CITY OF LONG BEACH
COASTAL ZONE
MANAGEMENT GRANT
NUMBER G0088116
JUNE 1988

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C57
1988

ABSTRACT

1. **TITLE:** City of Long Beach Ocean Beach Boardwalk.
2. **AUTHORS:** Nabiel Shawa, City Administrator; David Jensen, Architect; Hart Crowser, Geotechnical Consultants.
3. **SUBJECT:** Design and construction standards for the City of Long Beach Ocean Beach Boardwalk.
4. **DATE:** June 1988
5. **DEPARTMENT & PARTICIPATING LOCALITY:** Washington State Department of Ecology & City of Long Beach.
6. **SOURCE OF COPIES:** City of Long Beach
7. **WDOE PROJECT NUMBER:** G0088116
8. **SERIES NUMBER:** Section 306 of the Coastal Zone Management Act.
9. **NUMBER OF PAGES:** 124

The outstanding purpose of this publication is the development of design and construction standards of the first ocean beach boardwalk on the Pacific Coast in the State of Washington. The goals of this project are: reduce user conflict by dedicating a section of the beach and dunes to pedestrian activities; vastly improve pedestrian access to the dunal area by providing a dedicated pathway through the dunes with off ramps to the beach, which will reduce vegetative destruction on the dunal system; increase the public's awareness of the importance of the dunal system and its related ecosystem.

Section One of the City of Long Beach Ocean Beach Boardwalk gives a summary account of the project and the following sections.

Section Two includes complete architectural drawings for the Ocean Beach Boardwalk with a materials schedule list.

Section Three consists of the Project Manual which includes complete specifications, bidding requirements, and bidding forms.

Section Four is the geotechnical consultants data on piling installation. This information has been incorporated in the architectural drawing and project manual.

Section Five includes structural engineering data which has been incorporated in the boardwalk design.

TABLE OF CONTENTS

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"The preparation of this report was financially aided through a grant from the Washington State Department of Ecology with funds obtained from the National Oceanic and Atmospheric Administration, and appropriated for Section 306b of the Coastal Zone Management Act of 1972."

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U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

SECTION 1

SUMMARY ACCOUNT

Pursuant to the tasks setforth in Appendix "A" of Coastal Zone Management Grant number G0088116 the following is a summary account of each individual task.

TASK 1: ARCHITECTURAL DRAWINGS

The City of Long Beach selected David Jensen as the architect for the ocean beach boardwalk project. This selection was made after a review of architects that responded to a legal notice requesting statements of qualifications.

The enclosed drawings are complete architectural working plans necessary for construction. The style fits in with the City of Long Beach's early seashore theme. The boardwalk is composed of rough lumber (except for handrails). It includes amenities such as the Squall Shelter (which will contain interpretive signage), low level lighting (which will allow evening use but will not drown out sunsets or star light), down ramps to the beach, and benches along the entire structure. Also the boardwalk will be completely barrier free with planned barrier free parking at either end. The city's sidewalk system will also tie directly into both ends of the boardwalk to form an approximately 1.5 mile pedestrian loop from downtown Long Beach.

Mr. Jensen paid particular attention to utilizing standard lengths of lumber and repetitive patterns for construction in an attempt to contain construction costs, yet the type of material and construction standards specified provide for a structure that will endure coastal weather.

On June 14, 1988 the City of Long Beach held a boardwalk review meeting with affected agencies. Those present were Pete Skowland of Shorelines Division of the Department of Ecology, Dan Guy of the Department of Wildlife, and Dave Heiser of Washington State Parks and Recreation Commission. We reviewed architectural design, exact placement of the boardwalk on the dunal system, proposed materials and construction methods. At the conclusion of the meeting all parties were satisfied (some were actually excited) with the proposal.

TASK 2: PROJECT MANUAL

The enclosed Project Manual accompanies the architectural working drawing. It includes complete specifications for the entire project as well as bidding information and forms.

TASK 3: GEOTECHNICAL ENGINEERING RECOMMENDATIONS

Hart Crowser provided the city with geotechnical recommendations concerning the specifications for the boardwalk pilings. Their report includes suitability of soils for this project, pile size for projected boardwalk live loads, methods for pile installation, and guidelines for piling depths. These recommendations were incorporated into the working drawings and project manual.

TASK 4: STRUCTURAL ENGINEERING SPECIFICATIONS

Gray & Osborne is the City of Long Beach's engineering consultants. They assisted the city in providing structural engineering and electrical specifications (as well as many other productive suggestions and ideas). The enclosed structural engineering packet is in rough draft form but it includes pertinent information. Theses specifications were also incorporated in the working drawings and project manual.

SECTION 2

ARCHITECTURAL DRAWINGS

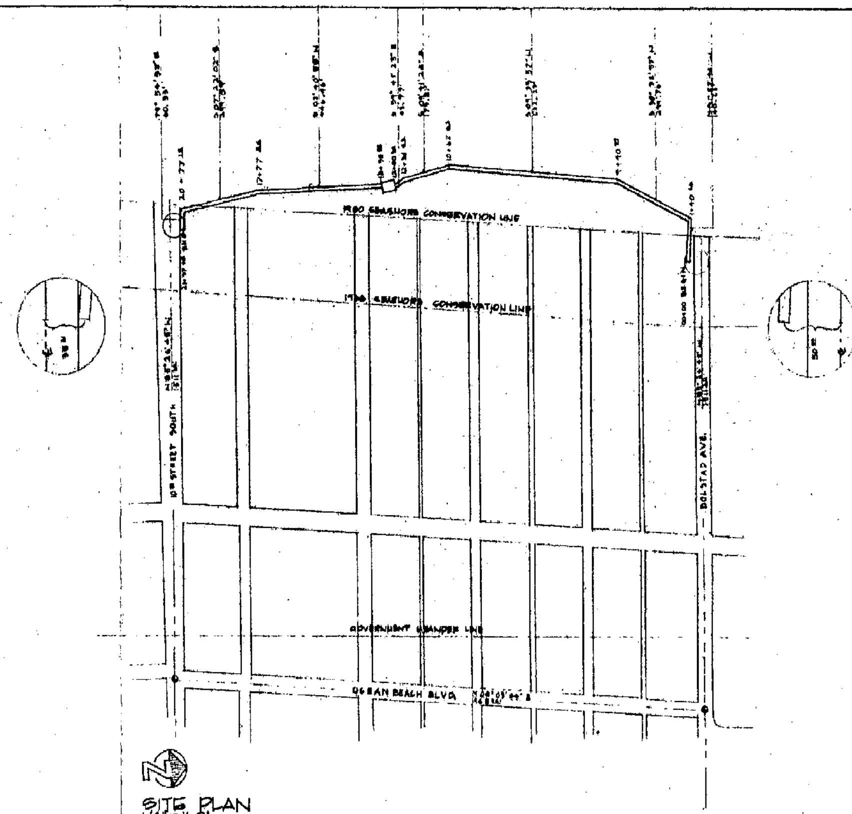
BY

DAVID JENSEN

PROJECT DIRECTORY

OWNER:	City of Long Beach P.O. Box 310 Long Beach, Wa. 98631
ARCHITECT:	David E. Jensen 103 Pacific Ave. So. Long Beach, Wa. 98631
STRUCTURAL ENGINEER:	Gray and Osborne, Inc., P.S. Consulting Engineers Attn: Andy Soule' 701 Dexter Ave. N. Suite 200 Seattle, Wa. 98109
GEOTECHNICAL ENGINEER:	Hart Crowser, Inc. Attn: Michael Bailey 1910 Fairview Ave. E. Seattle, Wa. 98109
ELECTRICAL ENGINEER:	Gray and Osborne, Inc., P.S. Consulting Engineers 701 Dexter Ave. N. Seattle, Wa. 98109

TABLE OF CONTENTS



SITE PLAN

OCEAN BEACH BOARDWALK

LONG BEACH WASHINGTON

OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
POST OFFICE BOX 310 LONG BEACH, WASHINGTON 98631

CZM GRANT #G0088118

DAVID E. JENSEN, ARCHITECT
ROUTE 1 BOX 31 LONG BEACH
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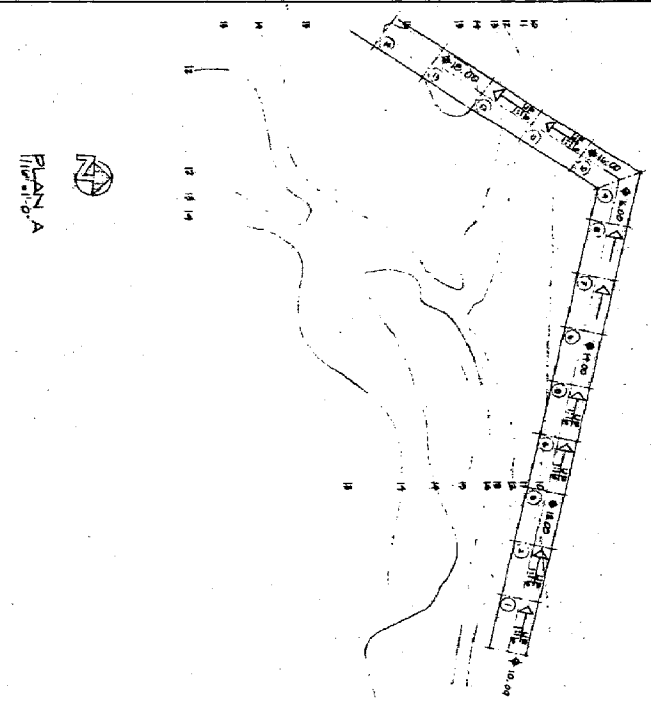
206-642-3507

SCHEMATIC DESIGN
DESIGN DEVELOPMENT
1-11-89 CONSTRUCTION DOCUMENTS

1



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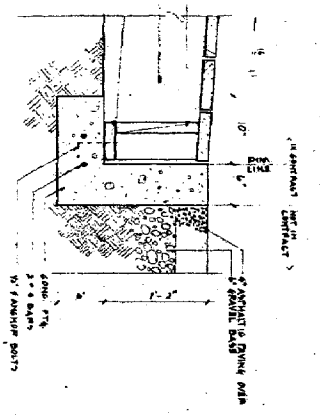

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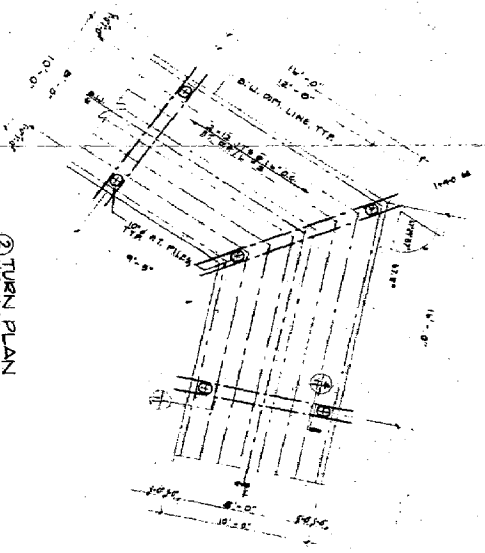

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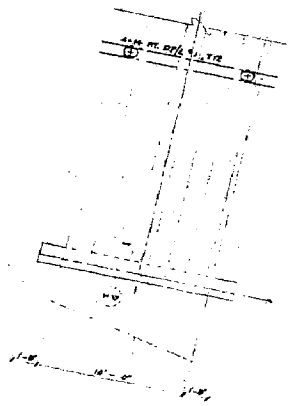

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2

OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
POST OFFICE BOX 310 LONG BEACH, WASHINGTON 98631

CZM GRANT #G0000110

DAVID E. JENSEN, ARCHITECT
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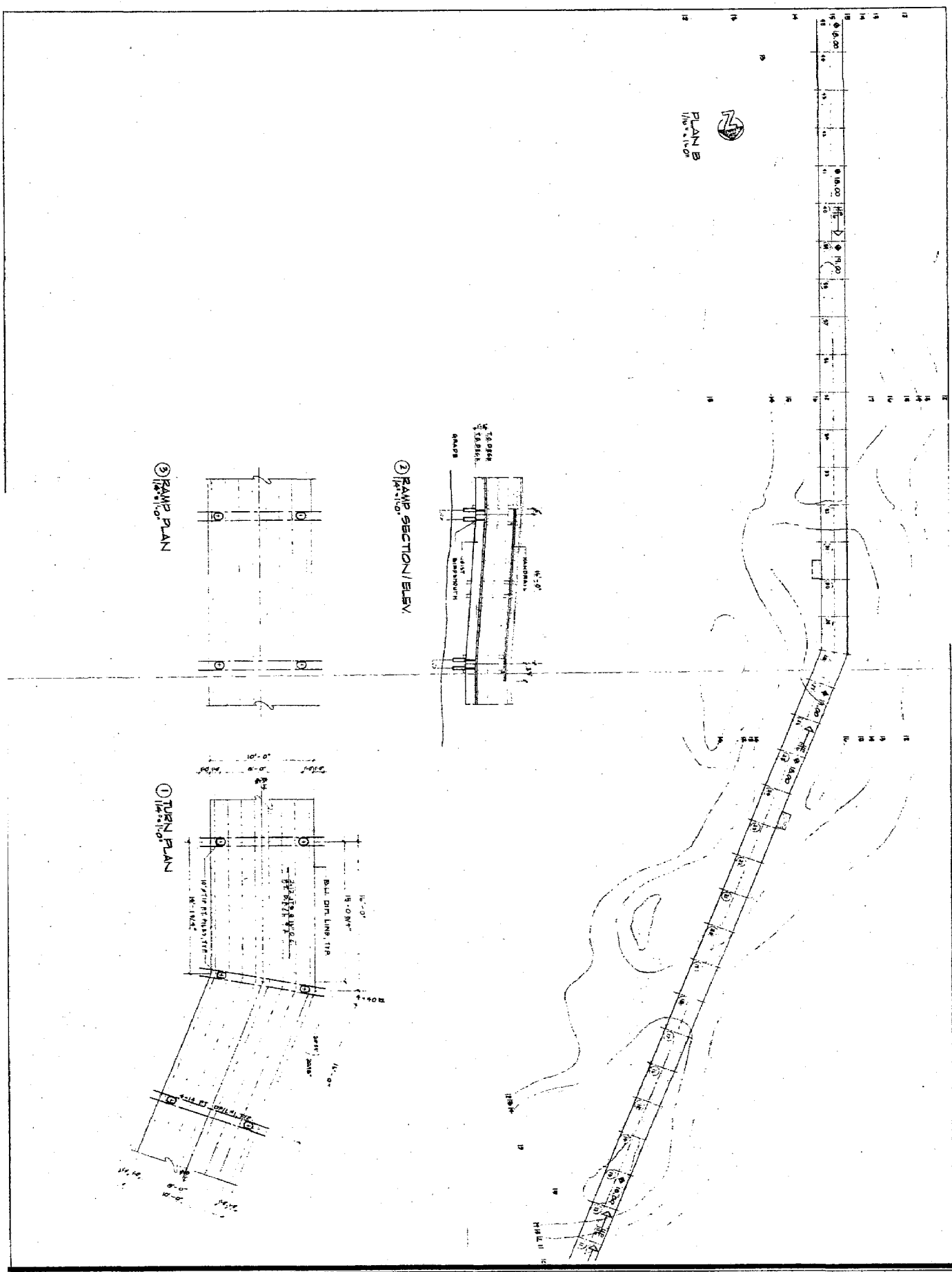
SCHEMATIC DESIGN
DESIGN DEVELOPMENT
CONSTRUCTION DOCUMENTS



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OCEAN BEACH BOARDWALK
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CZM GRANT #G0058116

DAVID E. JENSEN, ARCHITECT
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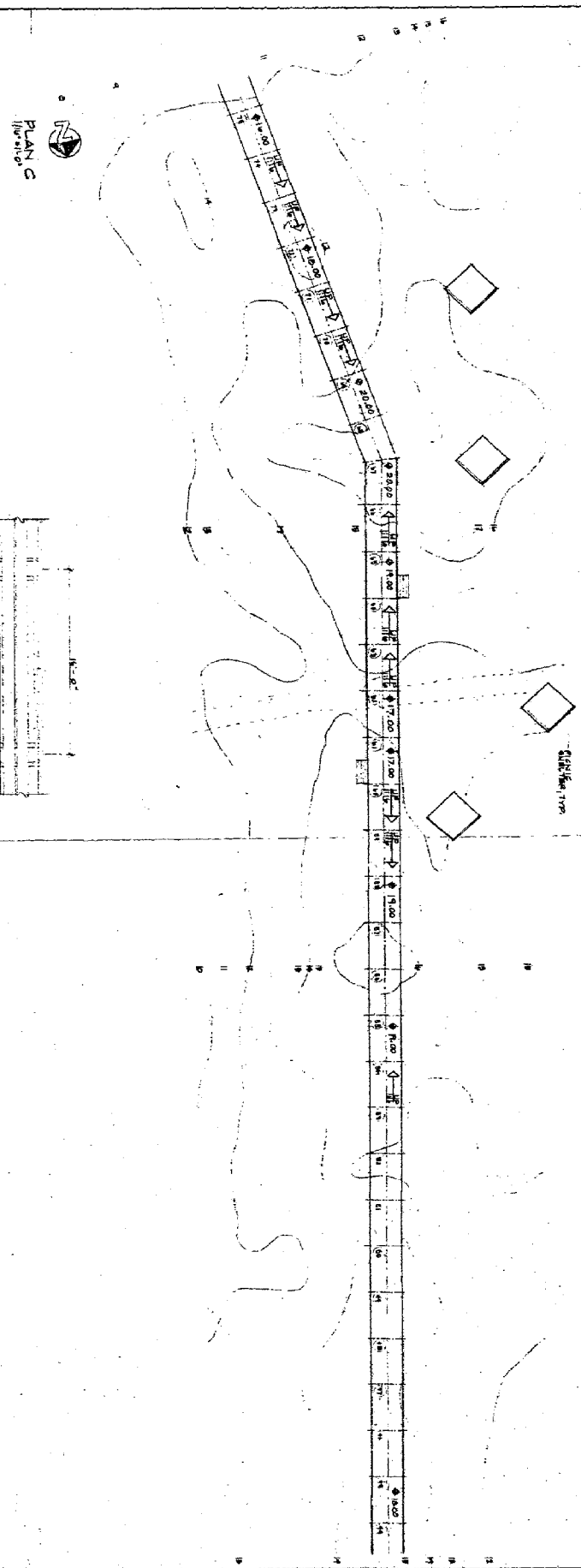
7-11-90	CONSTRUCTION DOCUMENTS



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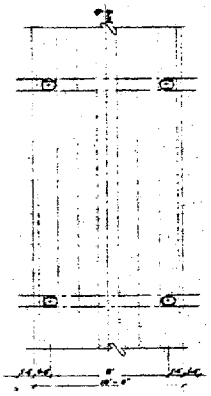

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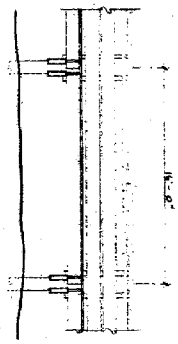

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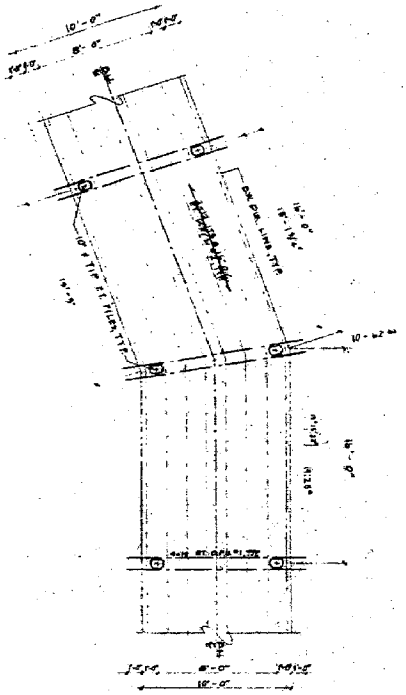

① TURN PLAN
1/4"=1'-0"

4

OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
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CZM GRANT #G0058116

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SCHEMATIC DESIGN
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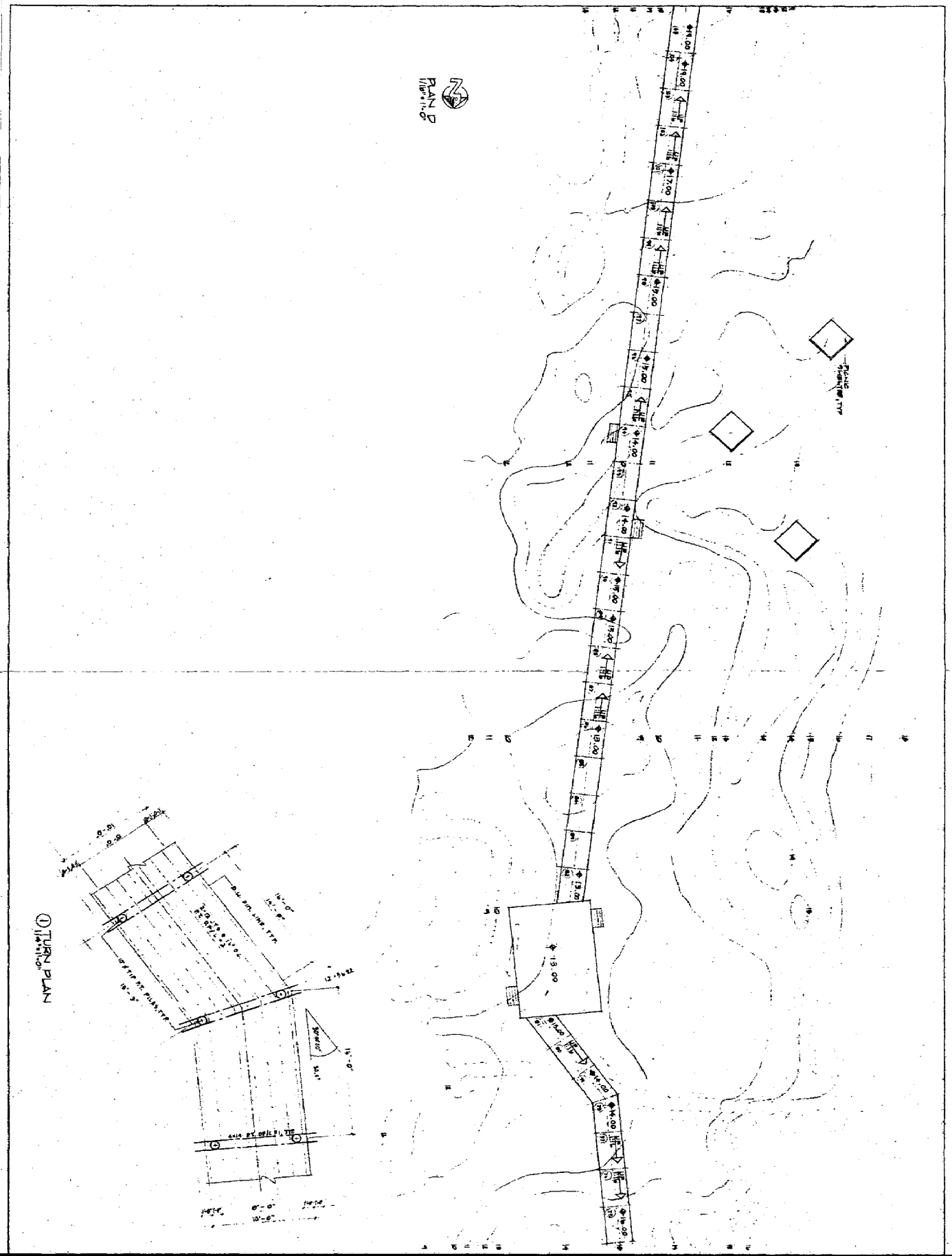

5

OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
POST OFFICE BOX 310 LONG BEACH, WASHINGTON 98631

