	
Name of Departmental Representative:	
Name of Client:	
Name of Client Project Co-ordinator	PH: ( )- -

Site Specific Orientation Provided at Project Location **Yes** ☐ **No** ☐

Notice of Project Required **Yes** ☐ **No** ☐

NOTE:
PWGSC REQUIRES A Notice of Project FOR ALL CONSTRUCTION WORK RELATED ACTIVITIES

NOTE:
OHS law is made up of many municipal, provincial, and federal acts, regulations, bylaws and codes. There are also many other pieces of legislation in British Columbia that impose OHS obligations.

Important Notice: This hazard assessment has been prepared by PWGSC for its own project planning process, and to inform the service provider of actual and potential hazards that may be encountered in performance of the work. PWGSC does not warrant the completeness or adequacy of this hazard assessment for the project and the paramount responsibility for project hazard assessment rests with the service provider.

TYPES OF HAZARDS TO CONSIDER	Potential Risk for:				COMMENTS
Examples: Chemical, Biological, Natural, Physical, and Ergonomic Listed below are common construction related hazards. Your project may include pre-existing hazards that are not listed. Contact the Regional Construction Safety Coordinator for assistance should this issue arise.	**PWGSC, OGD's, or tenants**		**General Public or other contractors**		Note: When thinking about this pre-construction hazard assessment, remember a **hazard** is anything that may cause harm, such as chemicals, electricity, working from heights, etc; the **risk** is the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be.
	Yes	**No**	**Yes**	**No**	
Typical Construction Hazards					
Concealed/Buried Services (electrical, gas, water, sewer etc)					
Slip Hazards or Unsound Footing					
Working at Heights					
Working Over or Around Water					
Heavy overhead lifting operations, mobile cranes etc.					
Marine and/or Vehicular Traffic (site					

Canada

vehicles, public vehicles, etc.					
Fire and Explosion Hazards					
High Noise Levels					
Excavations					
Blasting					
Construction Equipment					
Pedestrian Traffic (site personnel, tenants, visitors, public)					
Multiple Employer Worksite					Example: Contractor working in an occupied Federal Employee space.

Electrical Hazards					**Comments**
Contact With Overhead Wires					
Live Electrical Systems or Equipment					
Other:					
Physical Hazards					
Equipment Slippage Due To Slopes/Ground Conditions					
Earthquake					
Tsunami					
Avalanche					
Forest Fires					
Fire and Explosion Hazards					
Working in Isolation					
Working Alone					
Violence in the Workplace					
High Noise Levels					
Inclement weather					
High Pressure Systems					
Other:					
Hazardous Work Environments					
Confined Spaces / Restricted Spaces					Review and provide confined space assessment(s) from PWGSC or client confined space inventories. Refer to PWGSC Standard on Entry into Confined Spaces. Contact the Regional Construction Safety Coordinator.
Suspended / Mobile Work Platforms					
Other:					
Biological Hazards					
Mould Proliferations					
Accumulation of Bird or Bat Guano					
Bacteria / Legionella in Cooling Towers / Process Water					
Rodent / Insect Infestation					
Poisonous Plants					
Sharp or Potentially Infectious Objects in Wastes					

Wildlife					
Chemical Hazards					
Asbestos Materials on Site					If "yes" a pre-project asbestos survey report is required. Provide Contractor with DP – 057 ELF Form 16 "Contractor Notification and Acknowledgement"
Designated Substance Present					If "yes" a pre-project designated substance survey report is required.
Chemicals Used in work					
Lead in paint					If "yes" a pre-project lead survey report is required.
Mercury in Thermostats or Switches					If "yes" a pre-project mercury survey report is required.
Application of Chemicals or Pesticides					
PCB Liquids in Electrical Equipment					
Radioactive Materials in Equipment					
Other:					
Contaminated Sites Hazards					
Hazardous Waste					
Hydrocarbons					
Metals					
Other:					

Security Hazards					**Comments**
Risk of Assault					
Other:					
Other Hazards					

Other Compliance and Permit Requirements[1]	**YES**	**NO**	**Notes / Comments[2]**
Is a Building Permit required?			
Is an Electrical permit required?			
Is a Plumbing Permit required?			
Is a Sewage Permit required?			
Is a Dumping Permit required?			
Is a Hot Work Permit required?			
Is a Permit to Work required?			Mandatory for ALL AFD managed work sites.
Is a Confined Space Entry Permit required?			Mandatory
Is a Confined Space Entry Log required			Mandatory for all Confined Spaces
Discharge Approval for treated water required			

Notes:

(1) Does not relieve Service Provider from complying with all applicable federal, provincial, and municipal laws and regulations.

