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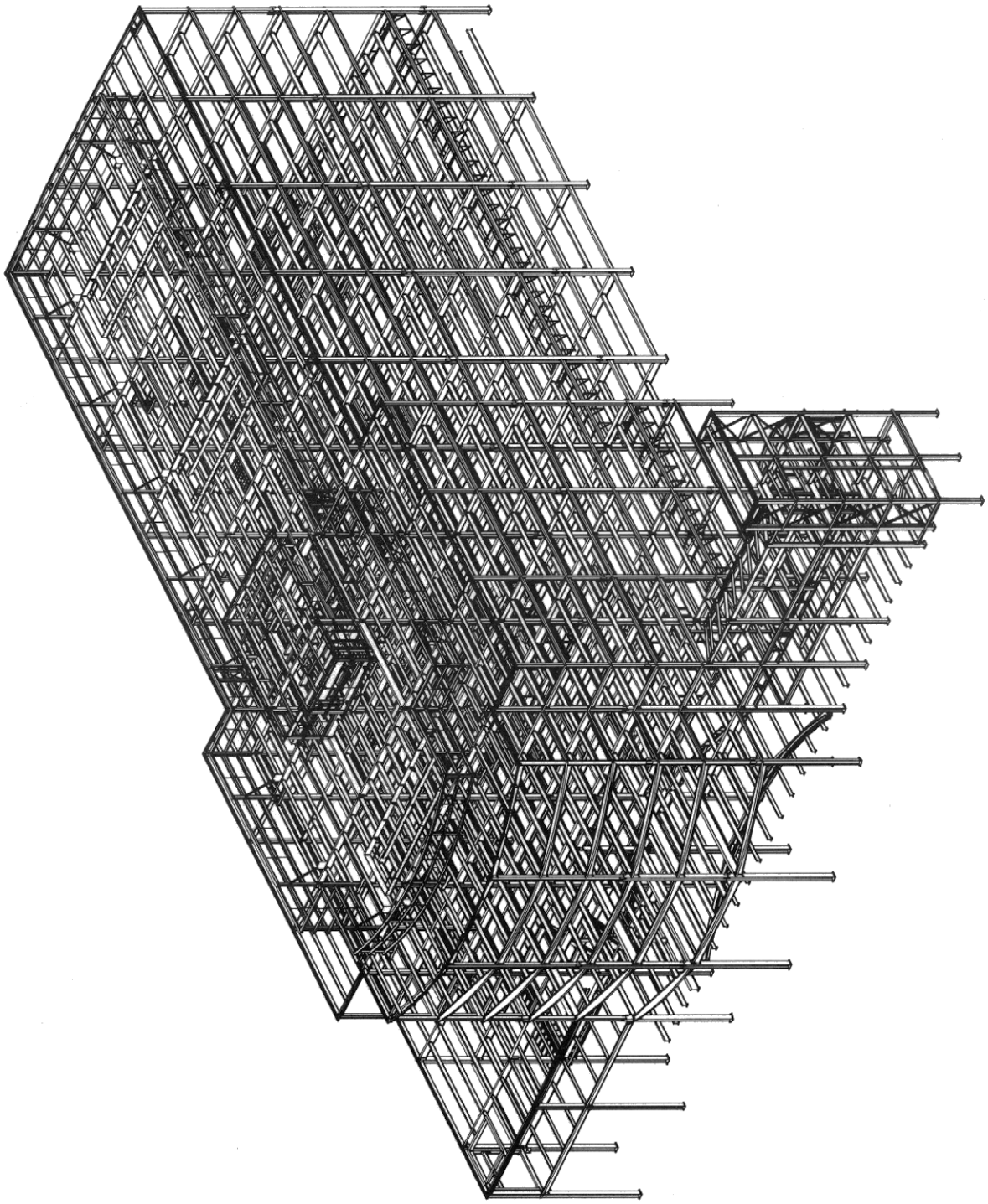
APPENDIX A - CASE STUDY PROJECT DETAILS