CZM GRANT #G0095116

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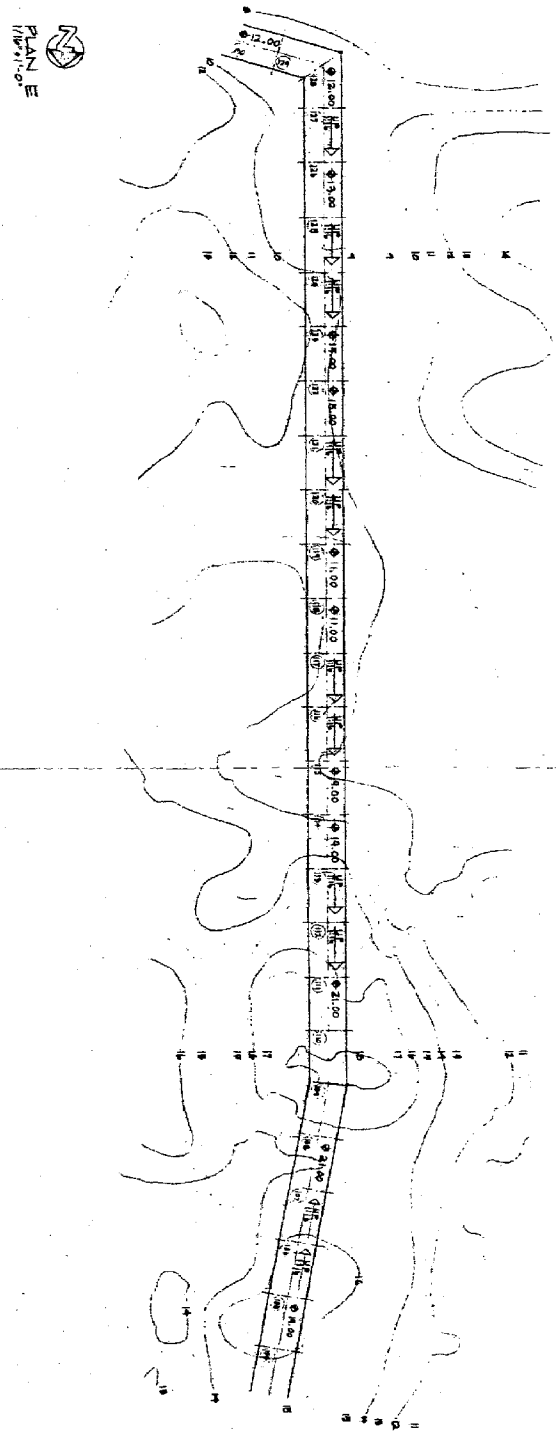
	SCHEMATIC DESIGN
	DESIGN DEVELOPMENT
7-91	CONSTRUCTION DOCUMENTS



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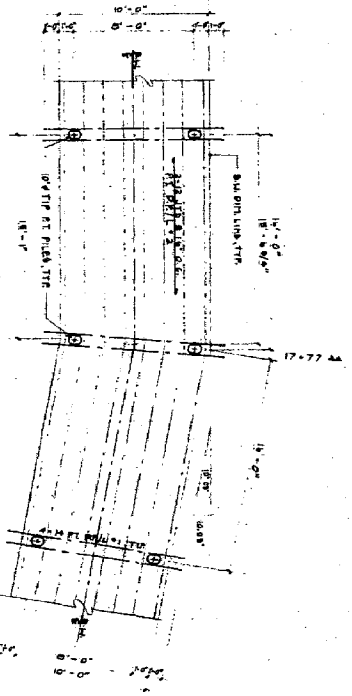

① TURN PLAN

OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
POST OFFICE BOX 310 LONG BEACH, WASHINGTON 98631

CZM GRANT #G0088116

DAVID E. JENSEN, ARCHITECT
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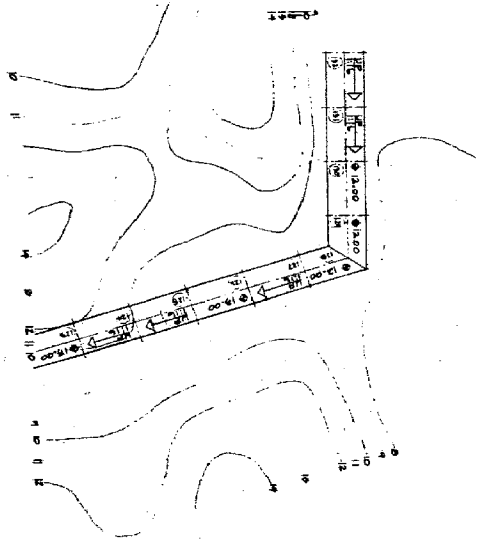
	SCHEMATIC DESIGN
1/16	DESIGN DEVELOPMENT
	CONSTRUCTION DOCUMENTS



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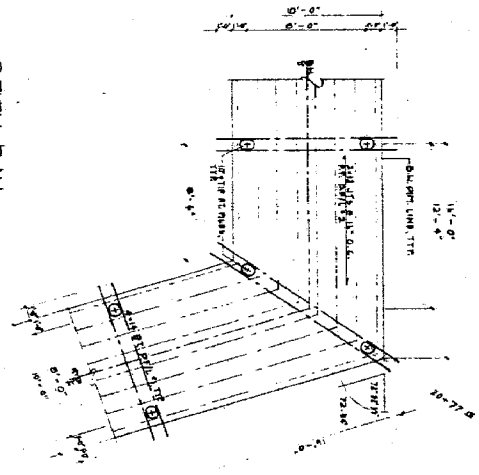

① TURN PLAN

OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
POST OFFICE BOX 319 LONG BEACH, WASHINGTON 98631

CZM GRANT #G0068116

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206-642-3507

	SCHEMATIC DESIGN
	DESIGN DEVELOPMENT
141-80	CONSTRUCTION DOCUMENTS

BOARDWALK SCHEDULE

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8	RAMP	2,3/3	5/11	—	—	
9	TURN	2/2	—	—	—	
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20	LEVEL	2,3/4	—	6/11	—	
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23	LEVEL	2,3/4	—	—	—	
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25	LEVEL	2,3/4	—	6/11	—	
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SCHEMATIC DESIGN
DESIGN DEVELOPMENT
7-1-86 CONSTRUCTION DOCUMENTS

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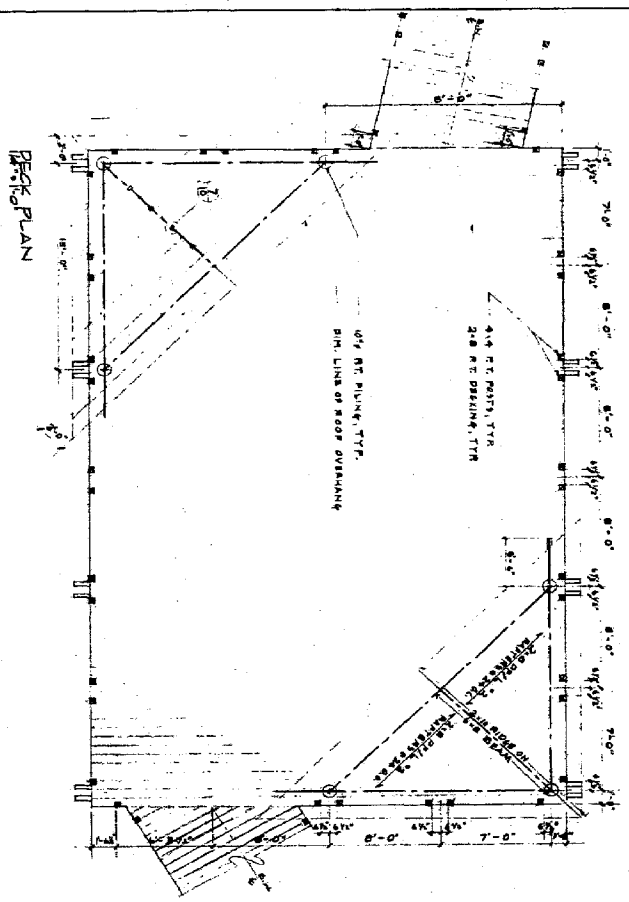
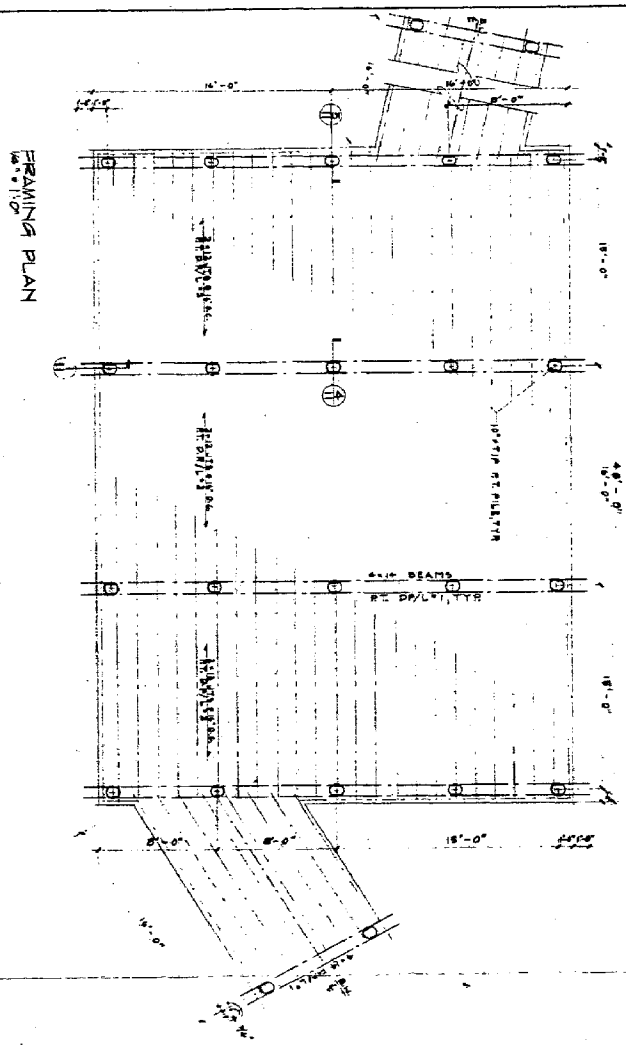
WASHINGTON

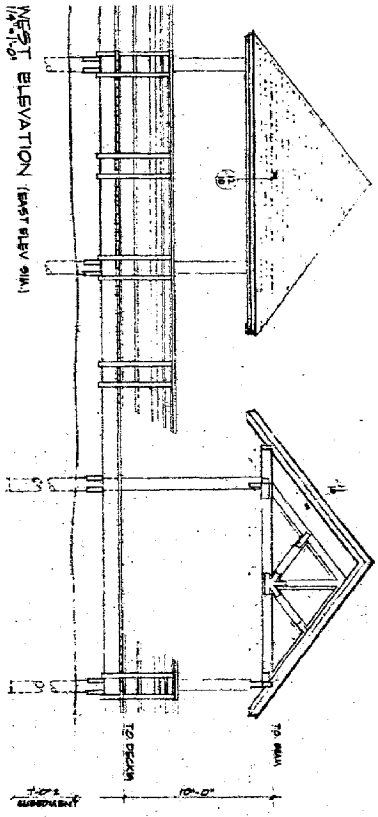
OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
POST OFFICE BOX 310 LONG BEACH, WASHINGTON 98631

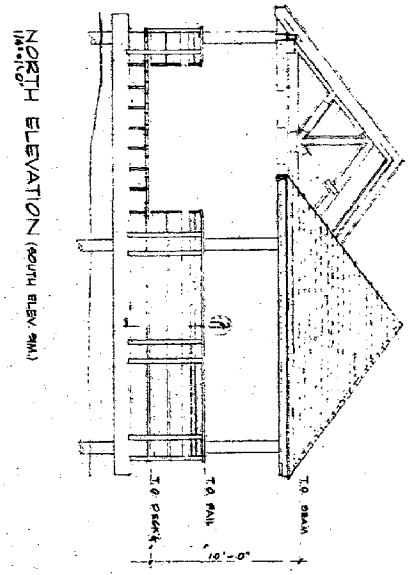
CZM EQUIP #G0089116

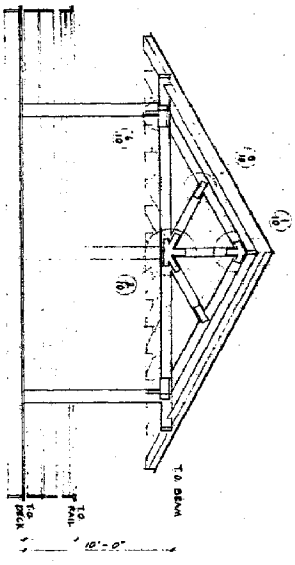
8











6

OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
POST OFFICE BOX 310 · LONG BEACH, WASHINGTON 98631

CZM GRANT #G0055116

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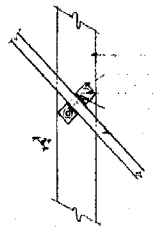
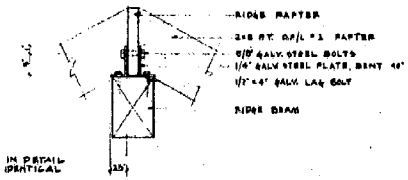
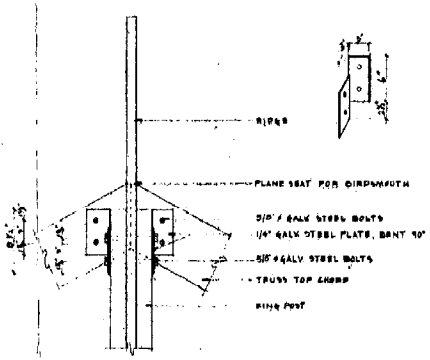
SCHEMATIC DESIGN
DESIGN DEVELOPMENT
CONSTRUCTION DOCUMENTS



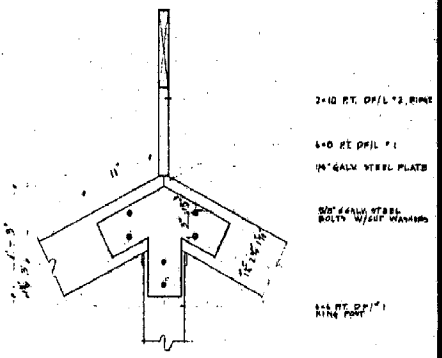
⑩ RAFTER TIE-DOWN
1½" = 1'-0"



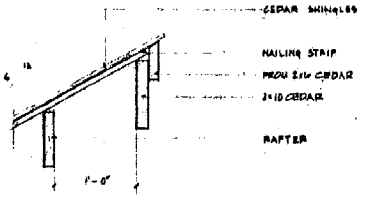
⑦ RIDGE CONN.
1½" = 1'-0"



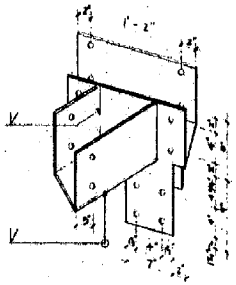
④ RIDGE TO TRUSS CONN
1½" = 1'-0"



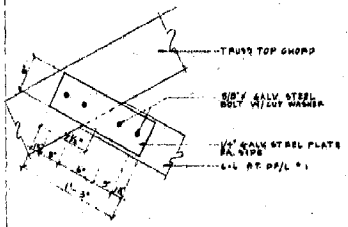
① TOP CHORD CONN.
1½" = 1'-0"



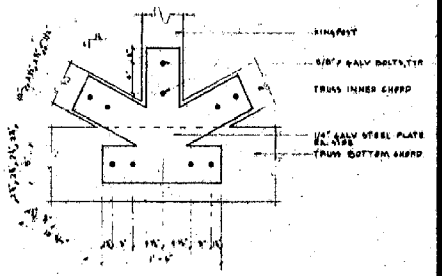
⑪ BARGE
1½" = 1'-0"



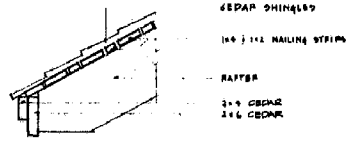
⑧ TRUSS TO BEAM OBLIQUE
1½" = 1'-0"



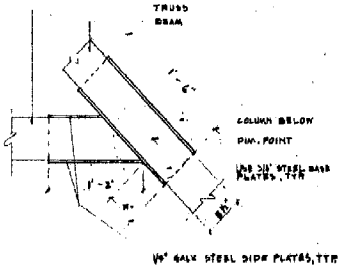
⑤ STRUT TO CHORD CONN.
1½" = 1'-0"



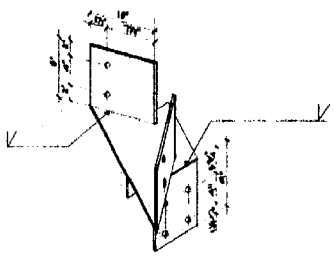
② BOTTOM CHORD CONN.
1½" = 1'-0"



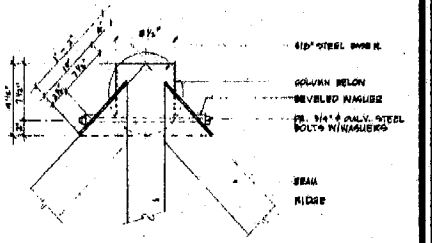
⑫ EAVE
1½" = 1'-0"



⑨ TRUSS TO BEAM CONN.
1½" = 1'-0"



⑥ BEAM TO RIDGE OBLIQUE
1½" = 1'-0"



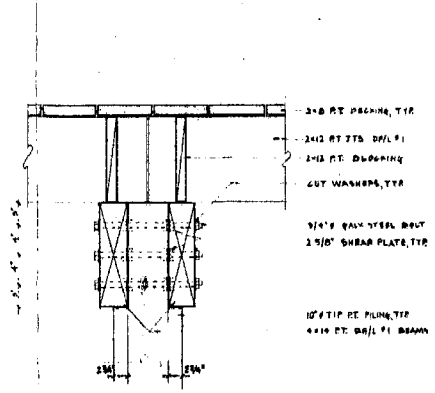
③ BEAM TO RIDGE CONN.
1½" = 1'-0"

OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
POST OFFICE BOX 310 LONG BEACH, WASHINGTON 98631

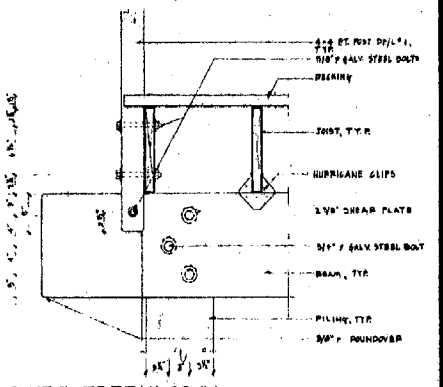
CZM GRANT #G0088116

DAVID E. JENSEN, ARCHITECT
ROUTE 1 BOX 31 193 PACIFIC AVENUE SOUTH
LONG BEACH WASHINGTON
206-642-3807

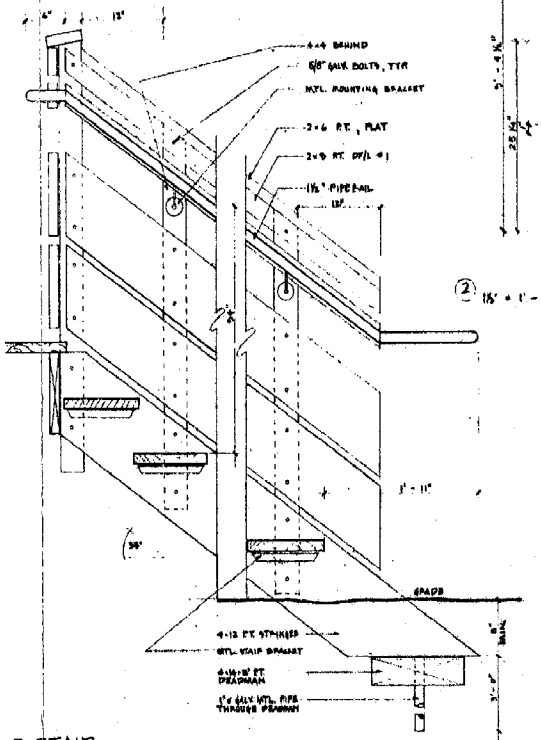
10



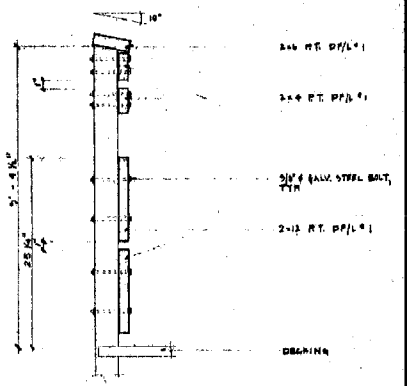
④ BEAM TO PILE CONN.
1½" = 1'-0"



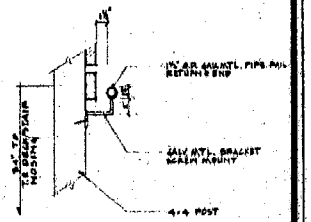
① DECK TO BEAM CONN.
1½" = 1'-0"



⑤ STAIR
1½" = 1'-0"



②
1½" = 1'-0"



③ HAND RAIL
1½" = 1'-0"

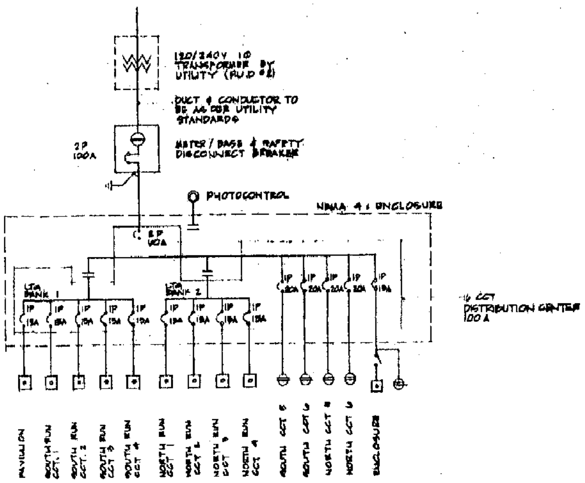
SCHEMATIC DESIGN
DESIGN DEVELOPMENT
T.I.P. #6 CONSTRUCTION DOCUMENTS

DAVID E. JENSEN, ARCHITECT
ROUTE 1 BOX 21
LONG BEACH
103 PACIFIC AVENUE SOUTH
WASHINGTON
206-642-3607

OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
POST OFFICE BOX 310
LONG BEACH, WASHINGTON 98631

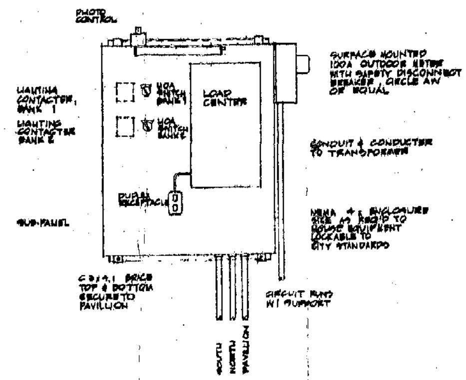
GEM GRANT #G0088116

11

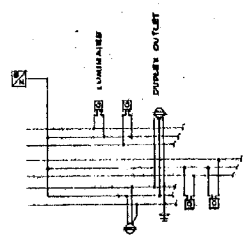


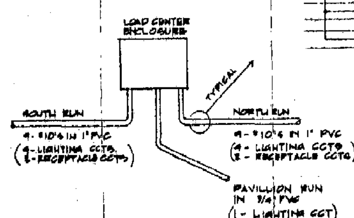
ELECTRICAL SCHEMATIC

PANEL BOARD DATA			
PANEL BOARD CCT. #	LOAD DESCRIPTION	WIRE SIZE	CIRCUIT BREAKERS
L 1	PAVILLION LIGHTING	10	1P - 15A
L 2	SOUTH RUN DN LTG. (#1)	10	1P - 15A
L 3	" " " " (#2)	10	1P - 15A
L 4	" " " " (#3)	10	1P - 15A
L 5	" " " " (#4)	10	1P - 15A
L 6	NORTH RUN DN LTG. (#1)	10	1P - 15A
L 7	" " " " (#2)	10	1P - 15A
L 8	" " " " (#3)	10	1P - 15A
L 9	" " " " (#4)	10	1P - 15A
L 10	SOUTH RECEPTACLE (#5)	10	1P - 20A
L 11	" " (#6)	10	1P - 20A
L 12	NORTH RECEPTACLE (#5)	10	1P - 20A
L 13	" " (#6)	10	1P - 20A
L 14	ENCLOSURE LIGHT & RECEP.	12	1P - 15A
L 15	SPARE		
L 16	SPARE		