(2) TBD means To Be Determined by Service Provider.

Service Provider Acknowledgement: We confirm receipt and review of this Pre-Project Hazard Assessment and acknowledge our responsibility for conducting our own assessment of project hazards, and taking all necessary protective measures (which may exceed those cited herein) for performance of the work.			
Service Provider Name			
Signatory for Service Provider		**Date Signed**	
RETURN EXECUTED DOCUMENT TO PWGSC DEPARTMENTAL REPRESENTATIVE PRIOR TO ANY WORK COMMENCING			

Appendix D - Confirmation of Prime Contractor's Main Responsibilities Under Worksafe BC

Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

Confirmation of Prime Contractor's Main Responsibilities Under the Worksafe B.C. Occupational Health and Safety Regulations and *Worker's Compensation Act*

Name of Project:

Owner: Crown Owned

Contractor:

Consulting Engineer:	YES	NO
1.The Contractor acknowledges appointment as Prime Contractor on the construction project noted below	☐	☐
2.The name of the Prime Contractor's Qualified Coordinator of occupational health and safety activities for this project has been submitted to the Owner and is as shown below.	☐	☐
3. The Prime Contractor understands that in any conflict of directions, WCB OH&S Regulations and/or the Worker's Compensation Act shall prevail.	☐	☐
4. The Prime Contractor understands and will direct that all supervisors/coordinators must immediately report any apparent conflict as described above.	☐	☐
5. The Prime Contractor agrees that their supervisor shall immediately notify the consulting Engineer's representative of any reported conflict.	☐	☐
6. The Prime Contractor has requested and received information from the Owner regarding any known hazards to the health and safety of persons pre-existing at the workplace.	☐	☐
7. The Prime Contractor has conducted an inspection of the workplace to verify the presence of any hazards.	☐	☐
8. The Prime Contractor will communicate hazards information to any persons who may be affected and ensure that appropriate measures are taken to effectively control or eliminate the hazards.	☐	☐
9. The Prime Contractor accepts that written documentation such as notes, records, inspections, meeting minutes, etc., on all health and safety issues must be available upon request to the PWGSC departmental representatives and/or to a WCB officer at the workplace.	☐	☐
10. The Prime Contractor will confirm that all workers are suitably trained and competent to perform the duties for which they have been assigned.	☐	☐
11. The Prime Contractor confirms that safety orientation of all new workers will be conducted.	☐	☐
12. The Prime Contractor's written Safety Program has been provided to the Owner's representative.	☐	☐
13. The Prime Contractor confirms that meetings to exchange information on any safety issues, concerns, hazards or safety directives will be conducted weekly or more often if required.	☐	☐
14. The Prime Contractor confirms that before the commencement of work, crews will attend a daily crew safety meeting.	☐	☐
15. The Prime Contractor confirms that their supervisor has assessed and will coordinate the workplace first-aid requirements	☐	☐
16. The Prime Contractor confirms that the procedure to transport injured workers is established	☐	☐

Prime Contractor Representative's

Name:_____

Title:_____ Signature:_____

Date:_____

Prime Contractor's OH&S Coordinator

Name:_____

Title:_____ Signature:_____

Date:_____

Canada

Appendix E - Environmental Protection Plan (EPP) Checklist

Environmental Protection Plan (EPP) – Checklist

Note: This checklist was developed to assist the Contractor in determining and mitigating environmental issues at site. It is considered a generic checklist and it is in the Contractor's best interest to review the PWGSC Environmental Effects Evaluation (EEE) and/or the Fish and Fish Habitat Report as supporting documents in the completion of the site Environmental Protection Plan (EPP). Applicable provincial and federal guidelines and regulations should be reviewed prior to submission of the EPP.