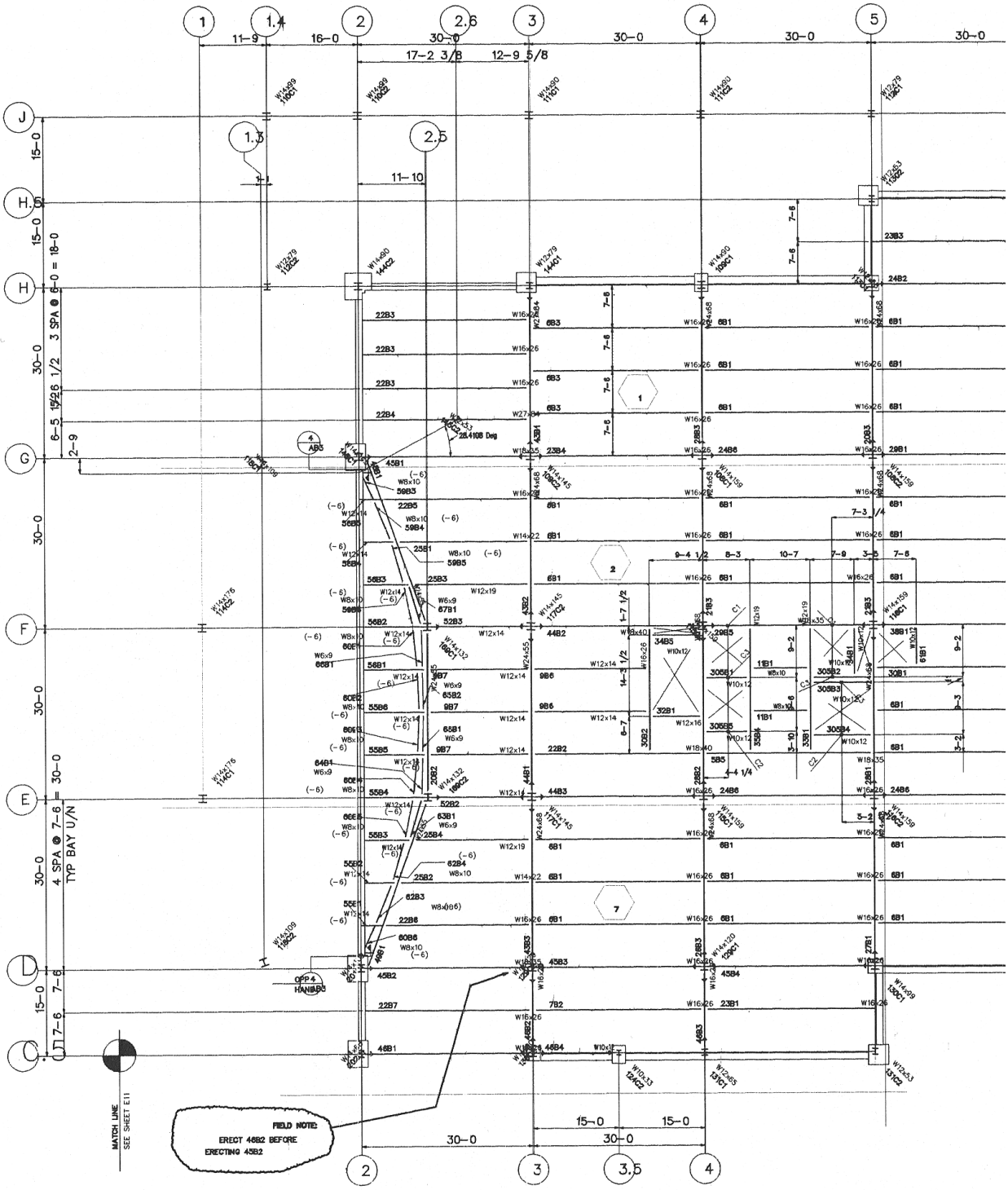
Case study photos

Case study photos

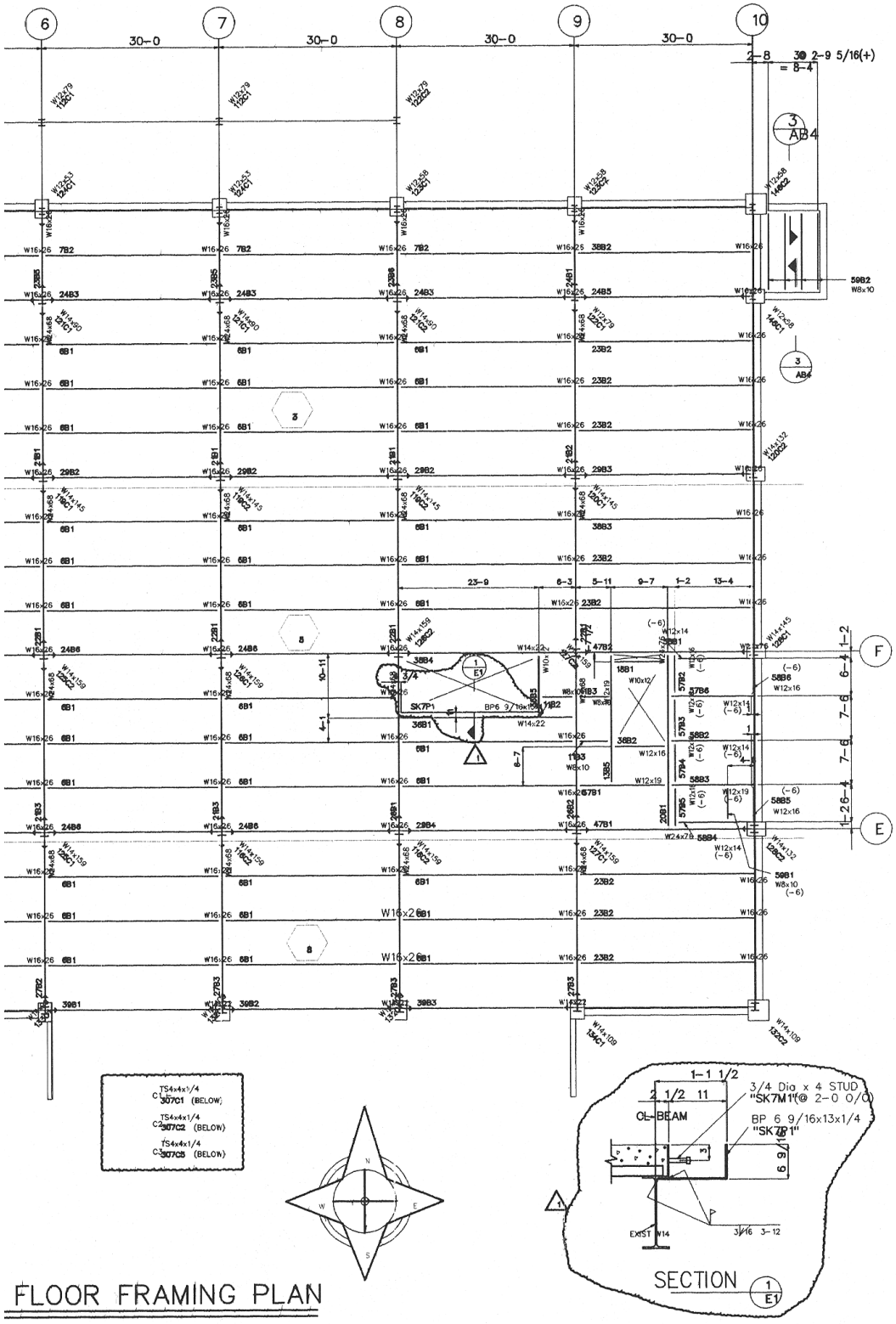
Case study photos



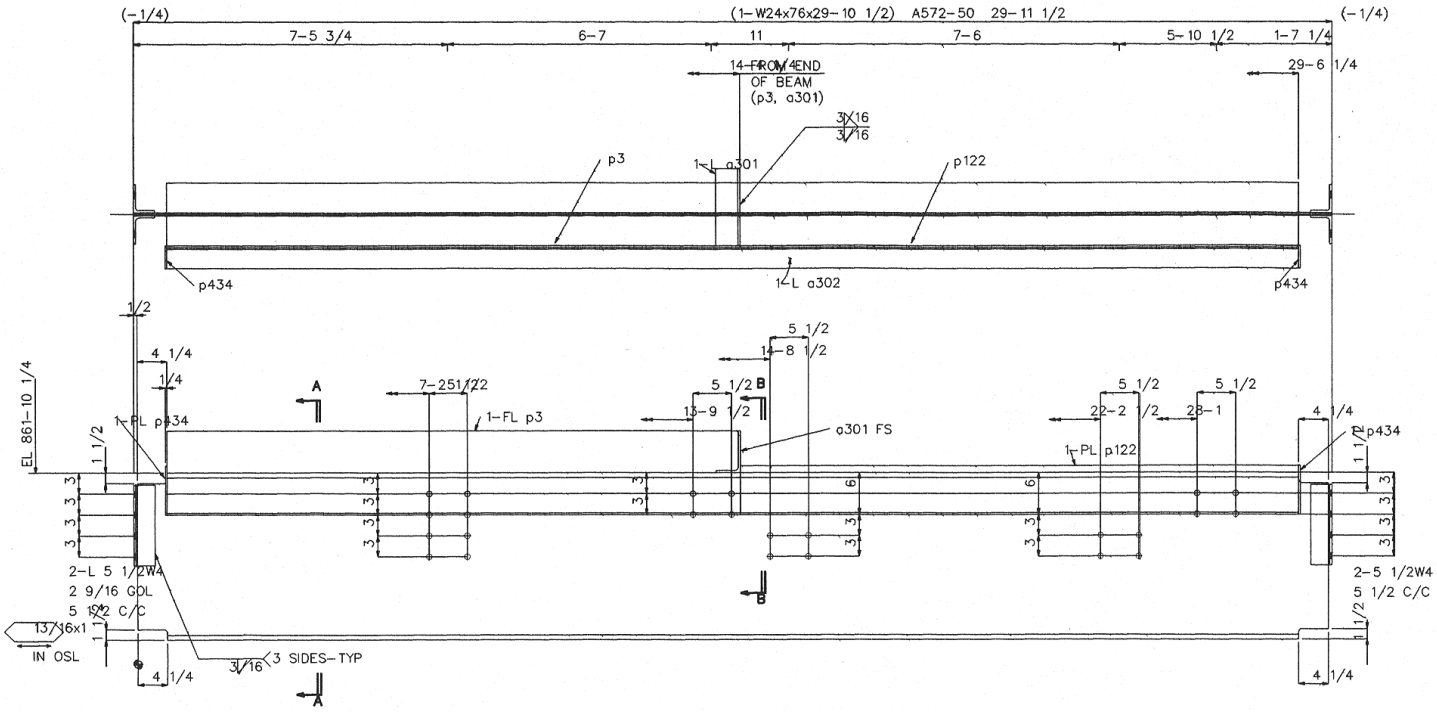
Case study isometric



Erection drawing (E-sheet)