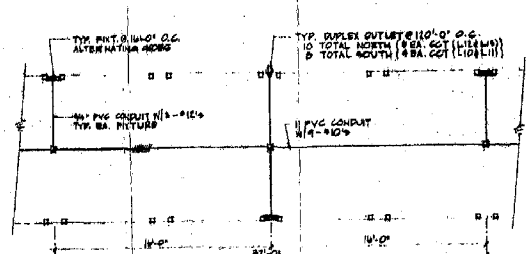


ENCLOSURE LAYOUT

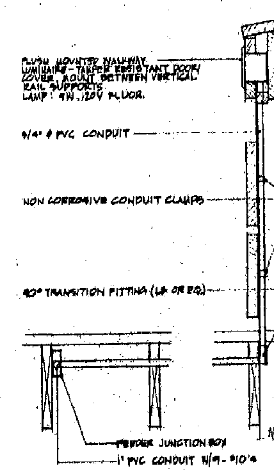




CONDUIT FEEDERS



LUMINAIRE/RECEPTACLE LOCATION



TYPICAL FIXTURE

OCEAN BEACH BOARDWALK
CITY OF LONG BEACH
POST OFFICE BOX 310 LONG BEACH, WASHINGTON 98631

CZM GRANT #G0088116

DAVID E. JENSEN, ARCHITECT
ROUTE 1 BOX 31 LONG BEACH
103 PACIFIC AVENUE SOUTH WASHINGTON
206-642-3507

SCHEMATIC DESIGN
DESIGN DEVELOPMENT
5-11-09 CONSTRUCTION DOCUMENTS

E-1

SECTION 3

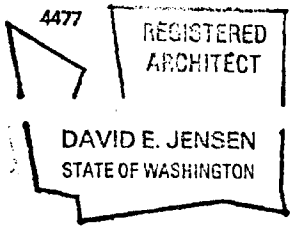
PROJECT MANUAL

SECTION 3

PROJECT MANUAL
including Specifications
for construction of

OCEANBEACH BOARDWALK

City of Long Beach
Washington



Prepared by

David E. Jensen, Architect
103 Pacific Ave. S.
Rt. 1, Box 31
Long Beach, Wa. 98631
206-642-3507

June 30, 1988

Coastal Zone Management Grant # G0088116

DIVISION 0 - CONTRACT ADMINISTRATION

0001 PROJECT MANUAL INDEX

DIVISION 0 - CONTRACT ADMINISTRATION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

0731 SHINGLES

DIVISION 16 - ELECTRICAL

1601 GENERAL
1610 MATERIALS
1620 INSTALLATION

DIVISION 0 - CONTRACT ADMINISTRATION

0002 PROJECT DIRECTORY

OWNER:	City of Long Beach P.O. Box 310 Long Beach, Wa. 98631
ARCHITECT:	David E. Jensen 103 Pacific Ave. S. Long Beach, Wa. 98631
STRUCTURAL ENGINEER:	Gray and Osborne, Inc., P.S. Consulting Engineers Attn: Andy Soule' 701 Dexter Ave. N. Suite 200 Seattle, Wa. 98109
GEOTECHNICAL ENGINEER:	Hart Crowser, Inc. Attn: Michael Bailey 1910 Fairview Ave. E. Seattle, Wa. 98109
ELECTRICAL ENGINEER:	Gray and Osborne, Inc., P.S. Consulting Engineers 701 Dexter Ave. N. Seattle, Wa. 98109

DIVISION 0 - CONTRACT ADMINISTRATION

0003 INVITATION TO BID

Notice is hereby given that

THE CITY OF LONG BEACH, WASHINGTON

will accept bids for the construction of

THE OCEANBEACH BOARDWALK

according to Construction Documents prepared by David E. Jensen, Architect and described in general as:

> A 2137 ft. long by 10 ft. wide wood framed, boardwalk to be constructed approximately on the secondary dune in a north-south direction between Bolstad Avenue and 10th Street South in the City of Long Beach, Wa. The project also includes a rain shelter pavillion and several satellite platforms.

Bona fide general contract bidders may secure copies of the proposed Contract Documents from the office of the architect on the following basis:

> Two copies of the Project Manual and two sets of the prints of the drawings, upon payment of $75.00 deposit, completely refundable if both sets are returned to the architect in satisfactory condition, within five calendar days after the bid opening.

Bid security in the amount of 5% of the base bid will be required to accompany bids.

Bids will be opened on:

> Time and date to be determined.

The Owner reserves the right to reject any or all bids and to waive irregularity in the bids and in the bidding.

DIVISION 0 - CONTRACT ADMINISTRATION

0010 INSTRUCTIONS TO BIDDERS

A. THE WORK:

THE OCEANBEACH BOARDWALK
LONG BEACH, WA.

B. SECURING DOCUMENTS:

Copies of the proposed Contract Documents may be obtained from:

David E. Jensen, Architect
103 Pacific Ave. S.
Long Beach, Wa. 98631

upon the conditions set forth in the invitation to bid.

C. BID FORM:

In order to receive consideration, make bids in strict accordance with the following:

1. Make bids upon the forms provided therefore, properly signed and with all items filled out. Do not change the wording of the bid form, and do not add words to the bid form. Unauthorized conditions, limitations, or provisions attached to the bid will be cause for rejection of the bid. If alterations by erasure or interlineation are made for any reason, explain over such erasure or interlineation with a signed statement from the bidder.

2. No telegraphic bid or telegraphic modification of a bid will be considered. No bids received after the time fixed for receiving them will be considered. Late bids will be returned to the bidder unopened.

3. Address bids to the Owner, and deliver to the address given in the invitation to bid on or before the day and hour set for opening the bids. Enclose each bid in a sealed envelope bearing the title of the Work. the name of the bidder, and the date and hour of the bid opening. Submit only the original signed copy of the bid. It is the sole responsibility of the bidder to see that his bid is received on time.

D. BONDS:

1. Bid security in the amount stated in the invitation to bid must accompany each bid. The successful bidder's security will be retained until he has signed the Contract and has furnished the required Certificates of Insurance.

2. The Owner reserves the right to retain the security of all bidders until the successful bidder enters into the Contract or until 30 days after bid opening, whichever is sooner. Other bid security will be returned as soon as practicable. If any bidder refuses to enter into a Contract, the Owner may retain his bid security as liquidated damages but not as a penalty.

3. Prior to signing the Contract, the Owner may require the successful bidder to secure and post a Labor and Materials Payment Bond and a Performance Bond, each in the amount of 100% of the Contract Sum, and each on the form provided therefore in the Project Manual. Such bonds shall be issued by Surety acceptable to the Owner. Costs of such bonds will be added to the agreed Contract sum.

E. EXAMINATION OF DOCUMENTS AND SITE OF WORK

Before submitting a bid, each bidder shall examine the Drawings carefully, shall read the Specifications and all other proposed Contract Documents, and shall visit the site of the Work. Each bidder shall fully inform himself prior to bidding as to existing conditions and limitations under which the Work is to be performed, and shall include in his bid a sum to cover the cost of items necessary to perform the Work as set forth in the proposed Contract Documents. No allowance will be made to a bidder because of lack of such examination or knowledge. The submission of a bid will be considered as conclusive evidence that the bidder has made such examination.

F. PROOF OF COMPETENCY OF BIDDER

A bidder may be required to furnish evidence satisfactory to the Owner that he and his proposed subcontractors have sufficient means and experience in the types of work called for to assure completion of the Contract in a satisfactory manner.

G. WITHDRAWAL OF BIDS

1. A bidder may withdraw his bid, either personally or by written request, at any time prior to the scheduled time for opening bids.

2. No bidder may withdraw his bid for a period of thirty calendar days after the date set for opening thereof, and bids shall be subject to acceptance by the Owner during this period.

H. AWARD OR REJECTION OF BIDS

The Contract, if awarded, will be awarded to the responsible bidder based on Contract Sum and interview, subject to the Owner's right to reject any or all bids and to waive informality in the bids and in the bidding.

I. EXECUTION OF AGREEMENT

1. The form of Agreement which the successful bidder will be required to execute is included in the Project Manual.

2. The bidder to whom the Contract is awarded shall, within fifteen calendar days after notice of award and receipt of Agreement forms from the Owner, sign and deliver required copies to the Owner.

3. At or prior to delivery of the signed Agreement, the bidder to whom the Contract is awarded shall deliver to the Owner those Certificates of Insurance required by the Contract Documents and such Labor and Materials Payment Bonds and Performance Bond as are required by the Owner.

4. Bonds and Certificates of Insurance shall be approved by the Owner before the successful bidder may proceed with the Work. Failure or refusal to provide Bonds or Certificates of Insurance in a form satisfactory to the Owner shall subject the successful bidder to loss of time from the allowable construction period equal to the time of delay in furnishing the required material.

J. INTERPRETATION OF CONTRACT DOCUMENTS PRIOR TO BIDDING

1. If any person contemplating submitting a bid for construction of the Work is in doubt as to the true meaning of any part of the proposed Contract Documents, or finds discrepancies in or omissions from any part of the proposed Contract Documents, he may submit to the Architect a written request for interpretation thereof not later than seven days before bids will be opened. The person submitting the request shall be responsible for its prompt delivery.

2. Interpretation or correction of proposed Contract Documents will be made only by Addendum and will be mailed or delivered to each general contract bidder of record. The Owner will not be responsible for any other explanations or interpretations of the proposed Contract Documents.

DIVISION 0 - CONTRACT ADMINISTRATION

0031 BID FORM

To: City of Long Beach
P.O. Box 310
Long Beach, Wa. 98631

Having carefully examined instruction to bidders and the contract documents entitled : The Oceanbeach Boardwalk as prepared by David E. Jensen, Architect, and having visited the site and examined the conditions affecting the work, the undersigned proposes to:

1. Complete the Work as required by the Contract Documents for the stipulated sum of:

Basic Project	+	WSST	=	Total
$	+	$	=	$

2. Start the Work on:

3. Substantially complete the Work on:

Notwithstanding any contrary provisions herein, the owners shall retain the final 10% of the contract price due to contractor for a period of 30 days after final acceptance, at which time the final payment shall be made to contractor, unless liens or taxes remain unsatisfied. Owner shall disburse such funds when any applicable liens or taxes are satisfied.

If written notice of acceptance of this proposal is mailed, telegraphed, or delivered to undersigned within time limit noted in contract documents after date of proposal submission and interview, or any time thereafter before this proposal is withdrawn, undersigned will, within ten (10) days after date of such mailing, telegraphing, or delivering of such notice, execute and deliver contract on AIA Form A 101, 1977 edition.

This proposal may be withdrawn at any time prior to the scheduled time for the opening of bids, or any authorized postponement thereof.

Enclosed is a certified check, cashier's check or bid bond in the amount of 5% of the base bid. (Cash deposits will not be accepted.)

Name of Firm:_____

Address:_____

City/State:_____ Zip:_____

Telephone:_____

State of Washington Contractor's License No.:_____

Note: If bidder is a corporation, write state of incorporation; and if a partnership, give full names and addresses of all partners below:

_____

_____

_____

_____ _____

Signed Date

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A310

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we
(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called the Principal, and
(Here insert full name and address or legal title of Surety)

a corporation duly organized under the laws of the State of
as Surety, hereinafter called the Surety, are held and firmly bound unto
(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called the Obligee, in the sum of

Dollars ($),

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for
(Here insert full name, address and description of project)

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this day of 19

(Witness)	(Principal) (Seal)
	(Title)
(Witness)	(Surety) (Seal)
	(Title)

0044 SUBSTITUTION LISTING

TO: CITY OF LONG BEACH
hereinafter called "Owner"

A. Pursuant to bidding requirements for the Work titled:

THE OCEANBEACH BOARDWALK
LONG BEACH, WASHINGTON.

The Contract Sum proposed by the undersigned on the bid form is for the Work as shown on the Drawings, described in the Specifications, and otherwise defined in the Contract Documents. However, the undersigned proposes the following substitutions for the Owner's consideration. Should the Owner accept any or all of the proposed substitutions, the bidder's proposed Contract Sum will be reduced by the amount shown.

B.

Specified product or material:	Drawing number or Spec Section:	Proposed substitution:	Proposed reduction in Contract Sum:

PROVIDE SIGNATURE IDENTICAL TO THAT SHOWN ON THE BID FORM

BIDDER: _____

by _____

DIVISION 0 - CONTRACT ADMINISTRATION

0050 FORM OF AGREEMENT

A. Standard Form of Agreement Between Owner and Contractor, AIA document A 101, 1977 edition will be used. Agreement shall be completed prior to initiating work.

DIVISION 0 - CONTRACT ADMINISTRATION

0060 BONDS

A. AIA Document A 311, Performance Bond and Labor and Materials Payment Bond will be used in accordance with the General Condition of the Contract for Construction. Deliver executed bond to owner prior to initiating work. Bonding to be approved by Owner. Bond shall be 100% of the amount of the Agreement as surety for actual performance of the contract.

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A311

Performance Bond

KNOW ALL MEN BY THESE PRESENTS: that

(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called Contractor, and,

(Here insert full name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto

(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called Owner, in the amount of

Dollars ($),

for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated 19 , entered into a contract with Owner for

(Here insert full name, address and description of project)

in accordance with Drawings and Specifications prepared by

(Here insert full name and address or legal title of Architect)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

PERFORMANCE BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

1) Complete the Contract in accordance with its terms and conditions, or

2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this day of 19

(Witness) (Principal) (Seal)

(Title)

(Witness) (Surety) (Seal)

(Title)

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A311

Labor and Material Payment Bond

THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE OWNER CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT

KNOW ALL MEN BY THESE PRESENTS: that

(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called Principal, and,

(Here insert full name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto

(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the amount of

(Here insert a sum equal to at least one-half of the contract price) Dollars ($),

for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Principal has by written agreement dated 19 , entered into a contract with Owner for

(Here insert full name, address and description of project)

in accordance with Drawings and Specifications prepared by

(Here insert full name and address or legal title of Architect)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

LABOR AND MATERIAL PAYMENT BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this day of 19

(Witness) (Principal) (Seal)

(Title)

(Witness) (Surety) (Seal)

(Title)

DIVISION 0 - CONTRACT ADMINISTRATION

0071 GENERAL CONDITIONS

A. General conditions of the contract for construction (AIA document A 201, 1976 edition) is hereby made part of these specifications. General contractor and all subcontractors shall read and be governed by them.

B. In case of conflict between General Conditions and these specifications, these specifications govern.

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A201

General Conditions of the Contract for Construction

THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES; CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS MODIFICATION

1976 EDITION

TABLE OF ARTICLES

This document has been approved and endorsed by The Associated General Contractors of America.

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INDEX

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ARTICLE 1

CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Owner-Contractor Agreement, the Conditions of the Contract (General, Supplementary and other Conditions), the Drawings, the Specifications, and all Addenda issued prior to and all Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the Architect pursuant to Subparagraph 2.2.8, or (4) a written order for a minor change in the Work issued by the Architect pursuant to Paragraph 12.4. The Contract Documents do not include Bidding Documents such as the Advertisement or Invitation to Bid, the Instructions to Bidders, sample forms, the Contractor's Bid or portions of Addenda relating to any of these, or any other documents, unless specifically enumerated in the Owner-Contractor Agreement.

1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Architect and the Contractor, but the Architect shall be entitled to performance of obligations intended for his benefit, and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner or the Architect and any Subcontractor or Sub-subcontractor.

1.1.3 THE WORK

The Work comprises the completed construction required by the Contract Documents and includes all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract Documents shall be signed in not less than triplicate by the Owner and Contractor. If either the Owner or the Contractor or both do not sign the Conditions of the Contract, Drawings, Specifications, or any of the other Contract Documents, the Architect shall identify such Documents.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

1.2.4 The organization of the Specifications into divisions, sections and articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

1.3 OWNERSHIP AND USE OF DOCUMENTS

1.3.1 All Drawings, Specifications and copies thereof furnished by the Architect are and shall remain his property. They are to be used only with respect to this Project and are not to be used on any other project. With the exception of one contract set for each party to the Contract, such documents are to be returned or suitably accounted for to the Architect on request at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's common law copyright or other reserved rights.

ARTICLE 2

ARCHITECT

2.1 DEFINITION

2.1.1 The Architect is the person lawfully licensed to practice architecture, or an entity lawfully practicing architecture identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Architect means the Architect or his authorized representative.

2.2 ADMINISTRATION OF THE CONTRACT

2.2.1 The Architect will provide administration of the Contract as hereinafter described.

2.2.2 The Architect will be the Owner's representative during construction and until final payment is due. The Architect will advise and consult with the Owner. The Owner's instructions to the Contractor shall be forwarded

through the Architect. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with Subparagraph 2.2.18.

2.2.3 The Architect will visit the site at intervals appropriate to the stage of construction to familiarize himself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of his on-site observations as an architect, he will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor.

2.2.4 The Architect will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

2.2.5 The Architect shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the Architect may perform his functions under the Contract Documents.

2.2.6 Based on the Architect's observations and an evaluation of the Contractor's Applications for Payment, the Architect will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in Paragraph 9.4.

2.2.7 The Architect will be the interpreter of the requirements of the Contract Documents and the judge of the performance thereunder by both the Owner and Contractor.

2.2.8 The Architect will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with any time limit agreed upon. Either party to the Contract may make written request to the Architect for such interpretations.

2.2.9 Claims, disputes and other matters in question between the Contractor and the Owner relating to the execution or progress of the Work or the interpretation of the Contract Documents shall be referred initially to the Architect for decision which he will render in writing within a reasonable time.

2.2.10 All interpretations and decisions of the Architect shall be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. In his capacity as interpreter and judge, he will endeavor to secure faithful performance by both the Owner and the Contractor, will not show partiality to either, and will not be liable for the result of any interpretation or decision rendered in good faith in such capacity.

2.2.11 The Architect's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.

2.2.12 Any claim, dispute or other matter in question between the Contractor and the Owner referred to the Architect, except those relating to artistic effect as provided in Subparagraph 2.2.11 and except those which have been waived by the making or acceptance of final payment as provided in Subparagraphs 9.9.4 and 9.9.5, shall be subject to arbitration upon the written demand of either party. However, no demand for arbitration of any such claim, dispute or other matter may be made until the earlier of (1) the date on which the Architect has rendered a written decision, or (2) the tenth day after the parties have presented their evidence to the Architect or have been given a reasonable opportunity to do so, if the Architect has not rendered his written decision by that date. When such a written decision of the Architect states (1) that the decision is final but subject to appeal, and (2) that any demand for arbitration of a claim, dispute or other matter covered by such decision must be made within thirty days after the date on which the party making the demand receives the written decision, failure to demand arbitration within said thirty days' period will result in the Architect's decision becoming final and binding upon the Owner and the Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede any arbitration proceedings unless the decision is acceptable to all parties concerned.

2.2.13 The Architect will have authority to reject Work which does not conform to the Contract Documents. Whenever, in his opinion, he considers it necessary or advisable for the implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of the Work in accordance with Subparagraph 7.7.2 whether or not such Work be then fabricated, installed or completed. However, neither the Architect's authority to act under this Subparagraph 2.2.13, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Architect to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

2.2.14 The Architect will review and approve or take other appropriate action upon Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

2.2.15 The Architect will prepare Change Orders in accordance with Article 12, and will have authority to order minor changes in the Work as provided in Subparagraph 12.4.1.

2.2.16 The Architect will conduct inspections to determine the dates of Substantial Completion and final completion, will receive and forward to the Owner for the Owner's review written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of Paragraph 9.9.

2.2.17 If the Owner and Architect agree, the Architect will provide one or more Project Representatives to assist the Architect in carrying out his responsibilities at the site. The duties, responsibilities and limitations of authority of any such Project Representative shall be as set forth in an exhibit to be incorporated in the Contract Documents.

2.2.18 The duties, responsibilities and limitations of authority of the Architect as the Owner's representative during construction as set forth in the Contract Documents will not be modified or extended without written consent of the Owner, the Contractor and the Architect.

2.2.19 In case of the termination of the employment of the Architect, the Owner shall appoint an architect against whom the Contractor makes no reasonable objection whose status under the Contract Documents shall be that of the former architect. Any dispute in connection with such appointment shall be subject to arbitration.

ARTICLE 3

OWNER

3.1 DEFINITION

3.1.1 The Owner is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Owner means the Owner or his authorized representative.

3.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

3.2.1 The Owner shall, at the request of the Contractor, at the time of execution of the Owner-Contractor Agreement, furnish to the Contractor reasonable evidence that he has made financial arrangements to fulfill his obligations under the Contract. Unless such reasonable evidence is furnished, the Contractor is not required to execute the Owner-Contractor Agreement or to commence the Work.

3.2.2 The Owner shall furnish all surveys describing the physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site.

3.2.3 Except as provided in Subparagraph 4.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

3.2.4 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

3.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the Work.

3.2.6 The Owner shall forward all instructions to the Contractor through the Architect.

3.2.7 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Work by Owner or by Separate Contractors, Payments and Completion, and Insurance in Articles 6, 9 and 11 respectively.

3.3 OWNER'S RIGHT TO STOP THE WORK

3.3.1 If the Contractor fails to correct defective Work as required by Paragraph 13.2 or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner, by a written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Subparagraph 6.1.3.

3.4 OWNER'S RIGHT TO CARRY OUT THE WORK

3.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within seven days after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, after seven days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy he may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and the amount charged to the Contractor are both subject to the prior approval of the Architect. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

ARTICLE 4

CONTRACTOR

4.1 DEFINITION

4.1.1 The Contractor is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

4.2 REVIEW OF CONTRACT DOCUMENTS

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Architect any error, inconsistency or omission he may discover. The Contractor shall not be liable to the Owner or

the Architect for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall perform no portion of the Work at any time without Contract Documents or, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and their agents and employees, and other persons performing any of the Work under a contract with the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Architect in his administration of the Contract, or by inspections, tests or approvals required or performed under Paragraph 7.7 by persons other than the Contractor.

4.4 LABOR AND MATERIALS

4.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

4.4.2 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.

4.5 WARRANTY

4.5.1 The Contractor warrants to the Owner and the Architect that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions of Paragraph 13.2.

4.6 TAXES

4.6.1 The Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted at the time bids are received, whether or not yet effective.

4.7 PERMITS, FEES AND NOTICES

4.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and for all other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required at the time the bids are received.

4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work.

4.7.3 It is not the responsibility of the Contractor to make certain that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the Architect in writing, and any necessary changes shall be accomplished by appropriate Modification.

4.7.4 If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Architect, he shall assume full responsibility therefor and shall bear all costs attributable thereto.

4.8 ALLOWANCES

4.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by such persons as the Owner may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.

4.8.2 Unless otherwise provided in the Contract Documents:

.1 these allowances shall cover the cost to the Contractor, less any applicable trade discount, of the materials and equipment required by the allowance delivered at the site, and all applicable taxes;

.2 the Contractor's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowance;

.3 whenever the cost is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expenses.

4.9 SUPERINTENDENT

4.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be so confirmed on written request in each case.

4.10 PROGRESS SCHEDULE

4.10.1 The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information an estimated progress sched-

ule for the Work. The progress schedule shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

4.11 DOCUMENTS AND SAMPLES AT THE SITE

4.11.1 The Contractor shall maintain at the site for the Owner one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be available to the Architect and shall be delivered to him for the Owner upon completion of the Work.

4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

4.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

4.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.

4.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

4.12.4 The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

4.12.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

4.12.6 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data or Samples under Subparagraph 2.2.14 unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Architect's approval thereof.

4.12.7 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Architect on previous submittals.