EPP Framework	Content Requirements	Yes	No	N/A
Project Setting and Site Activities				
Project Description	A brief description of the project and its location is provided.			
Environmental Sensitivities	Sensitive or protected features that could be impacted as a result of the Contractor's activities are described.			
Site Activities	A scope of work and a list of all construction or related activities to be undertaken during the project are provided.			
Project Schedule and Site Drawings				
Project Schedule	A project schedule is provided, including scheduled shut-downs and restricted work periods due to environmental requirements.			
Site Drawing	One or more site drawings(s) are provided, indicating the site location; site set-up and layout; erosion and sediment controls; in-stream work areas; and environmental sensitivities.			
Potential Environmental Impacts and Controls				
Potential Environmental Issues and Impacts	The potential environmental issues and impacts that may result from the construction activities are described. Environmental Reports (Environmental Effects Evaluation, Environmental Assessments; Fish and Fish Habitat and Compensation Reports, Aquatics Effects Evaluations etc) will be provided to the contractor especially with respect to any in-stream work procedures that will be required. For example, in-stream works will impact fish and fish habitat in the surrounding ecosystem and potentially upstream and downstream of proposed works. It is the Contractor's responsibility to ensure the work is completed in a manner that causes the least impact on the ecosystem (see section on Mitigation).			
Permits, Approvals, and Authorizations	List required permits, approvals and authorizations. As applicable, environmental mitigation measures prescribed by regulatory agencies and included in project permits, approvals and authorizations are described. NOTE: DFO, MOE and NWPA approvals and authorizations for in-stream works are PWGSC's responsibility however, the Contractor must be aware of the requirements of these approvals/authorizations. Permitting for water withdrawal from the water body as part of construction activities is part of the Contractor's responsibility. Scientific Collection Permits such as licences for Fish Salvage Permits are also the responsibility of the Contractor and are obtained by the Contractor's **environmental monitor/consultant*** who will be completing the salvage.			

Mitigation Strategies	Procedures, controls or best management practices (BMPs) to prevent or reduce adverse impacts on the environment are provided. For example, all work in BC must adhere to the BC MOE "Standards and Best Practices for Instream Works" for those works that are completed below the high water mark. DFO mitigation techniques under the Fisheries Act must also be followed. One useful document that contains information on Ministry of Environment's ecosystems, guidelines and mitigation techniques is from the MOE Ecosystems Branch – Develop With Care 2014 – Environmental Guidelines for Urban and Rural Land Development in BC.			
Erosion and Sediment Control	Erosion and sediment controls are provided, as appropriate for the jurisdiction.			
Waste Management and Hazardous Materials				
Waste Management and Hazardous Materials	Hazardous materials that will be used and/or stored on site are listed. Expected hazardous and non-hazardous waste materials along with proper handling, containment, storage, transportation and disposal methods are listed. As appropriate for the jurisdiction, estimated waste quantities and specific handling procedures are also provided. For example, re-fuelling of equipment will be conducted at least 30m away from any active drainage courses.			
EPP Implementation				
Site Representative	Name(s) and contact details for the person(s) who will be the Contractor's Site Representative(s) are provided.			
Training and Communication	Training and communication details are provided.			
Monitoring and Reporting	Monitoring and inspection procedures, including a schedule of monitoring activities and reporting procedures are provided. For example, this would include downstream monitoring activities for increased siltation during in-stream works.			
Documentation	Information and/or records that will be maintained relating to the EPP and end environmental matters on the project site are described.			
EPP Update	EPP review and update procedures are provided.			
Environmental Emergency Response Procedures				
Environmental Emergency Response Procedures	Potential incidents that may impact the environment are identified, and emergency response procedures to prevent and respond to incidents are provided. An environmental emergency response contact list is also provided.			

***Environmental Monitor/Qualified Professional as recognized by the province:** an applied scientist or technologist specializing in a relevant applied science or technology including, but not necessarily limited to, agrology, forestry, biology, engineering, geomorphology, geology, hydrology, hydrogeology or landscape architecture, and who is registered in British Columbia with their appropriate professional organization, and acting under that association's Code of Ethics and subject to disciplinary action by that association, and who, through demonstrated suitable education, experience, accreditation and knowledge relevant to the particular matter, may be reasonably relied on to provide advice within their area of expertise.