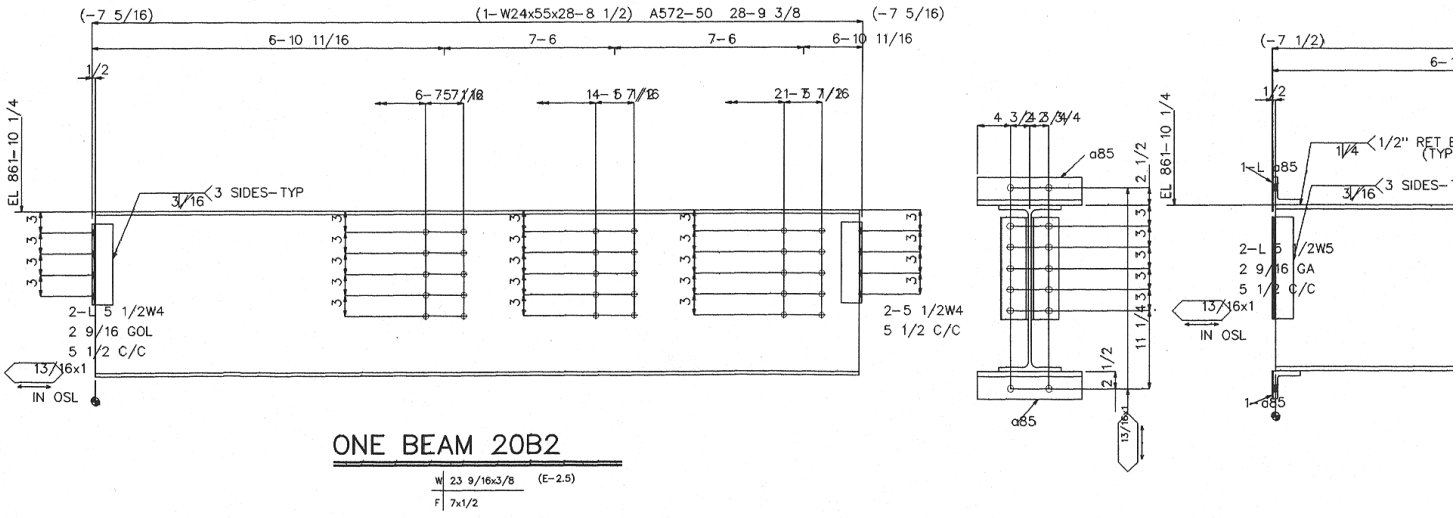


FLOOR FRAMING PLAN



ONE BEAM 20B1

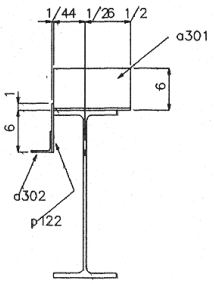
W 23 15/16x7/16 (E-9)
F 9x11/16



ONE BEAM 20B2

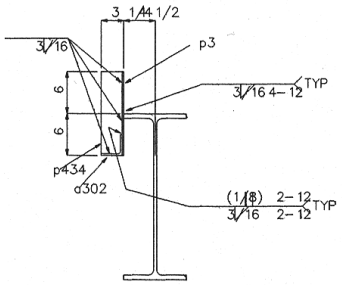
W 23 9/16x3/8 (E-2.5)
F 7x1/2

Shop drawing



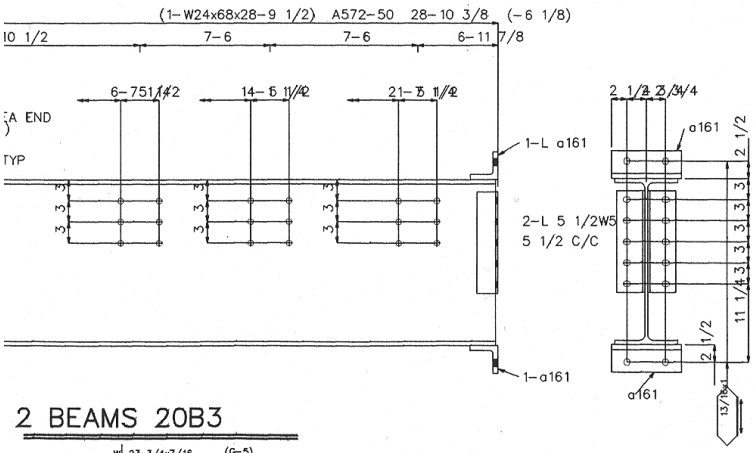
Section B–B

20B1



Section A–A

20B1



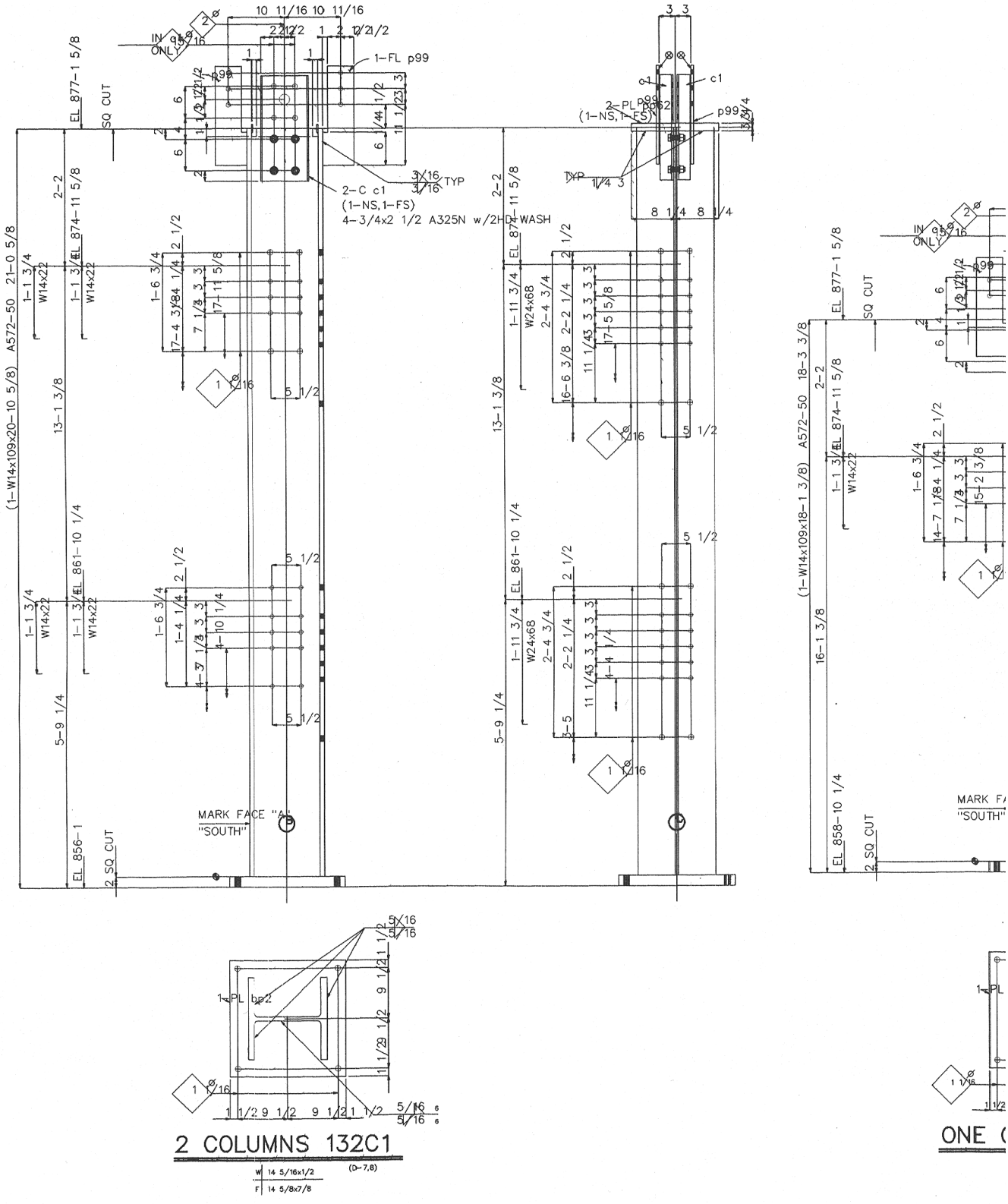
2 BEAMS 20B3

W 23 3/4x7/16 (G–5)
F 8 15/16x9/16

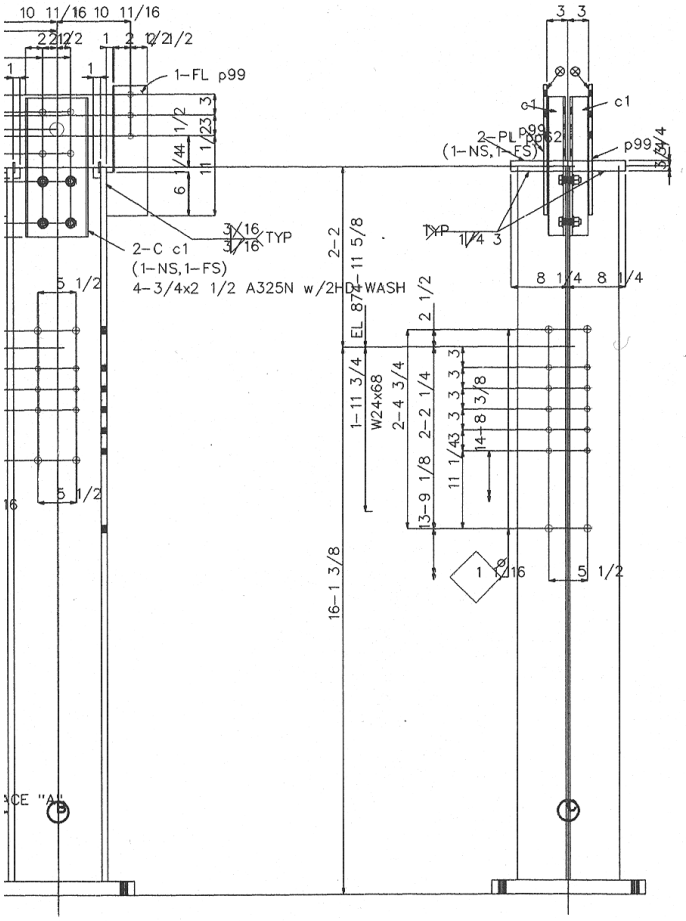
SHOP BILL OF MATERIAL

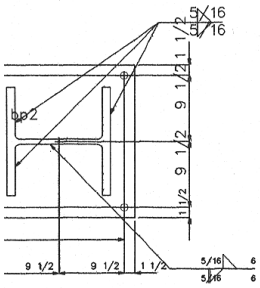
Total weight : 8432

SEQ NO	SEQ QUAN	MARK	QUAN	ITEM	LENGTH		WEIGHT	GRADE	REMARKS	PR
5	1	20B1	ONE	BEAM			2686			22–14
		20B1	1	W24x76	29	10 1/2	2270	A572–50		
		p3	1	PL1/4x12	14	0	143	A36		
		p122	1	PL1/4x7	15	2	90	A36		
		a301	1	L6x3 1/2x5/16	0	11	9	A36		
		a302	1	L3x3x1/4	29	2	143	A36		
		5 1/2W4	4	L4x3x5/16	0	11 1/2	28	A36		
		p434	2	PL1/4x3 1/4	0	7	3	A36		
				FIELD BOLTS						
			16	TC 3/4 Dia A325N	0	2 1/4			2HD WASH	
2	1	20B2	ONE	BEAM			1607			22–24
		20B2	1	W24x55	28	8 1/2	1579	A572–50		
		5 1/2W4	4	L4x3x5/16	0	11 1/2	28	A36		
				FIELD BOLTS						
			16	TC 3/4 Dia A325N	0	2 3/4			2HD WASH	
1	2	20B3	2	BEAM			4139		(1)–23/5,(1)–41/4	
		20B3	2	W24x68	28	9 1/2	3916	A572–50		
		5 1/2W5	8	L4x3x5/16	1	2 1/2	70	A36		
		a85	4	L4x4x3/4	1	3	92	A36		
		a161	4	L4x4x3/4	0	10	62	A36		
				FIELD BOLTS						
			8	TC 3/4 Dia A325N	0	3 1/2			2HD WASH	
			20	TC 3/4 Dia A325N	0	3			2HD WASH	
			8	TC 3/4 Dia A325N	0	2 3/4			2HD WASH	
			20	TC 3/4 Dia A325N	0	2 1/2			2HD WASH	



Shop drawing





COLUMN 132C2

W 14 5/16x1/2 (D-10)

F 14 5/8x7/8

SHOP BILL OF MATERIAL

7856 Total weight :

SEQ NO	SEQ QUAN	MARK	QUAN	ITEM	LENGTH	WEIGHT	GRADE	REMARKS	PR
8	2	132C1	2	COLUMN		5522			30-25
		132C1	2	W14x109	20 10 5/8	4803	A572-50	S2E	
		p99	4	FL1/2x6	1 6 3/4	57	A36		
		bp2	2	PL2x22	1 10	549	A36	.	10-8
		c1	4	C9x15	1 8	100	A36	.	10-22
		pp62	4	FL1/4x1 1/2	1 4 1/2	7	A36		
			8	TC 3/4 Dia A325N	0 2 1/2	6		2HD WASH	
				FIELD BOLTS					
			20	TC 3/4 Dia A325N	0 2 1/2			2HD WASH	
8	1	132C2	ONE	COLUMN		2334			30-26
		132C2	1	W14x109	18 1 3/8	1974	A572-50	S2E	
		p99	2	FL1/2x6	1 6 3/4	28	A36		
		bp2	1	PL2x22	1 10	275	A36	.	10-8
		c1	2	C9x15	1 8	50	A36	.	10-22
		pp62	2	FL1/4x1 1/2	1 4 1/2	4	A36		
			4	TC 3/4 Dia A325N	0 2 1/2	3		2HD WASH	
				FIELD BOLTS					
			10	TC 3/4 Dia A325N	0 2 1/2			2HD WASH	

APPENDIX B

SAMPLE SPECIFICATION

SECTION 05120
STRUCTURAL STEEL