4.12.8 No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been approved by the Architect as provided in Subparagraph 2.2.14. All such portions of the Work shall be in accordance with approved submittals.

4.13 USE OF SITE

4.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with any materials or equipment.

4.14 CUTTING AND PATCHING OF WORK

4.14.1 The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work or to make its several parts fit together properly.

4.14.2 The Contractor shall not damage or endanger any portion of the Work or the work of the Owner or any separate contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate contractor except with the written consent of the Owner and of such separate contractor. The Contractor shall not unreasonably withhold from the Owner or any separate contractor his consent to cutting or otherwise altering the Work.

4.15 CLEANING UP

4.15.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery and surplus materials.

4.15.2 If the Contractor fails to clean up at the completion of the Work, the Owner may do so as provided in Paragraph 3.4 and the cost thereof shall be charged to the Contractor.

4.16 COMMUNICATIONS

4.16.1 The Contractor shall forward all communications to the Owner through the Architect.

4.17 ROYALTIES AND PATENTS

4.17.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Architect.

4.18 INDEMNIFICATION

4.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom,

and (2) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Paragraph 4.18.

4.18.2 In any and all claims against the Owner or the Architect or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

4.18.3 The obligations of the Contractor under this Paragraph 4.18 shall not extend to the liability of the Architect, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, his agents or employees provided such giving or failure to give is the primary cause of the injury or damage.

ARTICLE 5

SUBCONTRACTORS

5.1 DEFINITION

5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the Work at the site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative. The term Subcontractor does not include any separate contractor or his subcontractors.

5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site. The term Sub-subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 Unless otherwise required by the Contract Documents or the Bidding Documents, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Owner and the Architect in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection.

5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Owner or the Architect has made reasonable objection under the provisions of Subparagraph 5.2.1. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection.

5.2.3 If the Owner or the Architect has reasonable objection to any such proposed person or entity, the Contractor shall submit a substitute to whom the Owner or the Architect has no reasonable objection, and the Contract Sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued; however, no increase in the Contract Sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting names as required by Subparagraph 5.2.1.

5.2.4 The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By an appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and the Architect. Said agreement shall preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph 5.3, and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to his Sub-subcontractors.

ARTICLE 6

WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award

separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, he shall make such claim as provided elsewhere in the Contract Documents.

6.1.2 When separate contracts are awarded for different portions of the Project or other work on the site, the term Contractor in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

6.1.3 The Owner will provide for the coordination of the work of his own forces and of each separate contractor with the Work of the Contractor, who shall cooperate therewith as provided in Paragraph 6.2.

6.2 MUTUAL RESPONSIBILITY

6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall connect and coordinate his Work with theirs as required by the Contract Documents.

6.2.2 If any part of the Contractor's Work depends for proper execution or results upon the work of the Owner or any separate contractor, the Contractor shall, prior to proceeding with the Work, promptly report to the Architect any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acceptance of the Owner's or separate contractors' work as fit and proper to receive his Work, except as to defects which may subsequently become apparent in such work by others.

6.2.3 Any costs caused by defective or ill-timed work shall be borne by the party responsible therefor.

6.2.4 Should the Contractor wrongfully cause damage to the work or property of the Owner, or to other work on the site, the Contractor shall promptly remedy such damage as provided in Subparagraph 10.2.5.

6.2.5 Should the Contractor wrongfully cause damage to the work or property of any separate contractor, the Contractor shall upon due notice promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute. If such separate contractor sues or initiates an arbitration proceeding against the Owner on account of any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor who shall defend such proceedings at the Owner's expense, and if any judgment or award against the Owner arises therefrom the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorneys' fees and court or arbitration costs which the Owner has incurred.

6.3 OWNER'S RIGHT TO CLEAN UP

6.3.1 If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required by Paragraph 4.15, the Owner may clean up and charge the cost thereof to the contractors responsible therefor as the Architect shall determine to be just.

ARTICLE 7

MISCELLANEOUS PROVISIONS

7.1 GOVERNING LAW

7.1.1 The Contract shall be governed by the law of the place where the Project is located.

7.2 SUCCESSORS AND ASSIGNS

7.2.1 The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party with respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him hereunder, without the previous written consent of the Owner.

7.3 WRITTEN NOTICE

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice.

7.4 CLAIMS FOR DAMAGES

7.4.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

7.5 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.5.1 The Owner shall have the right to require the Contractor to furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder if and as required in the Bidding Documents or in the Contract Documents.

7.6 RIGHTS AND REMEDIES

7.6.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

7.6.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

7.7 TESTS

7.7.1 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Architect timely notice of its readiness so the Architect may observe such inspection, testing or approval. The Contractor shall bear all costs of such inspections, tests or approvals conducted by public authorities. Unless otherwise provided, the Owner shall bear all costs of other inspections, tests or approvals.

7.7.2 If the Architect determines that any Work requires special inspection, testing, or approval which Subparagraph 7.7.1 does not include, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in Subparagraph 7.7.1. If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Architect's additional services made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Change Order shall be issued.

7.7.3 Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered by him to the Architect.

7.7.4 If the Architect is to observe the inspections, tests or approvals required by the Contract Documents, he will do so promptly and, where practicable, at the source of supply.

7.8 INTEREST

7.8.1 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing at the place of the Project.

7.9 ARBITRATION

7.9.1 All claims, disputes and other matters in question between the Contractor and the Owner arising out of, or relating to, the Contract Documents or the breach thereof, except as provided in Subparagraph 2.2.11 with respect to the Architect's decisions on matters relating to artistic effect, and except for claims which have been waived by the making or acceptance of final payment as provided by Subparagraphs 9.9.4 and 9.9.5, shall be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining unless the parties mutually agree otherwise. No arbitration arising out of or relating to the Contract Documents shall include, by consolidation, joinder or in any other manner, the Architect, his employees or consultants except by written consent containing a specific reference to the Owner-Contractor Agreement and signed by the Architect, the Owner, the Contractor and any other person sought to be joined. No arbitration shall include by consolidation, joinder or in any other manner, parties other than the Owner, the Contractor and any other persons substantially involved in a common question of fact or law, whose presence is required if complete relief is to be accorded in the arbitration. No person other than the Owner or Contractor shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Any consent to arbitration involving an additional person or persons shall not constitute consent to arbitration of any dispute not described therein or with any person not named or described therein. The foregoing agreement to arbitrate and any other agreement to arbitrate with an additional person or persons duly consented to by the parties to the Owner-Contractor Agreement shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

7.9.2 Notice of the demand for arbitration shall be filed in writing with the other party to the Owner-Contractor Agreement and with the American Arbitration Association, and a copy shall be filed with the Architect. The demand for arbitration shall be made within the time limits specified in Subparagraph 2.2.12 where applicable, and in all other cases within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

7.9.3 Unless otherwise agreed in writing, the Contractor shall carry on the Work and maintain its progress during any arbitration proceedings, and the Owner shall continue to make payments to the Contractor in accordance with the Contract Documents.

ARTICLE 8

TIME

8.1 DEFINITIONS

8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Substantial Completion of the Work as defined in Subparagraph 8.1.3, including authorized adjustments thereto.

8.1.2 The date of commencement of the Work is the date established in a notice to proceed. If there is no notice to proceed, it shall be the date of the Owner-Contractor Agreement or such other date as may be established therein.

8.1.3 The Date of Substantial Completion of the Work or designated portion thereof is the Date certified by the Architect when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended.

8.1.4 The term day as used in the Contract Documents shall mean calendar day unless otherwise specifically designated.

8.2 PROGRESS AND COMPLETION

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.2.2 The Contractor shall begin the Work on the date of commencement as defined in Subparagraph 8.1.2. He shall carry the Work forward expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the Owner or the Architect, or by any employee of either, or by any separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, adverse weather conditions not reasonably anticipatable, unavoidable casualties, or any causes beyond the Contractor's control, or by delay authorized by the Owner pending arbitration, or by any other cause which the Architect determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

8.3.2 Any claim for extension of time shall be made in writing to the Architect not more than twenty days after the commencement of the delay; otherwise it shall be waived. In the case of a continuing delay only one claim is necessary. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work.

8.3.3 If no agreement is made stating the dates upon which interpretations as provided in Subparagraph 2.2.8 shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen days after written request is made for them, and not then unless such claim is reasonable.

8.3.4 This Paragraph 8.3 does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Owner-Contractor Agreement and, including authorized adjustments thereto, is the total amount payable by the Owner to the Contractor for the performance of the Work under the Contract Documents.

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to the various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used only as a basis for the Contractor's Applications for Payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 At least ten days before the date for each progress payment established in the Owner-Contractor Agreement, the Contractor shall submit to the Architect an itemized Application for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment as the Owner or the Architect may require, and reflecting retainage, if any, as provided elsewhere in the Contract Documents.

9.3.2 Unless otherwise provided in the Contract Documents, payments will be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site and, if approved in advance by the Owner, payments may similarly be made for materials or equipment suitably stored at some other location agreed upon in writing. Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance and transportation to the site for those materials and equipment stored off the site.

9.3.3 The Contractor warrants that title to all Work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

9.4 CERTIFICATES FOR PAYMENT

9.4.1 The Architect will, within seven days after the receipt of the Contractor's Application for Payment, either issue a Certificate for Payment to the Owner, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor in writing his reasons for withholding a Certificate as provided in Subparagraph 9.6.1.

9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on his observations at the site as provided in Subparagraph 2.2.3 and the data comprising the Application for Payment, that the Work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in his Certificate); and that the Contractor is entitled to payment in the amount certified. However, by issuing a Certificate for Payment, the Architect shall not thereby be deemed to represent that he has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work or that he has reviewed the construction means, methods, techniques,

sequences or procedures, or that he has made any examination to ascertain how or for what purpose the Contractor has used the moneys previously paid on account of the Contract Sum.

9.5 PROGRESS PAYMENTS

9.5.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents.

9.5.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's Work. The Contractor shall, by an appropriate agreement with each Subcontractor, require each Subcontractor to make payments to his Subsubcontractors in similar manner.

9.5.3 The Architect may, on request and at his discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Architect on account of Work done by such Subcontractor.

9.5.4 Neither the Owner nor the Architect shall have any obligation to pay or to see to the payment of any moneys to any Subcontractor except as may otherwise be required by law.

9.5.5 No Certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

9.6 PAYMENTS WITHHELD

9.6.1 The Architect may decline to certify payment and may withhold his Certificate in whole or in part, to the extent necessary reasonably to protect the Owner, if in his opinion he is unable to make representations to the Owner as provided in Subparagraph 9.4.2. If the Architect is unable to make representations to the Owner as provided in Subparagraph 9.4.2 and to certify payment in the amount of the Application, he will notify the Contractor as provided in Subparagraph 9.4.1. If the Contractor and the Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which he is able to make such representations to the Owner. The Architect may also decline to certify payment or, because of subsequently discovered evidence or subsequent observations, he may nullify the whole or any part of any Certificate for Payment previously issued, to such extent as may be necessary in his opinion to protect the Owner from loss because of:

.1 defective Work not remedied,
.2 third party claims filed or reasonable evidence indicating probable filing of such claims,
.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment,
.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum,
.5 damage to the Owner or another contractor,
.6 reasonable evidence that the Work will not be completed within the Contract Time, or
.7 persistent failure to carry out the Work in accordance with the Contract Documents.

9.6.2 When the above grounds in Subparagraph 9.6.1 are removed, payment shall be made for amounts withheld because of them.

9.7 FAILURE OF PAYMENT

9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents any amount certified by the Architect or awarded by arbitration, then the Contractor may, upon seven additional days' written notice to the Owner and the Architect, stop the Work until payment of the amount owing has been received. The Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be effected by appropriate Change Order in accordance with Paragraph 12.3.

9.8 SUBSTANTIAL COMPLETION

9.8.1 When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Subparagraph 8.1.3, the Contractor shall prepare for submission to the Architect a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Architect on the basis of an inspection determines that the Work or designated portion thereof is substantially complete, he will then prepare a Certificate of Substantial Completion which shall establish the Date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall commence on the Date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

9.8.2 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof, as provided in the Contract Documents.

9.9 FINAL COMPLETION AND FINAL PAYMENT

9.9.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will

promptly make such inspection and, when he finds the Work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue a final Certificate for Payment stating that to the best of his knowledge, information and belief, and on the basis of his observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor, and noted in said final Certificate, is due and payable. The Architect's final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.9.2 have been fulfilled.

9.9.2 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment and (3), if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify him against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.9.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by the issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than the retainage stipulated in the Contract Documents, and if bonds have been furnished as provided in Paragraph 7.5, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.9.4 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from:

.1 unsettled liens,
.2 faulty or defective Work appearing after Substantial Completion,
.3 failure of the Work to comply with the requirements of the Contract Documents, or
.4 terms of any special warranties required by the Contract Documents.

9.9.5 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

.1 all employees on the Work and all other persons who may be affected thereby;
.2 all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-subcontractors; and
.3 other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy all damage or loss (other than damage or loss insured under Paragraph 11.3) to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to the acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to his obligations under Paragraph 4.18.

10.2.6 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and the Architect.

10.2.7 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

10.3 EMERGENCIES

10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 12 for Changes in the Work.

ARTICLE 11

INSURANCE

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts;

.2 claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;

.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;

.4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;

.5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; and

.6 claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than any limits of liability specified in the Contract Documents, or required by law, whichever is greater.

11.1.3 The insurance required by Subparagraph 11.1.1 shall include contractual liability insurance applicable to the Contractor's obligations under Paragraph 4.18.

11.1.4 Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates shall contain a provision that coverages afforded under the policies will not be cancelled until at least thirty days' prior written notice has been given to the Owner.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Owner shall be responsible for purchasing and maintaining his own liability insurance and, at his option, may purchase and maintain such insurance as will protect him against claims which may arise from operations under the Contract.

11.3 PROPERTY INSURANCE

11.3.1 Unless otherwise provided, the Owner shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work and shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism and malicious mischief. If the Owner does not intend to purchase such insurance for the full insurable value of the entire Work, he shall inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of himself, his Subcontractors and the Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by failure of the Owner to purchase or maintain such insurance and to so notify the Contractor, then the Owner shall bear all reasonable costs properly attributable thereto. If not covered under the all risk insurance or otherwise provided in the Contract Documents, the Contractor shall effect and maintain similar property insurance on portions of the Work stored off the site or in transit when such portions of the Work are to be included in an Application for Payment under Subparagraph 9.3.2.

11.3.2 The Owner shall purchase and maintain such boiler and machinery insurance as may be required by the Contract Documents or by law. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

11.3.3 Any loss insured under Subparagraph 11.3.1 is to be adjusted with the Owner and made payable to the Owner as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgagee clause and of Subparagraph 11.3.8. The Contractor shall pay each Subcontractor a just share of any insurance moneys received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each Subcontractor to make payments to his Sub-subcontractors in similar manner.

11.3.4 The Owner shall file a copy of all policies with the Contractor before an exposure to loss may occur.

11.3.5 If the Contractor requests in writing that insurance for risks other than those described in Subparagraphs 11.3.1 and 11.3.2 or other special hazards be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

11.3.6 The Owner and Contractor waive all rights against (1) each other and the Subcontractors, Sub-subcontractors, agents and employees each of the other, and (2) the Architect and separate contractors, if any, and their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by insurance obtained pursuant to this Paragraph 11.3 or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance held by the Owner as trustee. The foregoing waiver afforded the Architect, his agents and employees shall not extend to the liability imposed by Subparagraph 4.18.3. The Owner or the Contractor, as appropriate, shall require of the Architect, separate contractors, Subcontractors and Sub-subcontractors by appropriate agreements, written where legally required for validity, similar waivers each in favor of all other parties enumerated in this Subparagraph 11.3.6.

11.3.7 If required in writing by any party in interest, the Owner as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of his duties. He shall deposit in a separate account any money so received, and he shall distribute it in accordance with such agreement as the parties in interest may reach, or in accordance with an award by arbitration in which case the procedure shall be as provided in Paragraph 7.9. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate Change Order.

11.3.8 The Owner as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five days after the occurrence of loss to the Owner's exercise of this power, and if such objection be made, arbitrators shall be chosen as provided in Paragraph 7.9. The Owner as trustee shall, in that case, make settlement with the insurers in accordance with the directions of such arbitrators. If distribution of the insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

11.3.9 If the Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion thereof, such occupancy or use shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance have consented by endorsement to the policy or policies. This insurance shall not be cancelled or lapsed on account of such partial occupancy or use. Consent of the Contractor and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld.

11.4 LOSS OF USE INSURANCE

11.4.1 The Owner, at his option, may purchase and maintain such insurance as will insure him against loss of use of his property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of his property, including consequential losses due to fire or other hazards however caused, to the extent covered by insurance under this Paragraph 11.4.

ARTICLE 12

CHANGES IN THE WORK

12.1 CHANGE ORDERS

12.1.1 A Change Order is a written order to the Contractor signed by the Owner and the Architect, issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time.

12.1.2 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order, and shall be performed under the applicable conditions of the Contract Documents.

12.1.3 The cost or credit to the Owner resulting from a change in the Work shall be determined in one or more of the following ways:

- **.1** by mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** by unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** by cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- **.4** by the method provided in Subparagraph 12.1.4.

12.1.4 If none of the methods set forth in Clauses 12.1.3.1, 12.1.3.2 or 12.1.3.3 is agreed upon, the Contractor, provided he receives a written order signed by the Owner, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Architect on the basis of the reasonable expenditures and savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Clauses 12.1.3.3 and 12.1.3.4 above, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits required by agreement or custom; workers' or workmen's compensation insurance; bond premiums; rental value of equipment and machinery; and the additional costs of supervision and field office personnel directly attributable to the change. Pending final determination of cost to the Owner, payments on account shall be made on the Architect's Certificate for Payment. The amount of credit to be allowed by the Contractor to the Owner for any deletion

or change which results in a net decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change.

12.1.5 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order that application of the agreed unit prices to the quantities of Work proposed will cause substantial inequity to the Owner or the Contractor, the applicable unit prices shall be equitably adjusted.

12.2 CONCEALED CONDITIONS

12.2.1 Should concealed conditions encountered in the performance of the Work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or should concealed or unknown conditions in an existing structure of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, be encountered, the Contract Sum shall be equitably adjusted by Change Order upon claim by either party made within twenty days after the first observance of the conditions.

12.3 CLAIMS FOR ADDITIONAL COST

12.3.1 If the Contractor wishes to make a claim for an increase in the Contract Sum, he shall give the Architect written notice thereof within twenty days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Paragraph 10.3. No such claim shall be valid unless so made. If the Owner and the Contractor cannot agree on the amount of the adjustment in the Contract Sum, it shall be determined by the Architect. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

12.3.2 If the Contractor claims that additional cost is involved because of, but not limited to, (1) any written interpretation pursuant to Subparagraph 2.2.8, (2) any order by the Owner to stop the Work pursuant to Paragraph 3.3 where the Contractor was not at fault, (3) any written order for a minor change in the Work issued pursuant to Paragraph 12.4, or (4) failure of payment by the Owner pursuant to Paragraph 9.7, the Contractor shall make such claim as provided in Subparagraph 12.3.1.

12.4 MINOR CHANGES IN THE WORK

12.4.1 The Architect will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 13

UNCOVERING AND CORRECTION OF WORK

13.1 UNCOVERING OF WORK

13.1.1 If any portion of the Work should be covered contrary to the request of the Architect or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect, be uncovered for his observation and shall be replaced at the Contractor's expense.

13.1.2 If any other portion of the Work has been covered which the Architect has not specifically requested to observe prior to being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by the Owner or a separate contractor as provided in Article 6, in which event the Owner shall be responsible for the payment of such costs.

13.2 CORRECTION OF WORK

13.2.1 The Contractor shall promptly correct all Work rejected by the Architect as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including compensation for the Architect's additional services made necessary thereby.

13.2.2 If, within one year after the Date of Substantial Completion of the Work or designated portion thereof or within one year after acceptance by the Owner of designated equipment or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This obligation shall survive termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

13.2.3 The Contractor shall remove from the site all portions of the Work which are defective or non-conforming and which have not been corrected under Subparagraphs 4.5.1, 13.2.1 and 13.2.2, unless removal is waived by the Owner.

13.2.4 If the Contractor fails to correct defective or non-conforming Work as provided in Subparagraphs 4.5.1, 13.2.1 and 13.2.2, the Owner may correct it in accordance with Paragraph 3.4.

13.2.5 If the Contractor does not proceed with the correction of such defective or non-conforming Work within a reasonable time fixed by written notice from the Architect, the Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the Owner may upon ten additional days' written notice sell such Work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the Architect's additional services made necessary thereby. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

13.2.6 The Contractor shall bear the cost of making good all work of the Owner or separate contractors destroyed or damaged by such correction or removal.

13.2.7 Nothing contained in this Paragraph 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.5 hereof. The establishment of the time period of one year after the Date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which his obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to his obligations other than specifically to correct the Work.

13.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK

13.3.1 If the Owner prefers to accept defective or non-conforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 14

TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 If the Work is stopped for a period of thirty days under an order of any court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, or if the Work should be stopped for a period of thirty days by the Contractor because the Architect has not issued a Certificate for Payment as provided in Paragraph 9.7 or because the Owner has not made payment thereon as provided in Paragraph 9.7, then the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

14.2 TERMINATION BY THE OWNER

14.2.1 If the Contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, then the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any right or remedy and after giving the Contractor and his surety, if any, seven days' written notice, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished.

14.2.2 If the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, including compensation for the Architect's additional services made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Architect, upon application, in the manner provided in Paragraph 9.4, and this obligation for payment shall survive the termination of the Contract.

DIVISION 1 - GENERAL REQUIREMENTS

0101 SUMMARY OF WORK

A. The work comprises the completed construction required by the Contract Documents and includes all labor necessary to provide such construction, and all materials and equipment incorporated in such construction.

B. The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, agreements or representations either written or oral.

C. The Owner may in some cases choose to award separate contracts to furnish materials/equipment, and/or labor necessary for installation. Such cases would be noted in the Contract Documents.

DIVISION 1 - GENERAL REQUIREMENTS

0108 CODES

All work performed shall comply with the following applicable codes:

Uniform Building Code, 1985.
State of Washington Electrical Code, 1986.
National Electrical Code, 1986.
State of Washington Fire Codes, 1984.
NFPA Fire Codes, 1985.
Uniform Electrical Code, 1985.
Uniform Plumbing Code, 1985.
Uniform Mechanical Code, 1985.

0115 APPLICATIONS FOR PAYMENT

A. DESCRIPTION:

1. Comply with the procedures described in this section when applying for progress payments and final payment under the Contract.

2. Related work:

   a. Documents affecting work in this section include, but are not limited to the General Conditions and Sections in Division 1 of these specifications.

   b. The contract sum and the schedule for payments are described in the Form of Agreement.

   c. Payments upon Substantial Completion and Completion of the Work are described in the General Conditions and in Section 0170 of these specifications.

B. SUBMITTALS:

1. Make monthly submittal of request for payment on AIA Document G 702, "Application and Certificate for Payment" plus continuation sheet(s).

2. Sign the Application and Certificate for Payment.

3. Submit the Application and Certificate for Payment to the architect for approval.

4. The architect will review submittal and upon approval, will sign the Application and Certificate for Payment, will make required copies and distribute to Contractor and Owner.

5. The Owner will, upon approval, disburse directly to the Contractor.

0170 CONTRACT CLOSEOUT

A. GENERAL:

1. The Contractor shall provide an orderly and efficient transfer of the completed work to the owner.

2. Prior to requesting inspection by the architect, use adequate means to assure that the work is completed in accordance with the specified requirements and is ready for the requested inspection.

3. Related Work:

a. Documents affecting work of this section include, but are not necessarily limited to, General Conditions and Sections in Division 1 of these specifications.

b. Activities relative to Contract Closeout are described in, but not necessarily limited to Paragraphs 2.2.16, 9.8, and 9.9 of the General Conditions.

c. "Substantial Completion" is defined in Paragraph 8.1.3 of the General Conditions.

B. SUBSTANTIAL COMPLETION:

1. Prepare and submit list required by first sentence of Paragraph 9.8.1. of the General Conditions.

2. Within a reasonable time after receipt of the list, the architect will inspect to determine the status of completion.

3. Should the architect determine that the work is not substantially complete:

a. The architect promptly will so notify the contractor, in writing, giving the reasons therefore.

b. Remedy the deficiencies and notify the Architect when ready for reinspection.
c. The Architect will reinspect the Work.

4. When the Architect concurs that the Work is substantially complete:
   a. The Architect will prepare a "Certificate of Substantial Completion" on AIA form G 704, accompanied by the Contractor's list of items to be completed or corrected, as verified by the Architect.
   b. The Architect will submit the Certificate to the Owner and to the Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

C. FINAL COMPLETION:
1. Prepare and submit the notice required by the first sentence of Paragraph 9.9.1 of the General Conditions.
2. Verify that the work is complete including, but not necessarily limited to, the items mentioned in Paragraph 9.9.2 of the General Conditions.
3. Certify that:
   a. Contract Documents have been reveiwed.
   b. Work has been inspected for compliance with the Contract Documents.
   c. Work has been completed in accordance with the Contract Documents.
   d. Equipment and systems have been tested as required, and are operational.
   d. Work is complete and ready for final inspection.
4. The Architect will make an inspection to verify status of completion.
5. Should the Architect determine that the Work is incomplete or defective:
   a. The Architect promptly will so notify the Contractor, in writing, listing the incomplete or defective work.
   b. Remedy the deficiencies promptly, and notify the Architect when ready for reinspection.
6. When the Architect determines that the Work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals.

D. CLOSEOUT SUBMITTALS:
1. Project Record Documents described in Section 0172.
2. Operation and maintenance data for items noted in these Specifications and other items when so directed by the Architect.

3. Warranties and bonds.
4. Keys and keying schedule.
5. Evidence of Compliance with requirements of governmental agencies having jurisdiction.
   a. Certificates of Inspection.
   b. Certificates of Occupancy.
6. Evidence of payment and release of liens.
7. List of subcontractors, service organizations, principal vendors, including names, addresses and phone numbers.

E. INSTRUCTION:
1. Instruct the Owner's personnel in proper operation of systems, equipment and similar items where provided as part of the Work.

0171 CLEANING

A. GENERAL:
1. Throughout the construction period, maintain the building and site in a high standard of cleanliness.

B. PROGRESS CLEANING:
1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
2. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from building and site.
3. Provide adequate storage for all items awaiting removal from site, observing requirements for fire protection and protection of ecology.

C. FINAL CLEANING:
1. Prior to completion of Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste.
2. Broom clean paved areas on the site and public paved areas adjacent to the site. Completely remove resultant debris.
3. Visually inspect exterior and interior surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.
4. Remove all traces of splashed materials from adjacent surfaces.

5. Remove paint droppings, spots, stains and dirt from all finished surfaces.
6. Schedule final cleaning as approved by the architect to enable the Owner to accept a completely clean project.

0172 PROJECT RECORD DOCUMENTS

A. DOCUMENTATION:

1. Throughout the progress of the work, maintain an accurate record of changes in the Contract Documents.
2. Maintain accurate record of arrangements of items shown schematically in the Contract Documents.

B. RECORD DOCUMENTS:

1. Using an erasable colored pencil, clearly describe the change or location of schematic items by graphic line and measurement and/or note as required.
2. Date all entries.
3. The architect may waive the requirements for conversion of schematic layouts.

C. SUBMITTALS:

1. Submit two (2) completed sets of the Project Record Documents to the architect for approval.
2. As required make changes and submit the final Project Record Documents to the architect.

DIVISION 2 - SITE WORK

0230 PILE FOUNDATIONS

A. GENERAL:

1. Work included: Provide foundation of preservative treated, Type II piles where shown on drawings, as specified herein and as needed for a complete and proper installation.

2. Quality assurance:

a. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

b. Use construction procedures such as to ensure minimal disruption or damage to the physical environment.

3. Submittals:

a. Manufacturer's Certificates of Conformance or Compliance: Submit certificates of conformance or compliance attesting that the materials and components meet the requirements specified.

b. Pile Placing Plan and Schedule: The contractor shall provide a detailed description of pile installation, a driving schedule, a plan for protection of environment and a listing of site access requirements to the architect for review and approval prior to commencement of work.

B. PRODUCTS:

1. Piles:

a. Species: Piles shall be round timber from stems of trees of Pacific Coast Douglas Fir in accordance with ASTM D25.

b. Lengths: Piles shall be furnished in the lengths required for the installations as shown on the drawings and as specified.

c. Circumferences and diameters: The circumferences and diameters of piles shall be as specified in ASTM D25. Pile tip diameter shall be 10" minimum.

d. Pressure treating: Piles shall be Type II piles, clean pealed and treated in accordance with the requirements of American Wood-Preservers Association Standard C1 "All Timber Products - Preservative Treatment by Pressure Process." Water-borne preservatives with a minimum retention of .6 pcf shall be used. The thickness of the sap wood shall be not less than 1 inch. Creosote solutions shall not be used.

e. Identification marking: Each pile shall be branded or marked with the typical brand and key data as prescribed in AWPA Standard M6. The data shall be legibly and permanently burn-branded into the pile or be included on a recessed, noncorrosive metal tag applied to the pile. The code letters shall not be less than 5/8 inch high, if burn branded, and not less than 1/8 inch high if on a metal tag. The piles shall have the required data burn-branded or tagged on the butt face and in addition on the pile approximately 5 feet from the butt.

C. EXECUTION:

1. Installation: Piles may be installed by driving from the surface or, at the contractor's option, by driving into previously augered holes. Jetting will not be allowed. Piles shall be installed tip first at the locations and to the lines and grades as specified and as shown on the drawings. Piles shall be set as nearly plumb as possible but in no case shall the piles vary from plumb by more than 2 inches in 10 feet. Piles shall be located within 2 inches of the locations as shown on the plans. Driving shall be accomplished with a steam or diesel hammer. If used, the auger bit shall be at least 2 inches smaller in diameter than the pile tip and the depth of the auger hole shall not be greater than 5 feet. Piles shall be driven to refusal but not less than 7 feet below the elevation of the lowest ground surface as measured 3 feet in any direction from the pile. Refusal shall be determined from the following driving formula:

$$Q = \frac{a\ E_r}{S + S_o}$$

Where: $$S_o = \left[\frac{a\ E_r\ L}{2\ A\ E}\right]^{1/2}$$

And:

Q = Ultimate pile capacity in pounts = 36,000 lbs.

E_r = Rated hammer energy in foot-pounds.

a = Hammer efficiency = $\frac{\text{delivered energy}}{\text{rated energy}}$.

L = Length of pile in feet.

A = Cross sectional area of pile in square inches.

E = Modulus of elasticity of pile material in psi.

S = Final set, penetration per blow in feet.

Care shall be taken to protect the pile butt from excessive damage during installation by using leaders, pile bands, driving caps, or similar devices. After driving, piles shall be cut off square with the axis of the pile true to grade at a distance well below any mushrooming or splitting. Wasted portions of piles shall become the property of the contractor and shall be removed from the site. Piles shall be cut and drilled to accept the cross members as shown on the drawings. Cut surfaces shall receive a treatment of water-borne preservative salts compatible with the initial treatment. This treatment shall be applied in two separate, liberal coats by paint brush.

2. Soil Conditions: The project area topography consists of gently sloped, grass covered sand dunes that range in elevation from about 8 to 18 feet above sea level. Scattered logs lie among the dunes and the contractor

is cautioned that buried logs may be encountered during pile driving operations.

Hand explorations were conducted at random locations along the proposed alignment. Site soils were observed to be loose, damp, gray, uniformly graded fine sands. Scattered thin roots were observed throughout the depth of the explorations. The density of the subsurface soils was determined by probing with a $\frac{1}{2}$ inch diameter steel rod. Typically, probing depths ranged between 2 and 6 feet indicating a "loose" condition. The upper limit of this range was more commonly observed when probing occurred near the top of individual sand dunes.

3. Environment Protection: Care shall be taken to protect the existing vegetation and dune conditions adjacent to the construction site. The contractor shall confine his activities, as much as possible, to the actual alignment of the structure including additional areas as may be required for vehicle turn-out to allow passing. The contractor shall minimize vehicle traffic in the construction site to those vehicles required for delivery of materials and those required for actual construction. No private vehicles will be allowed in the dune area. The contractor shall not bulldoze or change the surface condition of the dune field under or adjacent to the structure except as required for access to perform work and only after approval of the architect and engineer. Details of the specific measures to accomplish the work and at the same time protect the environment shall be included in the Pile Placing Plan and Schedule.

DIVISION 3 - CONCRETE

0300 GENERAL REQUIREMENTS

A. GENERAL: These specifications provide minimum standards for the construction of reinforced concrete structural elements. When in conflict, the Building Code Requirements for Reinforced Concrete (ACI 318-71) shall govern.

B. DRAWINGS: The construction drawings, details and specifications shall show: the size and position of all structural elements and reinforcing steel; the specific strength of the concrete at stated ages or stages of construction; and the specified strength or grade of reinforcing steel.

C. INSPECTION: Concrete construction shall be inspected throughout the various work stages by the Architect. Compliance with project drawings and specifications is required. Areas for inspection will include: placing and curing of concrete; placing of reinforcement; form placement and removal; and general progress of work.

0310 CONCRETE FORMWORK

A. GENERAL: Forms shall result in a final structure which conforms to the shape, lines and dimensions of members as required by the plans and specifications. Forms and their supports shall be designed so that previously placed structure will not be damaged.

B. STANDARDS:
1. Building Code Requirements for Reinforced Concrete (ACI) 318-71).
2. Recommended Practice for Concrete Form Work (ACI 347).
3. Specification for Structural Concrete for Buildings (ACI 30).

C. MATERIALS:
1. Form plywood: B-B Plyform, Class 1 and 11 EXT-APA or HDO EXT-APA.
2. Form ties: Burk A Penta-Ties, Richmond Snap-Tys or equal.

D. INSTALLATION AND PREPARATION:
1. Workmanship: Forms shall be substantial and sufficiently tight to prevent leakage of mortar. They shall be properly braced and tied together so as to maintain position. All surfaces shall be straight, plumb, and level to within 1/8" of drawing dimensions.

2. Trade Coordination: Provide other trades with construction schedule and allow them sufficient time for installation of embedded items.

3. Form treatment: Earth and plywood forms should be moistened sufficiently so as not to absorb water from concrete. Plywood forms should also be treated with oil or other parting agent to facilitate their removal.

4. Cleaning: Forms should be free of sawdust, nails and other debris prior to placement of concrete.

5. Removal: Form shall be removed when concrete has sufficiently hardened to resist damage from removal. Form shall be removed in such a manner as to insure complete safety of the structure.

6. Embedded conduits and pipes: Sleeves, conduits or other pipes shall be of such a size or location so as not to significantly impair the strength of the construction. Embedded aluminum sleeves, pipes or conduit shall be coated to prevent aluminum-concrete reaction or electrolytic action between aluminum and steel.

0320 CONCRETE REINFORCEMENT

A. BENDING: Bars shall be bent cold. The minimum inside diameter of bends is 6 bar diameters for #3 through #6 bars.

B. SURFACE CONDITION: Reinforcement steel at the time of concrete placement shall be free from mud, oil or other coatings that would adversely affect bonding capacity.

C. PLACEMENT: Reinforcement shall be accurately placed and supported by metal chairs, spacer or ties before concrete is placed and shall be secured against displacement with permitted tolerances.

D. SPLICES: Lap all bars 30 bar diameters at splices.

E. CONCRETE PROTECTION:
   1. Cast and permanently exposed to earth - 3 in.
   2. Exposure to weather (#5 and smaller) - $1\frac{1}{2}$ in.
   3. Not exposed to weather or earth (#11 and smaller) - 3/4".

F. RACEWAYS: Feeder raceways shall be Schedule 80 PVC rigid conduit and shall meet NEMA TC-2 standards for plastic conduit, Carlon, Johns-Manville or equal.

All raceway supports, clamps, LB fittings and junction boxes shall be non-corrosive type.

Outlet and junction boxes shall be galvanized, cast iron alloy, one piece, threaded hub similar to FS, FD, or GRF boxes with neoprene gaskets and galvanized, cast iron alloy covers or FRP plastic with gasketed screw-down covers.

Receptacle covers in wet areas shall be equipped with gaskets, screw cover device covers.

Raceway attachment to the boardwalk structure shall be by non-corrosive, Type A tapping screws.

G. CONDUCTORS: Insulated conductors shall be UL listed.

Solid copper conductors, THW or THWN insulated, may be used in 120 volt lighting and receptacle circuit in sizes No. 10 and No. 12 AWG. Minimum conductor size for all power wiring shall be No. 12 AWG.

Connectors for splicing copper conductors shall be No. 18 through No. 6 AWG solid - "Scotchlok" insulated spring connectors.

Connectors for terminating copper conductors shall be No. 18 through No. 10 AWG - insulated, solid-barrel, crimp type, spade tongue terminal.

Grounding materials shall be as follows:

1. Grounding clamp shall be equal to T & B 3900 UB Series.

2. Grounding wire and cable shall be solid copper.

3. Ground rod shall be copper-clad steel, 3/4 inch round, 10 feet long.

H. SPARE PARTS: The Contractor shall furnish four (4) spare light fixtures to the Owner.

I. HANDLING: All equipment furnished under this section shall at all times during construction, be adequately protected against injury or damage.

Special instructions for proper field handling and installation required by manufacturer shall be performed by the Contractor.

1620 INSTALLATION

A. GENERAL: Install the equipment and materials in a neat and workmanlike manner employing workmen skilled in the particular trade and in accordance with the manufacturer's instructions and industry standards. Maintain adequate supervision of the work by a person in charge at the site during any time that work under this division is in process or when necessary for coordination with other work.

Do the work in a systematic manner and coordinate with other trades on the job. Check work under this division for interference with work under other divisions and cooperate in locating equipment to avoid all such interferences. No extras will be allowed because of moving work required to avoid interference with work under other divisions of this contract. Organize this work to harmonize with the work of other trades so that all work may proceed as expeditiously as possible. Coordinate the installation of built-in work, attaching items to buildings and cutting and patching with other trades.

The general arrangement of the panelboard fixtures, outlets, and other equipment, as shown on the plans is diagrammatic and approximately correct as to locations. Where conflicts occur in locating the work, verify the location of conduit, fixtures, panels, control devices, etc., with the Owner. Where minor changes in location are required because of structural conditions or for the convenience of the Owner, such changes shall be made without additional expense to the Owner.

B. GROUND SYSTEM: Thermit welding of ground mats shall be done with Burndy, Thermoweld, or Cadweld molds and charges. Clean all varnish, oxide, scale, concrete, etc. from conductors before firing joints.

Grounding electrode at the service shall have resistance to ground of less than 1 ohm as determined by a Biddle ground ohmeter.

PVC or other non-metallic conduit in any service on the project shall have an insulated grounding conductor installed in it and bonded at each end of the non-metallic run to metallic raceway or equipment.

C. PANELBOARDS: Equipment shall be installed in such a manner as to leave access to the box, building chases, knockouts, etc. for future circuit additions. Place conduit in the rear line of knockouts, where possble. Wiring to neutral and grounding blocks shall be installed on the bottom or furthest back row first. Wiring shall leave the blocks accessible for future neutral or grounding connections.

Knockouts shall be removed only where conduit or cable entrances are made to the box. If knockouts are incorrectly removed or worked out of position, they shall be plugged with snap-in steel seals. Where concentric knockouts are used, a grounding bushing shall be installed on any connector or conduit entering through such knockouts.

Knockouts for breaker positions shall not be removed unless a breaker is to be installed. Where twistouts or knockouts are removed, provide a circuit breaker (1 pole, 20 ampere) to fill the position even if not called for on the panel schedule, circuit, etc.

Panelboards with flush trim or interiors that require depth adjustment shall be correctly set up, adjusted, and fastened in place through jamb nuts, lock nut, or other suitable method. Installation instructions for these boards shall be given to the Owner.

Panelboard directories shall be nearly typewritten in the same sequence as the panelboard stamping. A copy shall be sent to the Owner for his records. Record drawings shall reflect the actual size and pole position of all breakers, switches, or fuses installed.

Grounding bars, pads, or buses shall be bonded to the enclosure and sized to accommodate the grounding conductors shown on the drawings. Neutrals shall be insulated, but bondable.

D. RACEWAYS: PVC Schedule 80 conduit shall be used for all boardwalk circuits.

Raceway shall run exposed except in finished areas or unless shown otherwise on the drawings. Exposed raceway shall be installed as as follows:

1. It shall be installed in lines parallel or perpendicular to the building or structural members lines. Raceway shall be run parallel to the structure. The installation shall not result in cross-overs or offsets that can be avoided by installing the raceway in a different sequence or a uniform line.

Direct buried conduit shall be installed where underground runs are shown. Conduit shall be Schedule 40 rigid steel conduit with a half lapped wrap of Scotchrap No. 51 plastic tape or a coat of Koppers Bitumastic No. 505 or factory PVC coating, 20 mils minimum thickness.

The trench for underground conduit runs shall be as straight as practicable. Changes in direction and/or grade shall be of sufficient length to allow a gradual change (3-foot radius minimum). The trench shall be graded true and free from stones or soft spots. Three inches of fine sand shall be placed in the trench bottom and tamped into place. After the duct is placed in the trench, native earth backfill passing a No. 8 sieve, free of stones, at least 6 inches over the top of duct shall be placed in the trench bottom and tamped around the sides of the conduit. Do not tamp on top of the conduit until the final backfill is placed to finish the grade.

Direct buried conduit installed in trenches shall be marked by a 1-inch thick concrete ribbon or a strip of yellow marking tape. The marker shall be placed a minimum of 12 inches below grade during backfilling of the trench. The concrete ribbon shall be painted with a yellow strip 6 inches wide. The tape shall be highly acid and alkali resistant polyethelene film 0.004 inch thick, 6 inches wide with lengthwise and crosswise shear strength of 1500 psi minimum. The tape shall read "CAUTION - BURIED ELECTRICAL LINE". The wording shall repeat every 12 to 18 inches minimum. The tape shall be the product of Brady or 3M Company or equal.

Install conduit as a complete, continuous system without wires, mechanically secure and electrically connected to all metal boxes, fittings, and equipment. Blank off all unused openings, using factory-made knockout seals. Keep conduits clean and dry until conductors are installed using caps, bushings, and "penny" or other suitable means. Install a No. 12 TW pull wire or nylon cord in each empty conduit, leaving at least 8 inches slack at each end. Close each end left exposed.

Conduit shall connect to equipment and fixtures as per the manufacturer's recommendation. Stub-ins to fixtures and receptacles shall be located directly under the components.

Cut ends of conduit square with hand or power saw or approved pipe cutter. Ream cut ends to remove burrs or sharp ends. Thread cuts on conduit in the field shall have same effective length and same thread dimensions and taper as specified for factory-cut threads. Transitions from plastic to steel shall be made with a threaded male adapter (plastic) to a steel conduit coupling.

Provide anchors, hangers, supports, clamps, etc. to support the raceways from the structures in or on which they are installed.

Conduit couplings, fittings, and boxes where threaded male to female connections are made shall be waterproofed, rustproofed and be non-corrosive. Boxes shall be attached using external ears, feet, or clamps. Drilling or punching enclosure to mount through inside of box or enclosure is not permitted.

E. CONDUCTORS: Insulated wire and cable shall be installed in raceway systems after the system is complete. Damage due to missing bushings, burrs on conduit ends, etc. shall be cause to require removal and replacement of conductors. Damaged ends shall be considered sufficient indication of damaged insulation to require replacement. Cable lubricants, pulling sleeves, pullboxes, etc. shall be used to keep pulling tensions within allowable limits. Pulling compounds shall be Ideal Yellow 77 or equal. Pulls shall be by hand using cable grips or wrapping extra conductor around to form an eye. Cable ends shall be cut off after pulling and all compound cleaned from conductors before terminating.

Leave at least 6 inches of free conductor at each outlet and fixture.

For 3-wire, 120/240 volt single phase circuits, use black and red with white neutral.

Do not use white or green color for any conductor not intended for neutral or grounding purposes.

Where wire markers are used for color coding, mark each conductor at all accessible locations such as panelboards, junction boxes, pullboxes, outlets, and fixtures.

Install wire neatly in all enclosures. Bend or form wires in neat runs from conduits to terminals. Arrange wires so that they may be grouped by conduit or by function in the enclosure. Install cable ties and straps to support and bundle wiring in enclosures. Arrange wires to allow wire tags and numbers to be easily read without bending or flexing wiring.

F. LIGHTING FIXTURES: The Contractor shall see that all lighting designated to be installed throughout the project shall be of the correct size and design to properly suit the requirements of the application. The Contractor shall be responsible for verifying the lighting fixture frame requirements, and mounting devices for all fixtures.

Install the flush mounted boardwalk fixtures straight and true. Equip with all necessary joining straps, couplings, nipples, etc. for complete workable units.

Furnish and install all supports, spacers, channels, etc. necessary to support lighting fixtures.

Nails or similar fasteners are not approved for lighting fixture support. Where fixtures are located so that they cannot be supported to structure members, the Contractor shall provide additional framing as required to support fixtures. Material for fixture support shall match the structure material.

After all fixtures and lamps are installed, a lighting test shall be made by the Contractor and a representative of the fixture manufacturer in the presence of the Owner; and any defects in control or operation found at this time shall be corrected by this Contractor at his own expense. Remedy in satisfactory manner any light leaks which may develop after installation of recessed or enclosed fixtures.

DIVISION 3 - CONCRETE

0321 REINFORCING STEEL

A. STANDARDS: Standard Specification for Deformed Billet-Steel Bars for Concrete Reinforcement (ASTM A 615-68).

B. GRADE: Grade 40.

0322 WELDED WIRE FABRIC

A. STANDARD: Specification for Welded Steel Wire Fabric for Concrete Reinforcement (ASTM A 185-70).

B. GRADE: Grade 40.

0330 CAST-IN-PLACE CONCRETE

A. STANDARDS:
1. Building Code Requirements for Reinforced Concrete (ACI 318-71).
2. Specifications for Structural Concrete for Buildings (ACI 301).
3. Recommended Practices for Hot Weather Concreting (ACI 605).
4. Recommended Practices for Cold Weather Concreting (ACI 306).

B. PORTLAND CEMENT: Conform to Specifications for Portland Cement (ASTM C150-69a).

C. AGGREGATE: Conform to Specifications for Concrete Aggregates (ASTM C 33-67).

D. MIXING WATER: Water shall be clean and free of injurious amounts of oils, acids, alkalis, salts, organic materials or other substances that may be deleterious to concrete or steel.

E. ADMIXTURE: Admixtures shall be subject to prior approval by Architect and conform to: Specification for Air-Entraining Admixtures for Concrete (ASTM C360).

F. MIXING: All concrete shall be mixed until there is a uniform distribution of the materials. Ready-mix concrete shall be mixed and delivered in accordance with requirements set forth in Specifications for Ready-Mixed Concrete (ASTM C94).

G. PROPORTIONS: Proportions of ingredients for concrete shall be established on the basis of ACI 318-71 Sec. 4.2.2. through 4.2.8. to provide:

1. Conformance to strength test requirements.

2. Adequate workability and proper consistency to permit the concrete to be worked readily into the forms and around reinforcement under the conditions of placement to be employed without excessive segregation or bleeding.

3. Resistance to freezing and thawing and other aggressive actions.

H. CONVEYING: Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent the separation or loss of materials. The conveying equipment shall be capable of providing a supply of concrete at the site of placement without separation of ingredients and without interruption sufficient to permit loss of plasticity between successive increments.

I. DEPOSITING:
1. Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. The concreting shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the spaces between the bars. No concrete that has partially hardened or been contaminated by foreign materials shall be deposited in the structure, nor shall retempered concrete or concrete which has been remixed after initial set be used unless approved by the Architect.
2. After concreting is started, it shall be carried on as a continuous operation until the placing of the panel or section is completed. The top surfaces of vertically formed lifts shall be generally level. When construction joints are necessary, they shall be made in accordance with Section 6.4. ACI 318-71.
3. All concrete shall be thoroughly consolidated by suitable means during placement, and shall be thoroughly worked around the reinforcement and embedded fixtures and into the corners of the forms.