PART 1 - GENERAL

SCOPE
Included are the following topics:

PART 1 - GENERAL

Scope
Related Work Specified Elsewhere
References
Submittals
Quality Assurance
Delivery, Storage and Handling

PART 2 - PRODUCTS

Materials
Fabrication
Shop Painting
Source Quality Control

PART 3 - EXECUTION

Erection
Field Quality Control

This section includes fabrication and erection of structural steel work, as shown on drawings, including schedules, notes and details showing size and location of members, typical connections and types of steel required.

RELATED WORK SPECIFIED ELSEWHERE
Section 03300 -- CAST-IN-PLACE CONCRETE for anchor rod installation in concrete.

Section 05500 – METAL FABRICATION for miscellaneous metal fabrications.

REFERENCES
Applicable provisions of Division 1 shall govern work of this Section.

Structural steel is that work defined in American Institute of Steel Construction (AISC) Code of Standard Practice and as otherwise shown on Drawings.

SUBMITTALS
General: Submit the following in accordance with the General and Supplementary Conditions.

Product data or manufacturer's specifications and printed installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

Structural steel (each type), including copies of mill reports covering chemical and physical properties.

High-strength bolts (each type), including nuts and washers.
Include Direct Tension Indicators if used.
Structural steel primer paint.
Shrinkage-resistant grout.

Test reports conducted on shop- and field-bolted and welded connections. Include data on type(s) of tests conducted and test results.

Copies of each survey showing elevations and locations of base plates and anchor rods to receive structural steel and final elevations and locations for major members. Indicate discrepancies between actual installation and Contract Documents.

Shop drawings, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams.

Include details of cuts, connections, camber, holes and other pertinent data. Indicate welds by standard AWS symbols. Show size, length and type of each weld.

Provide setting drawings, templates and directions for installation of anchor rods and other anchorages to be installed as work of other sections.

QUALITY ASSURANCE
Codes and Standards: Comply with provisions of following, except as otherwise indicated:

American Institute of Steel Construction (AISC) Code of Standard Practice for Steel Buildings and Bridges.