J. STRENGTH: Concrete shall attain f'c = 2500 psi compressive strength at 28 days.

K. FINISHING:

1. Floating: After the concrete has been darbied or bull-floated, it should be allowed to harden sufficiently so that a man's foot leaves only a slight imprint. Floating should not begin until the water sheen has disappeared. The surface then should be floated with wood or metal floats or with a finishing machine using float blades.
   The purpose of floating is threefold: to embed aggregate particles just beneath the surface; to remove slight imperfections, humps, and voids; and to compact the concrete at the surface in preparation for other finishing operations. The concrete should not be overworked while it is still plastic as this may bring an excess of water and fine materials to the surface and result in subsequent surface defects.
   Where floating is done to provide a coarse texture as the final finish, it may be necessary to float the surface a second time after it has partially hardened so that the desired finish will be imparted to the concrete.
2. Troweling: Floating and troweling should be delayed until after the concrete has hardened enough so that water and fine material are not brought to the surface.
   Spreading dry cement on a wet surface to take up excess water is not good practice.
   The first steel troweling should be sufficient to produce a smooth surface free of defects. A second troweling may follow after the concrete has become hard enough so that no mortar adheres to the edge of the trowel and a ringing sound is produced as the trowel passes over the surface. Additional trowelings may be desirable depending on conditions of traffic and exposure. During the final troweling, the trowel should be tilted slightly and heavy pressure exerted to compact the surface thoroughly.
3. Brooming: A scored surface may be produced by brooming before the concrete has thoroughly hardened. Rough scoring is achieved by the use of a stiff, coarse, fiber broom. Brooming usually follows floating. If a finer texture is desired, the concrete is troweled to a smooth surface and then brushed with a soft-bristled broom. Brooming should be delayed until the concrete is sufficiently hard to retain the scoring. Floor slabs are usually broomed transversely to the main direction of traffic.

L. CURING:

1. Concrete shall be maintained above 50F and in a moist condition for at least the first 7 days after placing, except that high-early-strength concrete shall be so maintained for at least the first 3 days. Supplementary strength tests in accordance with Section 4.3.4. ACI 318-71 may be required to assure that curing is satisfactory.

2. Curing by high pressure steam, steam at atmospheric pressure, heat and moisture, or other accepted processes, may be employed to accelerate strength gain and reduce the time of curing. Accelerated curing shall provide the compressive strength of the concrete at the load stage considered at least equal to the design strength required at that load stage.
3. Adequate equipment shall be provided for heating the concrete materials and protecting the concrete during freezing or near-freezing weather. All concrete materials and all reinforcement, forms, fillers, and ground with which the concrete is to come in contact shall be free from frost. No frozen materials or materials containing ice shall be used.
4. During hot weather, proper attention shall be given to ingredients, production methods, handling, placing, protection, and curing to prevent excessive concrete temperatures or water evaporation which will impair the required strength or serviceability of the member or structure.

M. DAMAGED OR DEFECTIVE WORK:
1. Floor slabs with unacceptable finishes, excessive shrinkage cracks, and/or improper drainage as determined by the Architect shall be removed and replaced at the contractor's expense.
2. Wall sections with unacceptable workmanship, and/or visual or structural defects as determined by the Architect shall be removed and replaced at the contractor's expense.

DIVISION 5 - METALS

0550 METAL FABRICATION

A. GENERAL:

1. Work included: Provide miscellaneous metal work shown on the drawings as specified herein and as needed for a complete and proper installation.

2. Quality assurance:

a. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section.

b. Perform shop and/or field welding required in connection with the work of this section in strict accordance with pertinent recommendations of the American Welding Society.

c. The contractor shall verify all measurements and shall take all field measurements necessary before fabrication.

3. Submittals:

a. Materials list of items proposed to be provided under this section.

b. Shop drawings shall be submitted to the architect prior to fabrication. Shop drawings shall indicate material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Shop drawings for the following items shall be submitted: handrails and fabricated metal connections.

B. PRODUCTS:

1. Materials: Comply with the following standards:

a. Steel shapes, plates and bars: ASTM A 36, hot dipped zinc coated.

b. Steel pipe: ASTM A53 grade A, black steel, hot dipped zinc plated.

c. Miscellaneous steel products: ASTM A-386, zinc coated by the hot dip process.

2. Fasteners:

a. Provide zinc coated fasteners of the type, grade and class required for the particular use.

b. Provide fasteners which comply with the following standards:

i. Bolts and nuts: ASTM 307, grade A, hexagon head, regular type.

ii. Lag bolts: Fed Spec FF-B-561, hexagon head.

iii. Washers: Fed Spec FF-W-92, round, carbon steel.

iv. Lock washers: Fed Spec FF-W-84, helical spring type, carbon steel.

3. Paint:

a. Primer: Use Koppers 654 primer.

b. Top coat: Use Koppers Bitumastic No. 300-M, coal tar epoxy.

c. For repair of galvanizing use a zinc-dust content paint complying with MIL-P-21035.

C. EXECUTION:

1. Surface conditions: Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

2. Coordination: Coordinate as required with other trades to assure those trades interface properly and adequately with the work of this section.

3. Fabrication:

a. Miscellaneous metalwork shall be well formed to shape and size with sharp lines and angles and true curves.

b. Drilling and punching shall produce clear, true lines and surfaces.

c. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth.

d. Corner joints shall be coped or mitered, well formed and in true alignment.

e. Railing splices shall be butted and reinforced by a tight fitting interior sleeve not less than 6" long.

4. Installation:

a. Work shall be accurately set to establish lines and elevations and securely fastened in place.

b. Installation shall be in accordance with manufacturer's instructions and approved drawings, cuts and details.

c. Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include through bolts, lag bolts and screws.

d. Field welding:

i. Comply with AWS recommended procedures of manual-shielded metal-arc welding for appearance and quality of weld and for methods to be used in correcting welding work.

ii. Grind exposed welds smooth and touch up shop coats.

e. Immediately after erection clean field welds, bolted connections and abraded areas of shop priming. Paint the exposed areas with same material used for shop painting.

DIVISION 6 - WOOD AND PLASTIC

0601 LUMBER

A. GENERAL:

1. Work included: Provide wood members and other items required for carpentry as shown on drawings, as specified herein and as needed for a complete and proper installation.

2. Related work: Section 0610 - Carpentry.

3. Quality assurance:

a. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of this section.

b. Lumber sizes shall conform to product standard PS 20.

B. PRODUCTS:

1. Grade stamps: Materials shall bear the grademark, stamp or other identifying marks indicating grades of material and rules or standards under which produced.

2. Materials:

a. Lumber:

Deck beams:	Sawn	DF/L	#1	Treated
Deck joists:	Sawn	DF/L	#2	Treated
Decking:	S4S	DF/L	#2	Treated
Railings:	S4S	DF/L	#1	Treated
Roof beams:	S4S	DF/L	#1	Treated
Roof rafters:	S4S	DF/L	#2	Treated
Nailers:	Sawn	Cedar	#2	-
Barge fascia:	S4S	Cedar	C1.	-

b. Pressure Treatment: Pressure treat with ammoniacal copper arsenite in accordance with APWA specification TI-W-571 "Chemonite" process and identified on each piece, to 0.40 lbs. per cubic foot, APWA standard C1 and C2. Creosote solutions shall not be used.

C. EXECUTION:

1. Deliveries:

a. Stockpile materials sufficiently in advance of need to assure their availability in a timely manner for this work.

b. Lumber shall be stockpiled within, but at the edge of, the right-of-way of 10th Street or Bolstad Ave. so as not to impede traffic.

0610 CARPENTRY

A. GENERAL:

1. Work included: Install wood framing and trim as indicated on the drawings, specified herein and as needed for a complete and proper installation.

2. Related work: Section 0601 - Lumber.

3. Quality assurance: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

B. PRODUCTS:

(No products are specified in this section.)

C. EXECUTION:

1. Surface conditions: Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

2. Workmanship:

a. Produce joints which are tight, true, and well nailed, with members assembled in accordance with the Drawings and with pertinent codes and regulations.

b. Selection of lumber pieces:

i. Carefully select the members.
ii. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing, and will allow making of proper connections.
iii. Cut out and discard defects which render a piece unable to serve its intended function.
iv. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

c. Do not shim any framing component.

3. General framing:

a. In addition to framing operations normal to the fabrication and erection indicated on the drawings, install wood blocking and backing required for the work of other trades.

b. Set horizontal and sloped members with crown up.

c. Do not notch, cut, or bore members for pipes or conduits, or for other reasons except as shown on the drawings or as specifically approved in advance by the architect.

d. Make bearings full unless otherwise indicated on the drawings.

e. Finish bearing surfaces on which structural members are to rest so as to give sure and even support.

f. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.

4. Blocking:

a. Cross bridging may be omitted for roof joists where the omission is permitted by code, except where otherwise indicated on the drawings.

b. Install solid blocking between joists at points of support.

5. Alignment: On framing members to receive a finished surface, align the finish subsurface to vary not more than 1/8" from the plane of surfaces of adjacent furring and framing members.

6. Fastenings:

   a. Nailing:

      i. Use only common wire nails or spikes of the dimension shown on the nailing schedule, except where otherwise specifically noted on the drawings.
      ii. For conditions not covered in the nailing schedule provide penetration into the piece receiving the point of not less than ½ the length of the nail or spike, provided, however, that 16d nails may be used to connect two pieces of 2" (nominal) thickness.
      iii. Nail without splitting wood.
      iv. Prebore as required.
      v. Remove split members and replace with members complying with the specified requirements.

   b. Bolting:

      i. Drill holes 1/16" larger in diameter than the bolts being used.
      ii. Drill straight and true from one side only.
      iii. Do not bear bolts threads on wood, but use washers under head and nut where both bear on wood, and use washers under all nuts.

   c. Screws:

      i. For lag screws and wood screws, prebore holes same diameter as root of threads, enlarging holes to shank diameter for length of shank.
      ii. Screw, do not drive, lag screws and wood screws.

7. Nailing: Unless otherwise directed by the architect, comply with the nailing schedule and other fastening requirements contained in the pertinent regulations of governmental agencies having jurisdiction.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

0731 SHINGLES

A. GENERAL:

1. Work included: Provide cedar shingles and other items required for roofing as shown on the drawings, as specified herein and as needed for a complete and proper installation.

2. Quality assurance:

a. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of this section.

b. Verify product quality at job site.

B. PRODUCTS:

1. Materials:

a. Provide Certi-grade #1, 16", red cedar shingles.

b. Provide hot dipped galvanized 4d and 6d common nails.

c. Provide premanufactured hip units.

C. EXECUTION:

1. Application:

a. Use double starter course.

b. Use $5\frac{1}{2}$" exposure.

c. Butts of first course shall project $1\frac{1}{2}$" beyond fascia.

d. Space shingles approximately 1/8" apart.

e. Joints of adjacent courses shall be offset $1\frac{1}{2}$" minimum and alternating courses shall not be in direct alignment.

2. Nailing:

a. Apply each shingle with 2 - 4d nails (only) driven about 3/4" from edge and course line.

b. Use 6d nails where driving into barge board.

3. Hips:

a. Apply hip units at same exposure as shingles.

b. Use nails sufficiently long to penetrate sheathing by $\frac{1}{2}$".

DIVISION 16 - ELECTRICAL

1601 GENERAL

A. SCOPE OF WORK: Electrical work includes the labor, materials, and equipment necessary to furnish, install, and place into operation the boardwalk power and lighting system. The work includes:

1. Connection to the PUD secondary transformer.

2. Connecting all components and control devices provided as part of the project.

3. Adjustment and calibration of electrical and lighting equipment.

4. Testing and start-up of all electrical equipment as necessary to place the system into operation.

5. Recordkeeping and providing operation and maintenance information.

B. SUBMITTALS: As soon as practicable after the date of notice to proceed and before commencement of installation or fabrication of any materials or equipment, submit to the Engineer for review descriptive information for materials used in the electrical work. Diagrams and symbols used shall conform to Joint Industry Conference (JIC) Electrical Standards for Industrial Equipment, NEMA, ANSI, and IEEE, latest revisions.

Data and shop drawings shall employ the terminology, classifications, and methods prescribed by the IES Lighting Handbook, as applicable, for the lighting system.

Requests for alternates shall be made in accordance with the General Conditions of the construction contract.

C. OPERATING AND MAINTENANCE INSTRUCTIONS: The system manufacturer shall provide four (4) copies, plus any Contractor requirements, of maintenance and operation manuals with illustrated parts list covering the equipment installed under this contract. All 4 copies shall be given to the Owner.

D. REFERENCE SPECIFICATIONS: Electrical work shall be in accordance with the National Electrical Code (latest edition) and local and state codes in legal force in the project area. If the Contractor observes that the drawings and/or specifications are at variance with such codes and regulations, he shall promptly notify the Engineer in writing. Should the Contractor perform any work in noncompliance with the above-mentioned codes and regulations without such notice to the Engineer, the Contractor shall bear all costs arising therefrom.

The above codes are referenced to establish minimum requireents and wherever this Specification requires higher grades of material or workmanship than required by the codes, this Specification shall prevail.

Mechanical equipment furnished by the Contractor that has electrical power or control devices attached or forming a part of the unit shall conform to JIC and National Machine Tool Builders Association (NMTBA) electrical standards.

E. TESTS AND INSPECTION: Submit work to all tests and inspections equired by the Engineer and any electrical inspector having jurisdiction. Certificates of approval that are issued shall be turned over to the Engineer. Secure and pay for all utility connection fees or aid-to-construction costs and other fees or costs incidental to the electrical work.

Cooperate with the Engineer and provide assistance at all times for the inspection of the electrical work performed under this contract. Remove covers, operate machinery or perform any reasonable work which, in the opinion of the Engineer, will be necessary to determine the quality or adequacy of the work.

In general, the following shall be performed:

1. Make any specific tests required by the manufacturer's installation instructions or electrical standards (i.e., NEMA, IEEE) for the class of equipment.

2. Check tightness of all bolted structural connections.

3. Check leveling and alignment of all components and fixtures.

4. Check for physical damage to components and fixtures.

F. RECORDS: Maintain on the job at all times a separate set of record drawings in accordance with the General Conditions. Deviations from the plans, stubouts, changes from the original work, routing of hidden raceways, actual fixtures and equipment locations, equipment sizes and dimensions and building outline changes shall be shown on the drawings. At the end of the project, forward to the Owner a complete set of drawings indicating all changes made on the job.

G. INTENT OF DRAWINGS: Electrical drawings are partly diagrammatic and it is not the intent to show in detail all features of work or exact physical arrangement of equipment. The location of

outlets and equipment are approximate unless dimensioned. The exact locations and routing of conduits shall be governed by structural conditions and physical interferences and by the location of electrical terminations on equipment.

H. WARRANTY-GUARANTEE: As per the General Conditions of the construction contract.

DIVISION 16 - ELECTRICAL

1610 MATERIALS

A. GENERAL: Provide new materials and equipment which are standard products of manufacturers regularly engaged in production of such equipment. Materials and equipment shall be UL approved and labeled for the purpose for which they are to be used. Similar items of equipment shall be of the same manufacturer and quality. The equipment and materials shall meet applicable NEMA, IEEE, and ANSI standards.

Furnich materials, devices, equipment, or supplies of materials that are inherently non-corrosive or are coated or covered in a manner acceptable which renders them non-corrosive and suitable for service in the high salt/humidity area due to the presence of the Pacific Ocean waters.

Metal parts of "wet" location or exterior fixtures and receptacles exposed to weather conditions shall be constructed of cast or spun aluminum, cast bronze, stainless steel, or other non-ferrous metals available to withstand exposure. Provide gaskets on all trims and housings of exterior or "wet" location fixtures. Non-corrosive type plaster rings, hangers, trim, and hardware shall be provided in wet or outdoor locations.

Where the Contractor proposes changes in the work or substitutions in material, he shall be responsible for ensuring that sizes, weights, openings, etc. are provided that do not require change in the work outside his contract or he shall pay for all such changes.

B. ELECTRICAL SERVICE: Service for the boardwalk electrical system shall be 120/240 volt, 1 phase, 60 cycle, 3 wire. The Contractor shall contact and arrange for the power company (Public Utility District) to provide 1-phase primary electrical service to the site in the vicinity of the interpretative center. Buried secondary service shall be provided from the transformer to the boardwalk electrical enclosure. The Contractor shall install the secondary service drop in PVC schedule 40 conduit per PUD standards.

The Contractor shall provide and install the meter can, disconnect and associated wiring and enclosure per the requirements of PUD. PUD shall install the service drop conductor and make all wiring connections at the transformer as well as provide and install the electrical meter.

All cost for the electrical service including charges by the power company, shall be paid for by the Contractor.

C. 120/240 VOLT, 1-PHASE PANELBOARD: The 16 circuit breaker load center shall be contained in a NEMA 4X enclosure. This enclosure shall be mounted on the east side of the interpretative center.

The panelboard shall be wall-mounted, circuit breaker type equipment, meeting NEMA PB-1--1971 and U.S. Standard 67. The panelboard shall be vertical main breaker or main lugs only, type. All breakers shall bolt to the bus. Panelboard shall be service entrance listed.

The panelboard shall be equipped with branch breakers as described in the "Electrical Data" on the Plan.

The panelboard shall be complete with insulated, but bondable neutral bar, grounding bar and directory card and holder. The panelboard shall have a 1" x 4" engraved Lamacoid nameplate on the enclosure.

The panelboard shall be equipped with a tumbler lock/catch. Provide three keys for Owner's use. Keys shall be removable in the locked and unlocked position.

The panelboard shall be manufactured by one of the following:

1. Cutler Hammer.
2. General Electric.
3. Square "D" Company.
4. Allen Bradley.

Equipment shall be installed in such a manner as to leave access to the box, building chases, knockouts, etc., for future circuit additions. Place conduit in the rear line of knockouts where possible. Wiring to neutral and grounding blocks shall be installed on the bottom or furthest back row first. Wiring shall leave the blocks accessible for future neutral or grounding connections.

Knockouts shall be removed only where conduit or cable entrances are made to the box. If knockouts are incorrectly removed or worked out of position, they shall be plugged with snap-in steel seals. Where concentric knockouts are used, a grounding bushing shall be installed on any connector or conduit entering through such knockouts.

Knockouts for breaker positions shall not be removed unless a breaker is to be installed. Where twistouts or knockouts are removed, provide a circuit breaker (1 pole, 20 ampere) to fill the position even if not called for on the panel schedule, circuits, etc.

A panelboard directory shall be neatly typewritten in the same sequence as the panelboard stamping. Record drawings shall reflect the actual size and pole position of all breakers.

Grounding bars, pads, or buses shall be bonded to the enclosure and sized to accommodate the grounding conductors shown on the drawings. Neutrals shall be insulated, but bondable.

Equipment shall be vacuumed clean after installation. If hole saws were used on the box, a magnet shall be used to pick up all shavings around the bus and its insulation before any breakers are installed.

Circuit breakers shall meet NEMA Standard AB-1-1975. They shall be molded case, thermal-magnetic trip, trip-free with non-interchangeable, non-adjustable trip unless otherwise noted. Breaker interrupting capacities shall be as follows: 240/120V system = 10,000RMS symmetrical, minimum.

D. LUMINATION EQUIPMENT:

1. Luminaires: Luminaires shall be mounted between the boardwalk vertical rail support members @ 32' O.C. per side (staggered @ 16' O.C. side to side).

   Provide luminaires complete with lamps of the number, type, and wattage indicated. The details, shapes, and dimensions are indicative of the general type desired, but are not intended to restrict selection to luminaires of any particular manufacturer. Luminaires of similar designs and equipment (light distribution and brightness characteristics) and of equal finish and quality will be acceptable as approved. The luminaires shall be suitable for high salt level/humidity environment.

   Electrical construction features of the lighting units consisting of metal gauges, wiring channels, ventilating, lamp holders, high-power factor ballasts, etc. shall comply with the latest rules and regulations of the National Fire Protection Association and the Electrical Testing Laboratories. Photometric curves and shielding of the units shall comply with the Specifications and Illuminating Engineering Society and Electrical Testing Laboratory Standards.

Furnish fixtures bearing US label. Attaching of labels after delivery of fixtures is not acceptable. The lighting fixtures installed shall have UL approved "wet" or "damp" location labels. There shall be no visible labels, trademarks, or monograms on the exterior of the lighting fixtures. Fixtures shall be listed as regular catalog items and shall be in regular production on date of Invitation for Bids.

Metal parts of "wet" location or exterior fixtures exposed to weather conditions shall be constructed of cast or spun aluminum, cast bronze, stainless steel, or other non-ferrous metals available to withstand exposure. Provide gaskets on all trims and housings of exterior or "wet" location fixtures. Non-corrosive type plaster rings, hangers, trim, and hardware shall be provided in wet or outdoor locations.

Fixture wire for incandescent lighting fixtures shall be Type AF insulated, No. 16 AWG up to and including 300 watts and No. 14 AWG on wattages over 300 watts. Fixture wire for fluorescent fixture ballasts and socket leads within wiring channels shall be Type "AWM" 600 volt rating, No. 18 AWG minimum, 90 degrees or 105 degrees C. as required.

Provide fluorescent and high-intensity discharge lamp fixtures with ballasts suitable for the line voltage to which they are connected and for the type, size and number of lamps served in the fixture.

They shall be high-power factor ballasts manufactured per ANSI C82.1-1972, C82.2-1963 and C82.3-1962 and listed by UL. In those ratings for which Certified Ballast Manufacturers Association (CBM) has issued specifications and which have been tested for compliance by ETL, furnish ballasts which comply with the specifications, meet the tests and with CBM/ETL labels attached.

Ballasts for fluorescent lamps shall be thermally protected, UL Class "P" with automatic reset integral protector device set to limit case temperature to 110 degrees C. maximum under abnormal conditions. They shall be Advance Kool Koil, Mark II, Universal No. VLH or Jefferson Super Premium TP.

Ballasts for high-intensity discharge lamps shall be high power factor, regulated and shall be suitable for the temperature range in which they are to be operated. Where fixtures are used in ambients below 50 degrees F., special low temperature ballasts shall be furnished in lieu of the standard temperature ballasts.

Guarantee ballasts against objectionable or excessive hum and vibration; if hum or noise does occur, replace all noisy ballasts with quiet-operating ones. Outdoor and "wet" location ballasts shall be weatherproof.

The Contractor shall submit information for review by the Owner as follows:

a. Candle power distribution, fixture efficiency, coefficient of utilization by the zonal cavity method, brightness and shielding angle in longitudinal and transverse directions with performance characteristics certified by an independent testing laboratory.

b. Finish, including appearance, metal treatment and quality and hardness of paint.

2. Lighting Contactor: NEMA ICS 2, electrically operated, mechanically held contactor rated (120 volts, 20 amperes, 6-pole). Provide in NEMA (4) (x) enclosure conforming to NEMA ICS 6. Contactor shall have silver alloy double-break contacts and coil clearing contacts and shall require no arcing contacts. (Provide contactor with hand-off-automatic.) Contactor shall be hermetically sealed.

3. Photocell Switch: UL 773 or UL 773A, hermetically sealed cadmium-sulphide cell rated 120 volts ac, 60 hertz with single-throw contacts rated 1000 watts, and 120 volts. Mount switch in a high-impact-resistant, noncorroding and nonconductive molded plastic housing with an EEI-NEMA locking-type receptacle. The switch shall turn on below 3 footcandles and off at 3 to 10 footcandles. A time delay shall prevent accidental switching from transient light sources. Mount a directional lens in front of the cell to prevent fixed light sources from creating a turnoff condition. Aim switch according to manufacturer's recommendations.

E. RECEPTACLES: Duplex receptacles shall be heavy-duty per NEMA WD-1, with staked screw terminals for connection and provisions for split bus operation. They shall be NEMA 5-15R or 5-20R type Arrow-Hart 5739, Bryant or Hubbell 5362 (ivory), P&S 6200, Sierra, or equal.

Receptacle covers shall be weatherproof with spring-hinged covers.

SECTION 4

GEOTECHNICAL ENGINEERING RECOMMENDATIONS

BY

HART CROWSER

Values of n_h may need to be factored for cyclic (i.e., seismic) loading. Lateral pile displacements under cyclic loading have been observed to increase over displacements due to static loading. For loose soils, a reduction in n_h to 1/4 the initial value has been suggested for cyclic loading. Actual test data are limited.

To compute pile deflection, the shear forces and moments applied at the ground line are first computed. Using the appropriate values for n_h and EI for the pile, the relative stiffness factor, T, is computed and Figure 1 or 2 is used to give values for the deflection and moment coefficients at any depth. The moments and deflections of the pile at any depth may then be determined using the previously given equations.

In order for the pile to develop "fixity," it is generally considered that a total embedment of at least 4T (4 times the relative stiffness factor) must be attained. With 4T or greater embedment, the ultimate resistance to an applied load is governed primarily by the strength characteristics of the pile and not the strength of the soil. In contrast, should the pile be embedded to a depth of 2T or less, the ultimate resistance to lateral loads would be governed primarily by the strength of the soil with the pile acting as a rigid member (or pole). An embedment of between 2T and 4T would be considered an intermediate case with the ultimate resistance dependent on both the soil and pile strength. The moment formulations calculated using this procedure do not contain a factor of safety. The structural engineer should incorporate a suitable factor of safety in the lateral load design and verify the strength of the pile to resist the applied lateral loads.

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
206.324.9530

J-2174

June 21, 1988

City of Long Beach
P.O. Box 310
Long Beach, WA 98631

Attn: Mr. Nabiel Shawa
City Engineer

Re: Geotechnical Engineering Recommendations
Proposed Boardwalk Foundation
Long Beach, Washington

Dear Mr. Shawa:

This letter report summarizes our observations and geotechnical engineering recommendations for the above referenced project. Geotechnical engineering recommendations are based on our interpretation of soil conditions observed during our geologic reconnaissance which included hand probing, augering, and trenching along the alignment of the proposed boardwalk.

This letter report is intended to provide the City of Long Beach with geotechnical input to assist in project planning and design. Geotechnical work for the proposed boardwalk has been accomplished in general accordance with our proposal dated May 20, 1988. Our work on the project included explorations, laboratory testing,

analyses, and development of the recommendations for pile design discussed in this letter report.

Geotechnical engineering recommendations contained within this letter report are based on our understanding of the work to be accomplished as well as observed site and subsurface conditions revealed by our explorations. If any of the work plans or design criteria change prior to construction, we should be consulted to determine the appropriateness of our recommendations.

The geologic reconnaissance and evaluation of subsurface conditions were performed in the field by a geotechnical engineer. Samples were collected during the explorations and returned to our laboratory. Moisture contents were determined for all samples and grain size analyses were performed on selected samples. Grain size testing consisted of a "200-wash" where the percentage of coarse to fine material is determined by washing the material through the No. 200 mesh sieve. The "200-wash" is performed in general accordance with ASTM D 1140. Soil classification data as well as conditions observed in the field were used to estimate soil parameters used for design.

This report is prepared for the exclusive use of the City of Long Beach and its consultants for specific application to the referenced project. Recommendations presented in this report are based in part on observations of conditions during the explorations and results of laboratory classification tests on the soil samples recovered. The nature and extent of variations between exploration locations may not become evident until construction. If variations then appear it will be necessary to re-evaluate the recommendations in this report. The scope of work did not include an evaluation of

potential dune migration or changes in conditions which could occur over the life of the structure. Our work has been performed in accordance with generally accepted geotechnical engineering practices. No other warranty, express or implied, is made.

Site and Project Description

Information on the proposed boardwalk was obtained from conversations with the City Engineer; the Architect, Mr. David E. Jensen; and the structural Engineering Consultant, Gray and Osborn, Inc., as well as review of preliminary drawings provided by the Architect.

The proposed boardwalk site is located among the environmentally sensitive primary and secondary sand dunes between 10th Street South and Bolstad Street in Long Beach, Washington. The project area topography consisted of gently sloped, grass covered sand dunes that ranged in elevation from about 8 to 18 feet above sea level. Scattered logs were observed to lie among the dunes and were presumably placed as driftwood when the surf zone was east of its present location. Although surface water was not observed in depressions along the proposed alignment, we understand an interdunal wetlands commonly exists further inland of the secondary sand dunes.

We understand the proposed work involves a timber boardwalk to be constructed approximately 2,200 feet in length and 10 feet in width. The structure is to be elevated from about 30 inches to 8 feet above the ground surface. Based on discussions with the City's structural engineering consultant, we understand the foundation could consist of nominal 10-inch-diameter treated timber

piles. A typical spacing of about 12 feet is anticipated between the timber piles. We understand an interpretive center is planned to be located in the general area of station 16+00 along the boardwalk. Access ramps are planned for the two ends of the boardwalk and additional ramps may be constructed that allow controlled access to the beach.

Generalized Subsurface Conditions

Hart Crowser visited this site on June 7 and 8, 1988, and accomplished hand explorations at random locations along the proposed alignment. Site soils were observed to be loose, damp, gray, uniformly graded fine sands. Scattered thin roots were observed throughout the depth of the explorations. The density of the subsurface soils was determined by probing with a 1/2-inch-diameter steel rod. Typically, probing depths ranged between 2 and 6 feet indicating a "loose" condition. The upper limit of this range was more commonly observed when probing occurred near the top of the individual sand dunes.

Geotechnical Engineering Recommendations

Hart Crowser's observations indicate the proposed timber pile foundation is appropriate for soil conditions at the site. Vertical capacity could be obtained from end bearing and/or side friction, depending on the method and depth of installation. At the present time it is unknown whether the piles will be augered, driven, or a combination of both. We understand use of jetting could be limited by concern for potential environmental impacts. We do not recommend jetting because the amount of soil loosened is difficult to control and may result in questions on available pile

capacity. We recommend that if the holes are pre-augered, the diameter of the auger be no larger than about 2 inches smaller than the minimum diameter of the pile to be installed. This would allow the pile to still develop some side friction for vertical compressive and uplift loads. In addition, if the holes are pre-augered the pile should also be driven a minimum of two feet so that a penetration rate may be recorded to verify pile capacity as discussed below.

Vertical Pile Capacity

We understand that 10-inch butt diameter timber piles will be installed with vertical compressive working loads of 8.8 kips each. Based on the soil conditions encountered, we recommend a minimum pile penetration of 7 feet below the existing ground surface in order to achieve the required vertical capacity. Anticipated settlements are estimated to be less than about an inch. These values are considered to be appropriate for the observed conditions. If during pile installation greater thicknesses of the "loose" sands are indicated by high penetration rates, then the depth of embedment should be extended until the required pile capacity is obtained.

We recommend that capacity of each pile and its depth of embedment be verified in the field based on observations and use of a dynamic pile driving formula. We recommend the formula be applied in conjunction with at least the final two feet of driving, and take into consideration various physical factors such as energy of the hammer, the size and length of the piles, and modulus of elasticity of the pile materials. In our opinion an appropriate formula would

be the Janbu or the Danish (S_o) pile driving formula, presented below:

$$Q = \frac{a E_r}{S + S_o}$$

Where:

$$S_o = \left[\frac{a E_r L}{2 A E}\right]^{1/2}$$

And:

Q = Ultimate pile capacity in pounds,

E_r = Rated hammer energy in foot-pounds,

a = Hammer efficiency = $\frac{\text{delivered energy}}{\text{rated energy}}$, (typically about 0.8)

L = Length of pile in feet,

A = Cross sectional area of pile in square inches,

E = Modulus of elasticity of pile material in psi,

S = Final set, penetration per blow in feet.

We recommend that a factor of safety of 2.5 be applied to the ultimate pile capacity as determined by the above pile driving formula to correspond to the design value.

Once pile dimensions are established and characteristics of the pile hammer are known, the equation can be solved to determine the desired value of S to obtain the pile design capacity. We recommend this be used along with observation of pile installation as discussed below, to determine pile acceptance.

Lateral Pile Capacity

The following discussions of laterally loaded piles assumes that the soil behaves in a linear manner with the force against the pile increasing proportionally with displacement. This assumption is valid for relatively small movements which are anticipated to result from normal loading for a structure of this type. The assumption is also made that the strength of the soil increases linearly with depth. This is a generally valid assumption for uncemented sands such as are present at the site.

Development of lateral pile criteria requires an assumption of the degree of fixity at the pile head. A pile is considered free-headed if the top is free to rotate. If the top of the pile is fixed against rotation by embedment in a pile cap that is sufficient to develop a fixed-end moment, the pile is considered restrained or fixed-headed. We anticipate the free-headed condition is likely applicable to piles for the boardwalk. Curves for solution of both the free-headed and fixed-headed conditions are included with this report, on Figures 1 and 2, respectively, so that either or both may be evaluated by the structural engineer as appropriate.

In addition to the pile head fixity condition, the following information is required to determine lateral pile deflections and moments:

Moment and Deflection Equations:

Free-Headed Condition	Fixed-Headed Condition
$Y = \frac{A_y P_{xx} T^3}{EI} + \frac{B_y M_{xx} T^2}{EI}$	$Y = \frac{A_y P_{xx} T^3}{EI}$
$M = A_m P_{xx} T + B_m M_{xx}$	$M = A_m P_{xx} T$

Where:

Y = Deflection at any point at or below the ground surface,

M = Moment at any point at or below the ground surface,

P_{xx} = Shear applied to the pile at ground surface (x-x plane),

M_{xx} = Moment applied to the pile at ground surface (x-x plane),

A_y, B_y = Deflection coefficients from Figure 1 or 2,

A_m, B_m = Moment coefficients from Figure 1 or 2,

EI = Flexural stiffness of the pile, in psi x in.^{4},

T = Relative stiffness factor = $\sqrt[5]{EI/n_h}$,

n_h = Coefficient of variation of horizontal subgrade reaction, in pounds per cubic inch,

$2T$ = Assumed depth to point of zero deflection, if greater than 4T total embedment.

We recommend a value of n_h of 7 pci prior to correcting for seismic effects as discussed below. This value is based on the typically loose, damp soil observed in our explorations. Soil near the ground surface tends to dominate the behavior of laterally loaded piles.

Additional Geotechnical Recommendations

We recommend that the installation of all piles be observed by a geotechnical engineer or engineering geologist from our firm. Our observer would evaluate the contractor's operation and collect and interpret the installation data. By careful observation of pile driving operations, we believe it possible to confirm the predetermined penetration depth, monitor variations in subsurface conditions, and determine the required penetration depths. Because the depth of our hand explorations was limited, this observation of pile installation is particularly important to verify bearing conditions at depth are consistent with design assumptions. In our opinion, such field decisions regarding installation should result in an economical and satisfactory pile foundation system.

We trust that this letter provides you with the necessary information. Should you have any questions, please call at your convenience.

Sincerely,

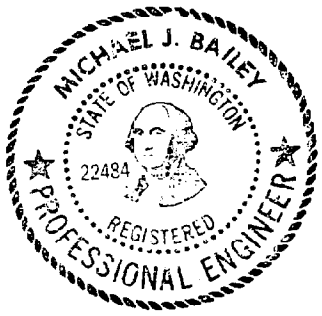
HART CROWSER, INC.

Michael Bailey

MICHAEL J. BAILEY, P.E.
Project Manager

David A. Baska

DAVID A. BASKA
Senior Staff Engineer

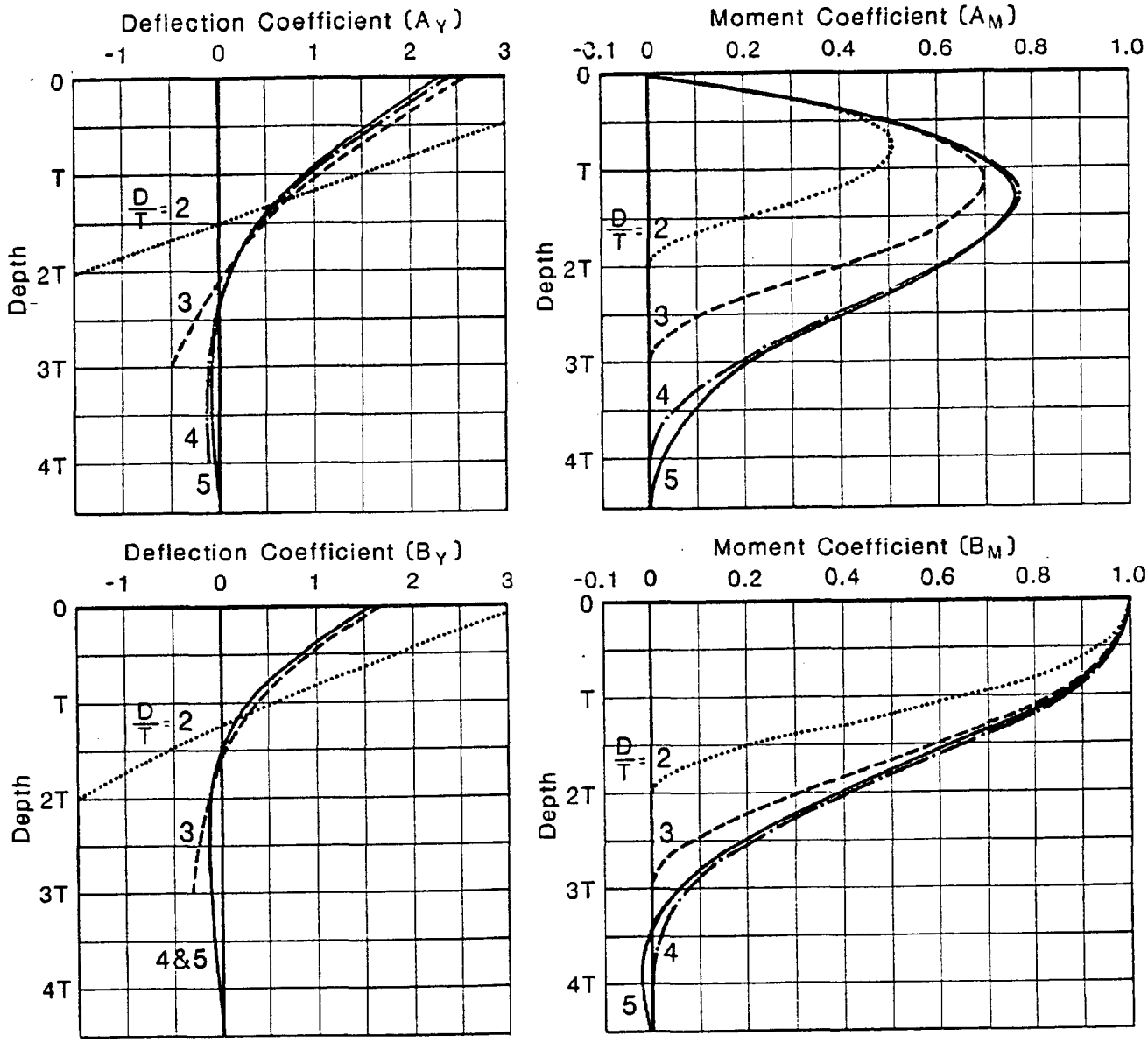


MJB/DAB:akw
LR2174/JOBS

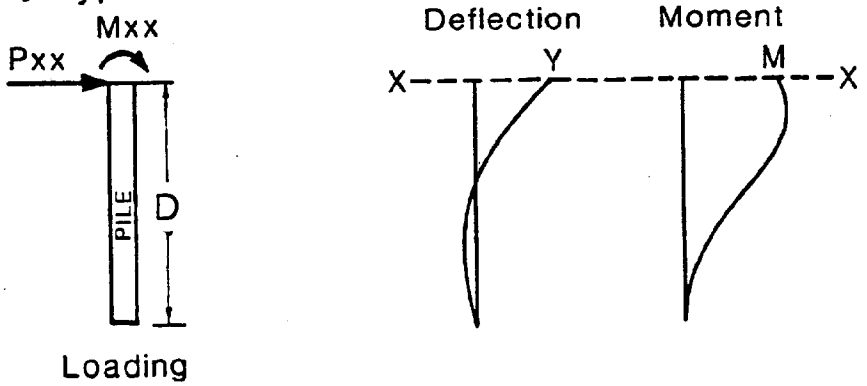
Attachments: Figure 1 - Laterally Loaded Piles in Elastic Subgrade Deflection and Moment Criteria-Free-Headed
Figure 2 - Laterally Loaded Piles in Elastic Subgrade Deflection and Moment Criteria-Fixed-Headed

Laterally Loaded Piles in Elastic Subgrade
Deflection and Moment Criteria
Free-Headed Pile Condition

(a) Deflection and Moment Coefficients



(b) Typical Deflection and Moment Curves



Pxx	Pile Shear at Ground Surface
Mxx	Pile Moment at Ground Surface
T	Relative Stiffness Factor

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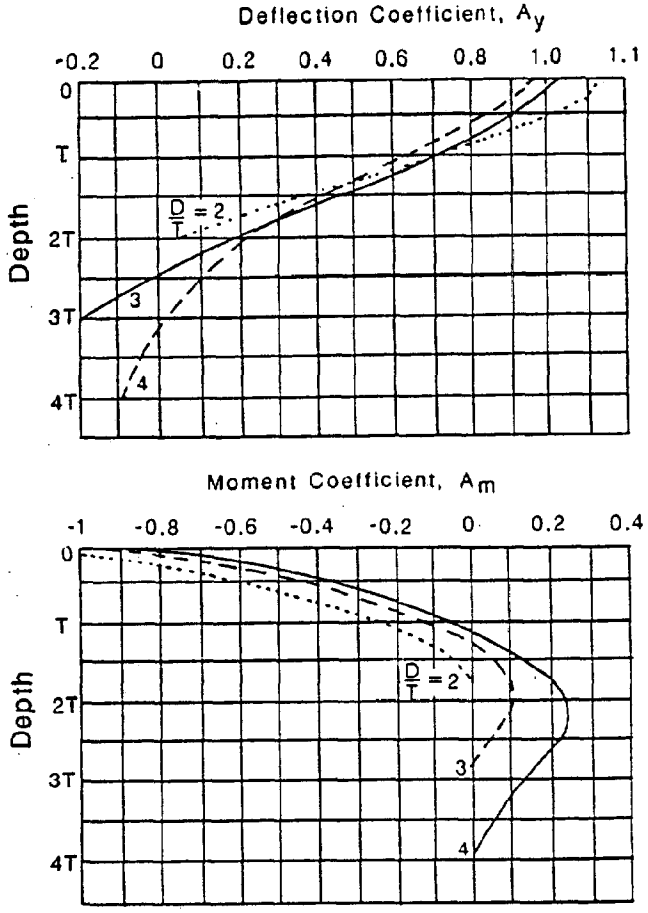
J-2174 6/88

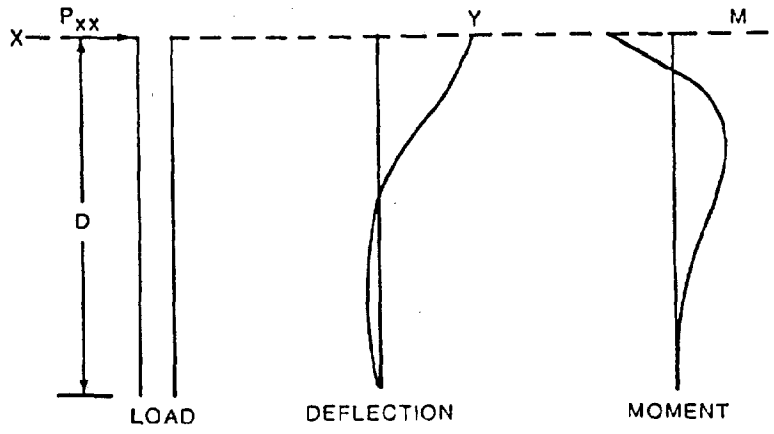
Figure 1

Laterally Loaded Piles in Elastic Subgrade
Deflection and Moment Criteria
Fixed-Headed Pile Condition