AISC Load and Resistance Factor Design Specification for Structural Steel Buildings, including Commentary.

Load and Resistance Factor Design Specification for Structural Joints using ASTM A325 or A490 Bolts approved by the Research Council on Structural Connections.

American Welding Society (AWS) D1.1 Structural Welding Code -- Steel.

ASTM A6 General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use.

Society for Protective Coatings (SSPC): Steel Structures Painting Manual, Volume 2, Systems and Specifications. Specifications shown on design drawings.

Fabricator Qualification: The structural steel fabricator shall be AISC certified-Complex Steel Building Structures.

Qualifications for Welding Work: Use prequalified weld procedures or welding procedures and welding operators in accordance with AWS "Qualification" requirements.

Provide certification that welders employed in work have satisfactorily passed AWS qualification tests.

If recertification of welders is required, retesting will be Contractor's responsibility.

DELIVERY, STORAGE AND HANDLING
Deliver materials to site at such intervals to ensure uninterrupted work progress.

Deliver anchor rods and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to avoid delay of work.

Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.

Do not store materials in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 -- PRODUCTS

MATERIALS
Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and applying surface finishes.

Structural Steel Shapes: ASTM A992.

Plates, Angels and Bars: ASTM A36

Cold-Formed Steel Tubing: ASTM A500, Grade B

Headed Type Shear Connectors: ASTM A108, Grade 1015 or 1020 cold finished carbon steel, with dimensions complying with AISC Specifications.

Steel Castings: ASTM A27, Grade 65-35, medium-strength carbon steel.

Anchor Rods: F1554 Grade 36, nonheaded type unless otherwise indicated.

Unfinished Threaded Fasteners: ASTM A307, Grade A, regular low-carbon steel bolts and nuts. Provide hexagonal heads and nuts for all connections.

High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts and hardened washers as follows:

Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A325.

Where indicated as galvanized, provide units that are zinc coated, either mechanically deposited complying with ASTM B695, Class 50, or hot-dip galvanized complying with ASTM A153.

Tension Control Bolts (as required): ASTM F-1852

Electrodes for Welding: Comply with AWS Code.

Steel Primer Paint Fast-curing lead- and chromate-free, universal modified alkyd primer with good resistance to normal atmospheric corrosion, complying with performance requirements of FS TT-P-664.

Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands. Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621.

Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:

100 Non-Shrink Grout (Non-Metallic), Conspec, Inc.
Supreme Grout, Cormix, Inc.
Sure Grip Grout, Dayton Superior
Euco N.S., Euclid Chemical Company
Crystex, L&M Construction Chemicals, Inc.
Masterflow 713, Master Builders
Sealtight 588 Grout, W.R. Meadows
Propak, Protex Industries, Inc.
Set Non-Shrink, Set Products, Inc.
Five Star Grout, U.S. Grout Corporation

FABRICATION

Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.

Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs and other defects.

Connections: Weld or bolt shop connections, as indicated.

Bolt field connections, except where welded connections or other connections are indicated.

Provide high-strength threaded fasteners for all bolted connections, except where unfinished bolts are indicated.

High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts. Use snug-tight bolts, except where noted and as recommended in the RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts.

Welded Construction: Comply with the AWS D1.1 Code as referenced in the AISC Specification for the Design and Fabrication of Steel Buildings.

Assemble and weld built-up sections by methods that will produce true alignment of axes without warp.

Build up welded doorframes attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug-weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10" o.c., unless otherwise indicated.

Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings.

Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning.

Expansion Joints: Provide expansion joints in steel shelf angles when part of structural steel frame, locate at vertical cladding expansion joints as indicated on Drawings.

SHOP PAINTING
General: Shop-paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed on exposed portions and initial 2" of embedded areas only.

Do not paint surfaces to be welded or high-strength bolted with friction-type connections.

Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

Color of Second Coat: Grey.

Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale and spatter, slag, or flux deposits. Clean steel in accordance with Society for Protective Coatings (SSPC) as follows:

SP-3 “Power-Tool Cleaning.”

Painting: Immediately after surface preparation, apply structural steel primer paint.

GALVANIZING
Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel indicated for galvanizing according to ASTM A123.

Galvanize structural steel in locations as indicated.

SOURCE QUALITY CONTROL
General: Materials and fabrication procedures are subject to inspection and tests in mill, shop and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

Promptly remove and replace materials or fabricated components that do not comply.

Design of Members and Connections: Details shown are typical, similar details apply to similar conditions, unless otherwise indicated.

Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

PART 3 -- EXECUTION

ERECTION
Surveys: Check elevations of concrete and masonry bearing surfaces, and locations of anchor rods and similar devices, before erection work proceeds and report discrepancies to the owner's authorized representative. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with the owner's authorized representative.

Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.

Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials and allow to cure.

For proprietary grout materials, comply with manufacturer's printed instructions.

Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

Level and plumb individual members of structure within specified AISC tolerances.

Establish required leveling and plumbing measurements at mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment and removal of paint on surfaces adjacent to field welds.

Do not enlarge unfair holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

Gas Cutting: Do not use gas-cutting torches in field for correcting fabrication errors in primary structural framing without the engineer's permission. Finish gas-cut sections equal to a sheared appearance when permitted.

Touch-Up Painting: Immediately after erection, clean field welds, bolted connections and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting. Comply with SSPC-PA 1 requirements for touch-up of field painted surfaces.

Apply by brush or spray to provide minimum dry film thickness of 2.0 mils.

FIELD QUALITY CONTROL
General: The Owner will engage the services of a testing agency to inspect high-strength bolted connections and welded connections and to perform tests and to submit test reports.

Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements and specifically state any deviations therefrom.

Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

The testing agency will review supplier's mill test reports for steel used in the project. The testing agency will report items that do not comply with ASTM material and test report requirements.

Shop and Field Welding, Inspection and Testing: The testing agency shall obtain copies of all welder certificates of welders assigned to the job all welders shall meet AWS requirements. Reports shall include welder's certifications, type and location of defects found during inspections and the measures required and performed to correct such defects, statements of final approval of all welding of connections and other fabrication data and information pertinent to the safe and proper welding of connections.

Ascertain that proper weld metal, electrodes, procedures and sequences are being used.

Ascertain that fit-up, joint preparation, size, contour, extent of reinforcement and length and location of welds comply with requirements of AWS D1.1.

Ascertain that fabricator's and erector's procedures correct for distortion and shrinkage caused by welding operations.

Shop Fabrication: Verify that fabricator's quality control program provides for the above mentioned items and the following minimum requirements for welding. Inspect and test during fabrication in accordance with AWS Structural Welding Code and as follows:

Perform visual inspections on 20% of all welds.

Perform Nondestructive Test of Welds as follows:

Fillet Welds: Test 10 percent of welds in accordance with magnetic particle testing.

Full Penetration Welds: Test 100 percent of welds in accordance with ultrasonic techniques.

Embedded Plates and Assemblies with Welded Deformed Bar and/or Stud Anchors: 50 percent of anchors shall be rapped with an 8 lb. hammer. Any that do not ring and 5 percent of all others shall be bent 15 degrees with a hammer test.

Field Welding: Inspect and Test for Conformance to AWS Requirements and as follows:

All welds shall be inspected visually.

Fillet Welds: Test 25 percent of all welds in accordance with magnetic particle testing.

Partial Penetration Welds: Test 100 percent of welds in accordance with ultrasonic testing techniques.

Welds that fail shall be rewelded and retested until they pass. The cost of retesting shall be borne by the Contractor.

Additional Testing in the Event of Rejected Welds: If more than 10 percent of any type of tested welds are rejected, an additional 20 percent of all such welds shall be tested in same manner. If more than 10 percent of these additional welds are defective and rejected then an additional 20 percent of such welds shall be tested. If more than 10 percent of this group are found rejectable then all welds shall be tested. The cost of this additional testing shall be borne by the Contractor.

Testing agency welding inspector shall have authority to reject weldments on the basis of a visual inspection.

Testing agency welding inspector's reports shall contain, as a minimum, a description of each weld tested, the identifying mark of the welder responsible for the weld, a critique of defects noted by visual inspection or testing and a statement regarding the acceptability of the weld as judged by

current AWS standards. Distribute reports as early as possible but no later than one week after the tests have been performed. Notify the Architect by phone if the results require immediate comment.

Bolting: Inspect in accordance with RCSC Specification for Structural Joints and as follows:

Visually inspect all bolts.

For Bolts Indicated to be “Slip Critical” (Friction Connections):

Check for proper tension by using methods defined in the RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts.

Correct bolted connections that fail by replacing or retightening, and performing other corrective measures required by connection geometry and fit up. The cost of retests on connections that fail shall be borne by the Contractor.

For Bolts Not Indicated to be “Slip Critical”: Inspect 5 percent of bolts by using wrench to verify that the plies of the connection are in firm contact, or “snug-tight”.

END OF SECTION

APPENDIX C

Sample Inventory for a Fabricator

CHANNEL A36 40' OR 60'

- C 12 X 20.7
- C 10 X 15.3
- C 8 X 11.5
- C 6 X 8.2

BEAM 50 Ksi 60'

- W 16 X 31
- W 16 X 26
- W 14 X 22
- W 12 X 26
- W 12 X 19
- W 12 X 16
- W 12 X 14
- W 10 X 22
- W 10 X 15
- W 10 X 12
- W 8 X 31
- W 8 X 24
- W 8 X 18
- W 8 X 15
- W 8 X 13
- W 8 X 10

RODS A 36 x 20'

- 1 IN. DIA.
- 7/8 IN. DIA.
- 3/4 IN. DIA.
- 5/8 IN. DIA.
- 1/2 IN. DIA.

PIPE x 21'

- 1 1/4 DIA. STANDARD
- 1 1/2 DIA. STANDARD

PLATES A36 x 20'

- PL 1 1/2 X 72
- PL 1 X 72
- PL 3/4 X 72
- PL 5/8 X 72
- PL 1/2 X 72
- PL 3/8 X 72
- PL 5/16 X 72

BARS A36 x 20'

- FB 3/4 X 12
- FB 3/4 X 10
- FB 1/2 X 12
- FB 1/2 X 10
- FB 1/2 X 8
- FB 1/2 X 6
- FB 1/2 X 4
- FB 1/2 X 3
- FB 1/2 X 2
- FB 3/8 X 12
- FB 3/8 X 10
- FB 3/8 X 8
- FB 3/8 X 6
- FB 3/8 X 4 1/2
- FB 3/8 X 4
- FB 3/8 X 2 1/2
- FB 3/8 X 2
- FB 3/8 X 1 1/2
- FB 1/4 X 12
- FB 1/4 X 10
- FB 1/4 X 8
- FB 1/4 X 6
- FB 1/4 X 4
- FB 1/4 X 3
- FB 1/4 X 2 1/2
- FB 1/4 X 2
- FB 1/4 X 1 1/2

ANGLE A36 x 40'

- L 6 X 4 X 3/8
- L 6 X 3 1/2 X 5/16
- L 5 X 3 1/2 X 3/8
- L 5 X 3 1/2 X 5/16
- L 5 X 3 X 1/4
- L 4 X 4 X 3/8
- L 4 X 4 X 5/16
- L 4 X 4 X 1/4
- L 4 X 3 X 3/8
- L 4 X 3 X 5/16
- L 4 X 3 X 1/4
- L 3 1/2 X 3 1/2 X 1/4
- L 3 X 3 X 3/8
- L 3 X 3 X 5/16
- L 3 X 3 1/4
- L 2 1/2 X 2 1/2 X 1/4
- L 2 X 2 X 1/4
- L 1 1/2 X 1 1/2 X 1/4

APPENDIX D

AISC SERVICES

The American Institute of Steel Construction, Inc. is a nonprofit corporation established in 1921 to serve the fabricated structural steel industry in the United States. Its purpose is to promote the use of structural steel through research activities, market development, education, codes and specifications, technical assistance, quality certification, and standardization.

For more than 75 years, AISC has conducted its numerous activities with a scrupulous sense of public responsibility. For this reason, and because of the high caliber of its staff, the Institute enjoys a positive relationship with architects, engineers, code officials, construction managers and educators who recognize its professional status in the fields of specification writing, structural research, design development, and performance standards.

EDUCATIONAL

AISC, together with AISC Marketing, Inc., sponsors a series of continuing education seminars on a regular basis. For example, in 1996, the AISC Seminar Series focused on "Innovations in Structural Steel Systems" while the 1997 seminar featured information on "Designing of Steel for Service," which included roof ponding, floor elevation and level, control of floor vibrations and control of lateral drift. The seminars are usually held in more than 60 cities around the country during a nine month period. For a complete list of seminar dates and locations, visit AISC's web page at http://www.asic.org.

In addition to the Seminar Series, AISC sponsors a number of short courses and a series of lectures from the winner of the Annual T.R. Higgins Award. In the past, the short courses have covered topics such as bracing and hollow structural sections.

On the university side, one of AISC's most noteworthy activities is sponsorship, together with ASCE, of the Student Steel Bridge Competition. The program challenges civil engineering students from across the country to design, fabricate and erect a 1:10 scale model of a bridge across a river valley in a mountainous region. While any type of steel bridge can be designed, there are height limits and the entries are judged on erection time, bridge weight, aesthetics, stiffness, and cost. During the past few years, solutions to the problem statement have become more and more advanced. Teams from more than 185 schools are expected to compete in the regional competitions, with the winners from each regional competition gaining eligibility to compete in the national competition.

AISC also fosters academic-industry relations through its Partners in Education (PIE) Committee. Among the chief goals of the committee are to encourage civil engineering programs to offer sufficient structural engineering content and steel design courses to ensure that future engineers understand the requirements necessary to provide safe and economic structures. The program also aims to encourage interaction between practicing engineers and both professors and engineering students. In addition, a goal is to expose architectural students to various facets of steel design and construction.

Among many other universities-related programs, AISC provides free copies of Modern Steel Construction magazine to students in accredited architectural and engineering programs.

NORTH AMERICAN STEEL CONSTRUCTION CONFERENCE

With today's economic climate and the fast pace of advancing technologies and resources, questions mount seemingly faster than they can be answered. The North American Steel Construction Conference provides an annual opportunity to delve into the rapidly changing and advancing world of steel design and construction, and surface with practical information to help your practice today. It also offers an opportunity to meet and network with other industry professionals.

The NASCC is designed to appeal to a wide range of attendees, including engineers, architects, educators, detailers, fabricators, construction managers, and erectors.

ENGINEERING & RESEARCH

The Engineering & Research Department, in coordination with numerous committees and selected outside consultants, provides the primary staff leadership and support for the technical activities of the Institute, including: Specifications & Codes; Publications; Software; Research; Quality Certification; and the North American Steel Construction Conference. (The latter two programs are highlighted separately.)

SPECIFICATIONS & CODES

The AISC Specification for Structural Steel Buildings has been promulgated for over 75 years with nine editions of Allowable Stress Design (ASD) and the more recent of two releases of Load and Resistance Factor Design (LRFD). These have been well recognized design standards, not only in the USA, but also worldwide. An expert and balanced committee has responsibility for maintaining the reliability (safety) of the specification in conformance with consensus operating procedures. Separate AISC Specifications on Seismic Provisions, Single Angle Members, Nuclear Facilities, and Tubular (HSS) Design (first introduced in 1997) supplement this parent document. In addition, AISC is responsible for producing the industry's Code of Standard Practice.

Active staff liaison with other independent and industry organizations, affiliated standards (such as AWS), code groups and professional societies, and research developments help to identify current needs and new information.

PUBLICATIONS

Dissemination of technical steel information in usable form is a constant task. A regular by-product of each main AISC Specification has been an accompanying "**Manual of Steel Construction"**. The Manual has and continues to be the best known engineering product of AISC. In addition, there now exists a series of **Design Guides** to expand coverage on special topics. More recently AISC published **"Designing with Structural Steel-A Guide for Architects,"** a comprehensive desk reference for architects which addresses the common steel systems, materials, and details. Ideas, and references used by architects daily, are incorporated. The quarterly publication, **Engineering Journal**, has been a popular reference for timely application articles on steel design and research. Contact AISC for a list of publications.

A periodical published by AISC is **Modern Steel Construction**. A monthly magazine reporting on innovative building and bridge projects, MSC presents in-depth information on the newest, most advanced applications of structural steel in a wide range of structure types. Two highly useful sections are Steel Interchange, a question-and-answer column, and Bridge Crossings, which offers
practical design advice to bridge designers and owners on such subjects as:

- Tips on Designing Weathering Steel
- Designing and Specifying Better Bearing Details
- Design and Use of Integral Pier Caps
- Economical Bridge Connections

MSC also included product information, a calendar listing and structural shape availability. For information on U.S. subscriptions to Modern Steel Construction call 312-670-2400. For information on foreign subscriptions to Modern Steel Construction call 312-670-5444.

SOFTWARE

Software has taken on an increasingly important role. The steel shape database, connection design (CONXPRT), and beam web opening (WEBOPEN) computer programs are available. Updates, expansion, and new initiatives are under serious review by a dedicated committee. For more information on AISC Software, call (312) 670-5444.

An AISC Home Page is on-line (http://www.aisc.org). Efforts are continuing on standardizing a data exchange format among design and detailing software.

RESEARCH

AISC remains at the center of much of the structural steel research, either in an advisory and/or partial funding role. Close cooperation with government agencies, steel mills, the private sector, universities, and local fabricators help to focus projects and to quickly disseminate important research results. Extensive work is currently underway for seismic considerations, particularly changes in special steel moment frames, and further progress on design, welding, and materials is anticipated.

QUALITY

The purpose of the AISC Quality Certification Program is to confirm to the construction industry that a certified firm has the personnel, organization, experience, procedures, knowledge, equipment, capability and commitment to fabricate and erect steel of the required quality for a given category of structural steel work.

The AISC Certification Program is not intended to involve inspection and/or judgment of product quality on individual projects. Neither is it intended to guarantee the quality of specific fabricated steel products or erection.

The program uses independent auditors to confirm that an individual fabrication plant has the capability to perform the desired level of work. The program does not look at specific projects; rather, the highly detailed checklist focuses on general management, engineering and drafting, procurement, operations and quality control. And, of course, the auditors examine actual work performance.

Fabricators can be certified in one of five categories, coinciding with the market for fabrication. In addition, fabricators can receive two optional endorsements, one for Sophisticated Paint Systems and one for Fracture Critical Members. Erection can be certified in two catergories.

CERTIFICATION PROGRAM

Certification Categories

Conventional Steel Buildings
Includes small public service and institutional buildings (schools, etc.), shopping centers, light manufacturing plants, miscellaneous and ornamental iron work, warehouses, low-rise beam/column/light truss structures.

Simple Steel Bridge Structures
Includes highway sign structures, parts for bridges (such as cross frames), unspliced rolled beam bridges.

Complex Steel Buildings
Includes large public service and institutional buildings, heavy manufacturing plants, powerhouses, metal producing/rolling buildings, crane girders, bunkers and bins, stadiums, auditoriums, high-rise buildings, petro/chemical processing. Fabricators certified for Complex Steel Buildings also are automatically certified for Conventional Steel Buildings.

Major Steel Bridges
All bridge structures other than unspliced rolled beam bridges. Fabricators certified for Complex Steel Bridges also are automatically certified for Simple Steel Bridge Structures.

Metal Building Systems (Mb)
Pre-engineered metal building systems including cold-formed members and panels.

Sophisticated Paint System Endorsement
Systems that require an extra degree of training, control, preparation, and inspection beyond that normally used in common single-coat systems such as oxides, alkyds, solvent-based epoxies and solvent-based zincs.

Fracture Critical Members Endorsement (F)
Familiarity with procedures required to produce fracture critical members in accordance with a fracture control plan as defined by AASHTO or AREA.

Certified Steel Erector
Erection contractors qualified to erect buildings of various types of low- and mid-rise structures and simple non-continuous bridges.

Certified Advanced Steel Erector
Erection contractors qualified to erect heavy structures, continuous girder bridges, railway bridges, power plants, locks and dams and high-rise structures.

While the pre-qualification aspect of the program is important, it is not its sole raison d' etre. Rather, the program also has long-term benefits for a fabricator through the periodic review and maintenance of quality systems and procedures. It helps communicate the latest quality issues to fabricators through the input of auditors trained in structural steel fabrication.

An up-to-date listing of all Quality Certified Fabricators and erectors can be found on AISC's homepage at http://www.aisc.org or in the December issue of Modern Steel Construction magazine. For more information on the program, call (312) 670-5435, e-mail qualcert@aiscmail.com or fax (312) 670-5403.

ENGINEERING JOURNAL

A quarterly technical journal devoted exclusively to the design of steel structures. Unlike some technical publications, EJ avoids the esoteric and aims instead to provide information that is usable in the everyday office. EJ provides structural engineers, architects, fabricators and educators the latest information on such subjects as base plate design, high-strength bolts for bridges, bracing design, serviceability limits and composite design. **For information on subscriptions to Engineering Journal, call 312-670-5444.**

AISC SOFTWARE:

AISC Database
A shapes program that can be incorporated into in-house programs

CONXPRT
A connections design program

WEBOPEN
For designing steel beam-web penetrations

AISC for AutoCAD
A shape drawing program that runs inside of DOS-based AutoCAD

SIMON Systems
A PC-based girder design program

New in 1997 is System VANCK
A V-load analysis program for curved open-framed I-girder bridges.

For more information on AISC Software, call 312-670-5444 or E-mail gonzalez@aiscmail.com
Or point your favorite web browser at AISC's homepage. For a complete and free listing of AISC publications, call 800-644-24400, or view the entire publications list on AISC homepage at http//www.aisc.org.