(a) Deflection and Moment Coefficients



(b) Typical Deflection and Moment Curves



P_{xx} Pile Shear at Ground Surface

T Relative Stiffness Factor

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J-2174 *6/88*

Figure 2

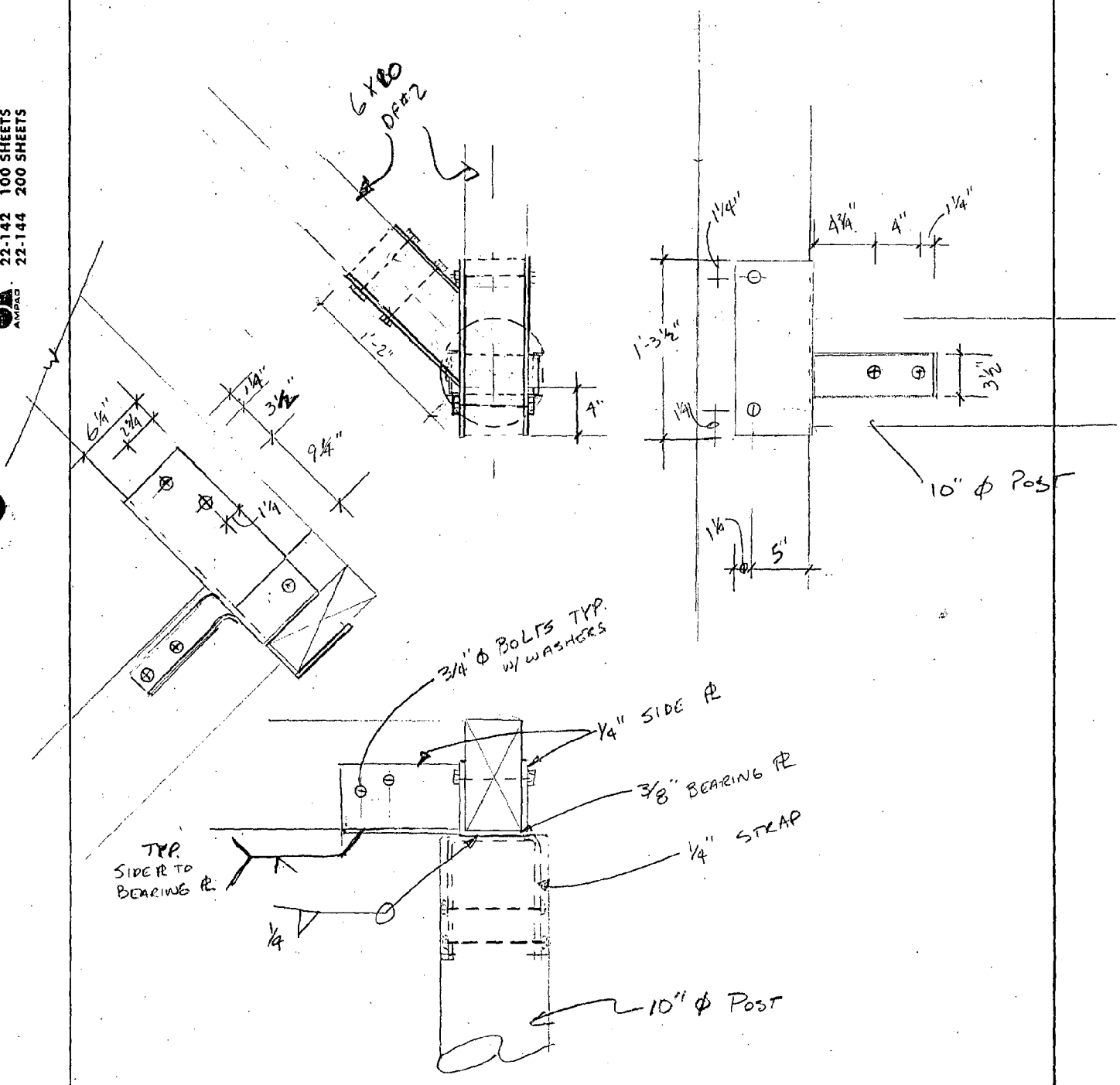
SECTION 5

STRUCTURAL ENGINEERING SPECIFICATIONS

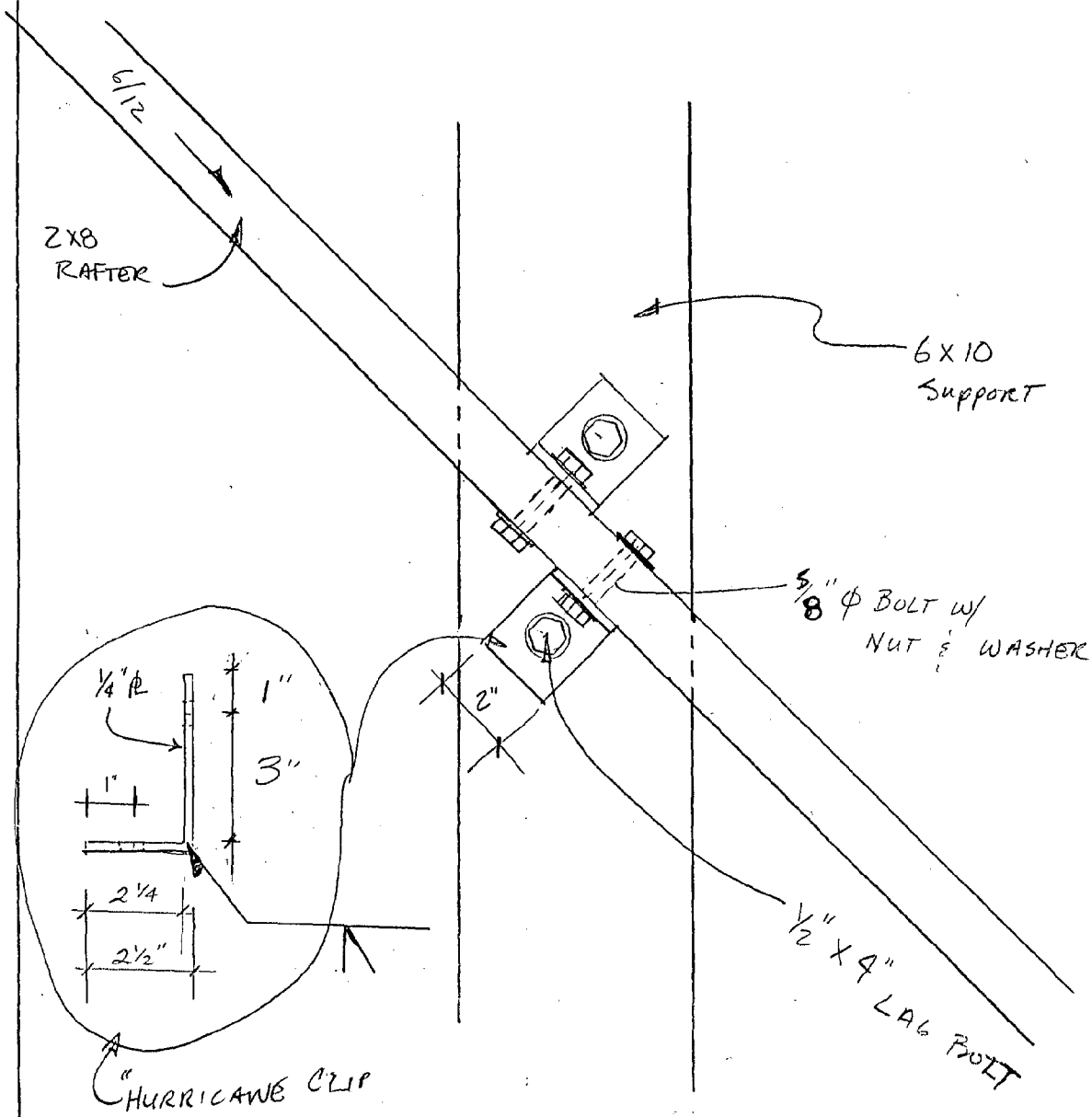
BY

GRAY AND OSBORNE

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

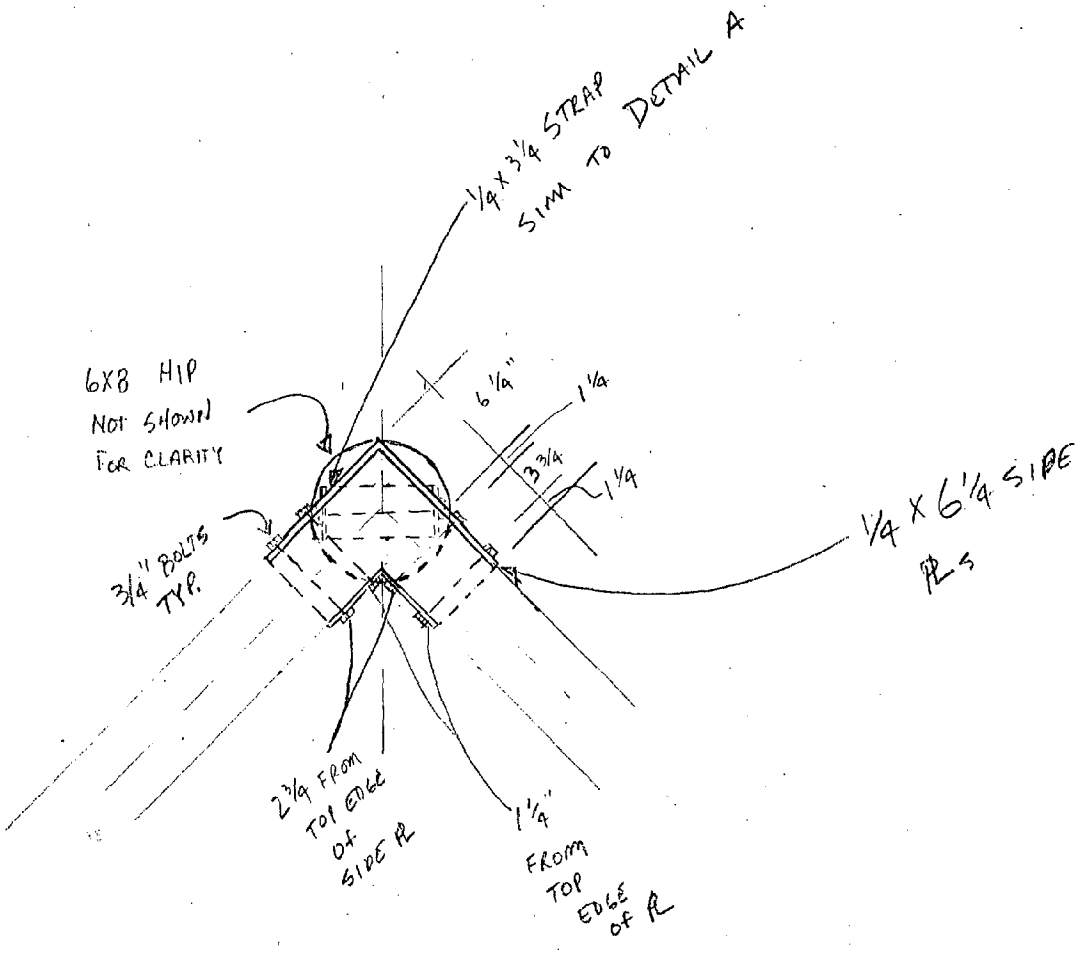


DETAIL A


6/12
2X8
RAFTER
6X10
Support
5/8" ϕ BOLT W/
NUT & WASHER
1/4" PL
1"
3"
1"
2"
2 1/4
2 1/2"
1/2" X 9"
LAG BOLT
"HURRICANE CLIP

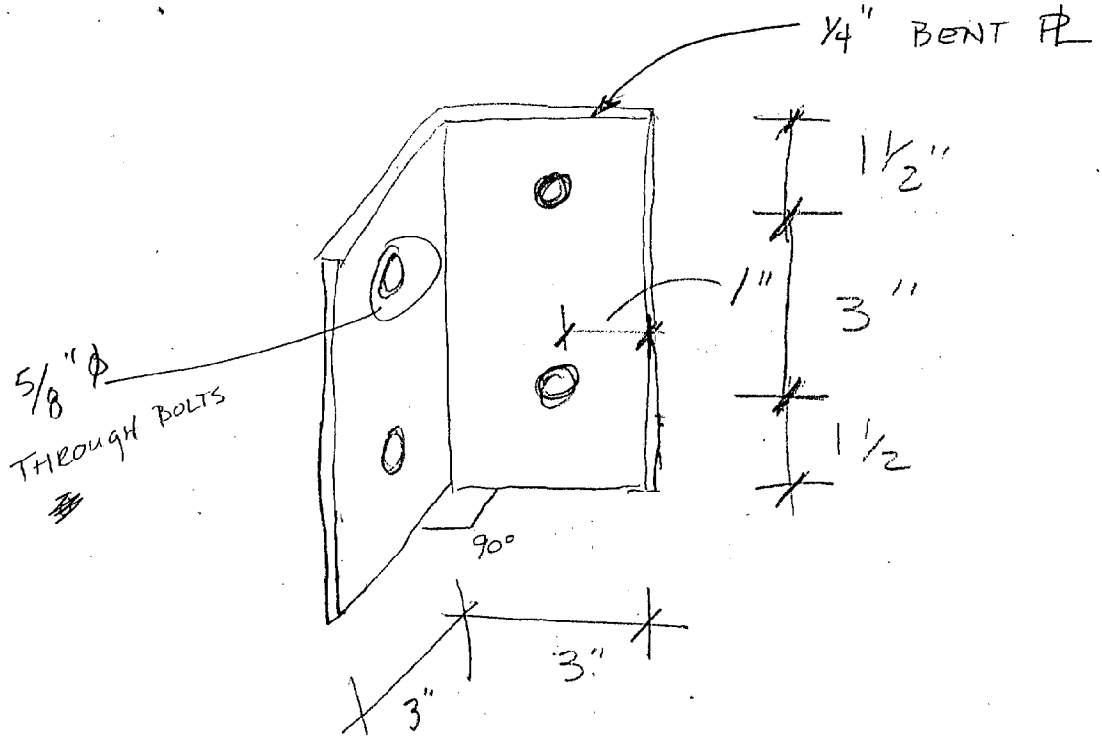
3" = 1'

DETAIL B


1/4 x 3 1/4 STRAP SIMM TO DETAIL A
6X8 HIP NOT SHOWN FOR CLARITY
6 1/4"
1 1/4
3 3/4
1 1/4
3/4" BOLTS TYP.
1/4 X 6 1/4 SIDE PLS
2 3/4 FROM TOP EDGE OF SIDE PL
1 1/4" FROM TOP EDGE OF PL

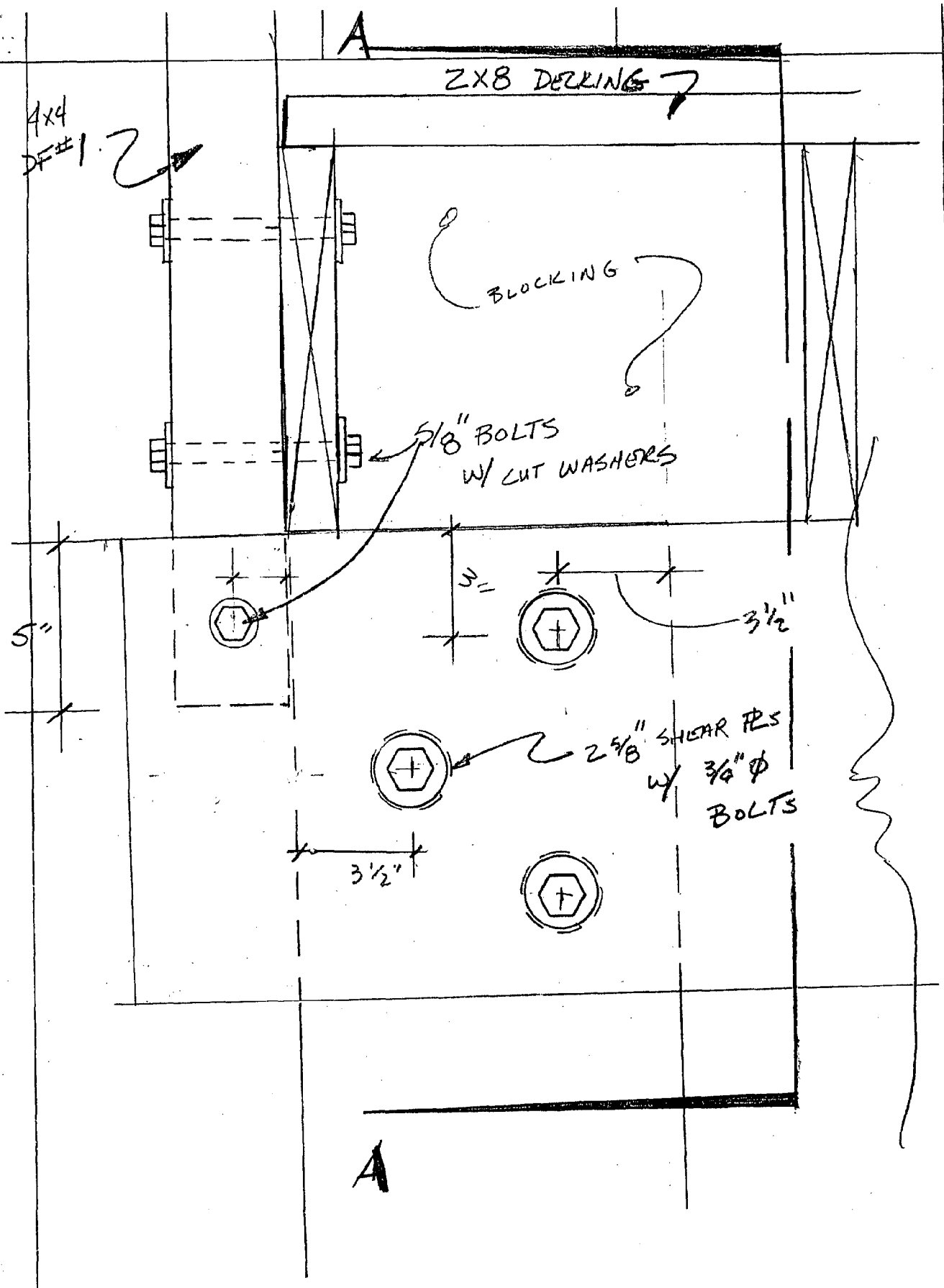
1/2"

DETAIL C

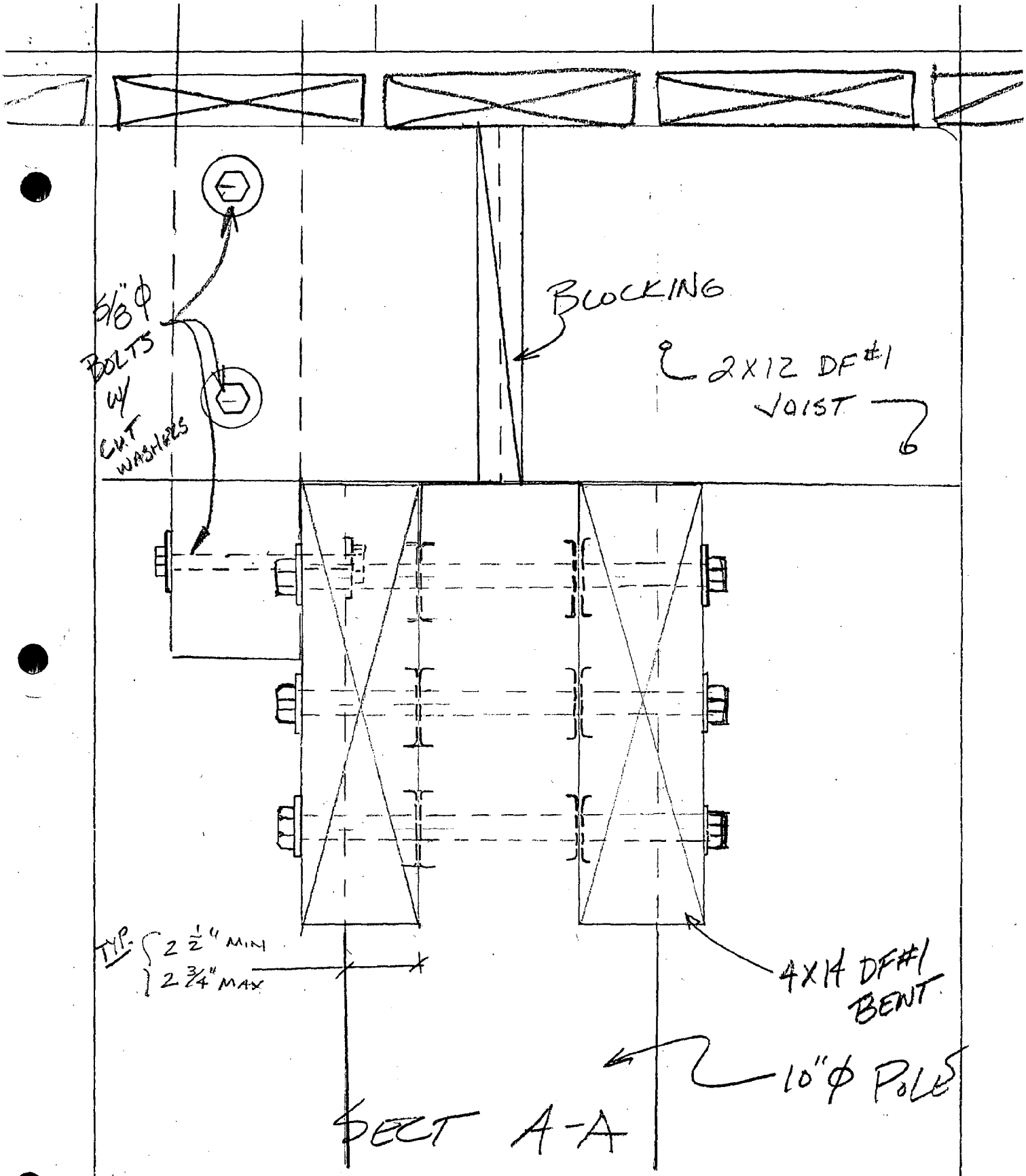


No Scale

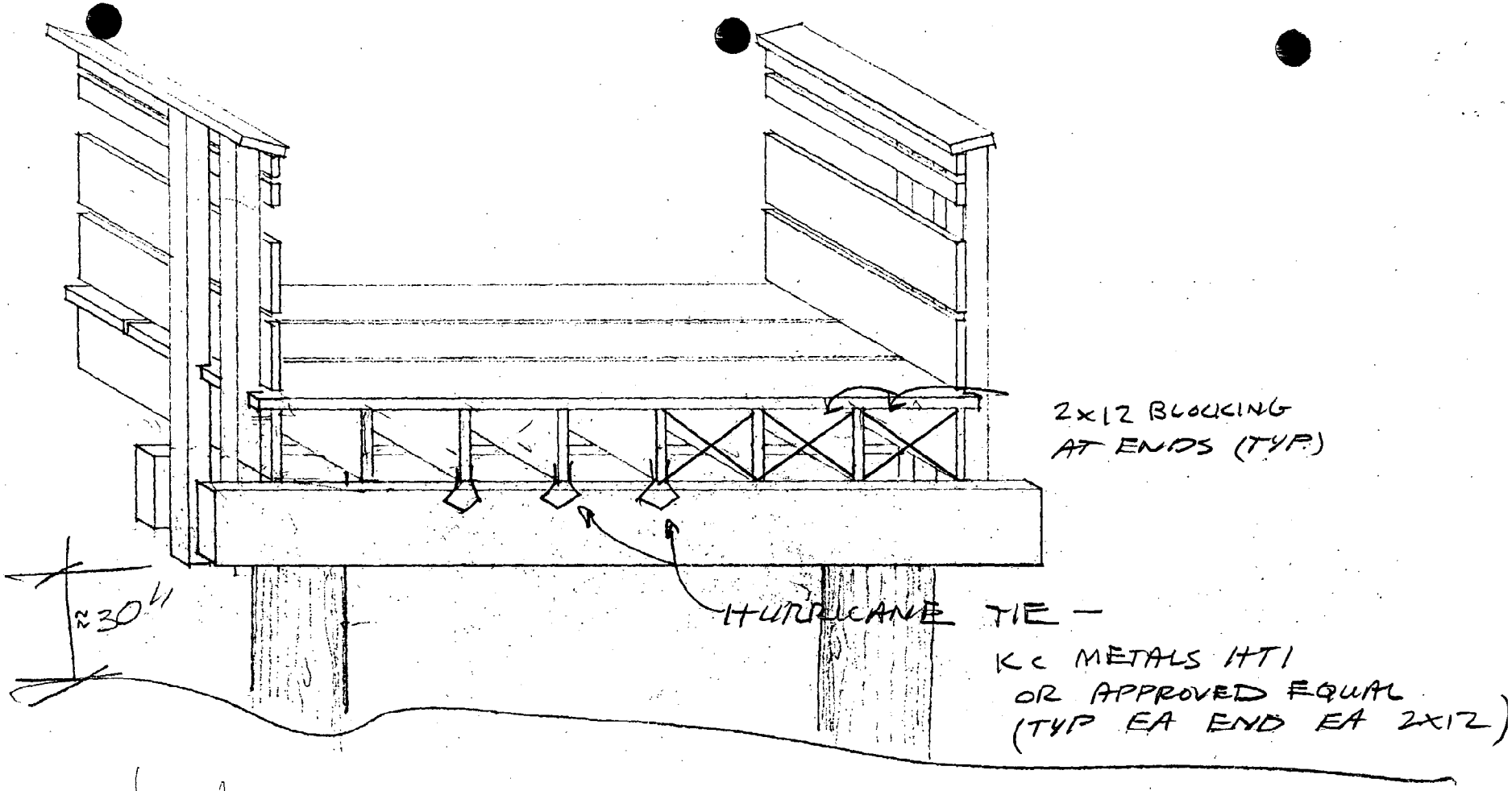
DETAIL D



DETAIL 1 (BENT - PILE & HAND RAIL CONNECTION SEE SECT A-A ALSO)


5/8"ϕ BOLTS W/ CUT WASHERS
BLOCKING
2X12 DF#1 JOIST
TYP. 2 1/2" MIN 2 3/4" MAX
4X14 DF#1 BENT
10"ϕ POLES

SECT A-A



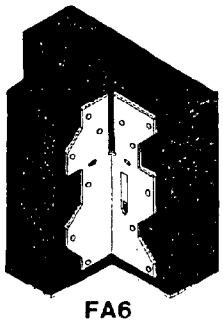
IC SECTION

LONG BEACH BOARDWALK
DAVID JENSEN-ARCHITECT
5.13.86

FA6 FA3

A35/A34 TABLE XVIII

STK NO	MATERIAL	NAIL SCHEDULE	DIRECTION OF LOAD	DESIGN LOADS NORMAL LBS	MAX LBS
FA6	18 GA GAL	12–8d	A, B, C	235	290
			D	300	370
			E	330	300
			F	200	200
			G	470	590
FA3	18 GA GAL	8–8d	H, I	310	390

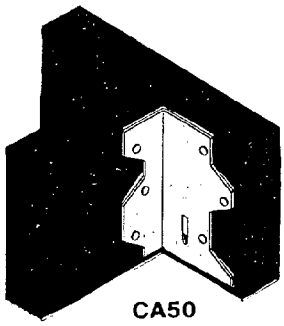


FA6

CA

L TABLE XVIII

STK NO	MATERIAL	DIMENSIONS (INCHES) LENGTH	A	B	NAIL SCHEDULE	DESIGN LOAD NORMAL LBS	MAX LBS
CA30	16 GA GAL	3	2⅜	1⅜	4–10d	210	260
CA50	16 GA GAL	5	2⅜	1⅜	6–10d	310	390
CA70	16 GA GAL	7	2⅜	1⅜	8–10d	420	520
CA90	16 GA GAL	9	2⅜	1⅜	10–10d	520	650
CA110	16 GA GAL	11	2⅜	1⅜	12–10d	610	765
CA130	16 GA GAL	13	2⅜	1⅜	14–10d	735	920

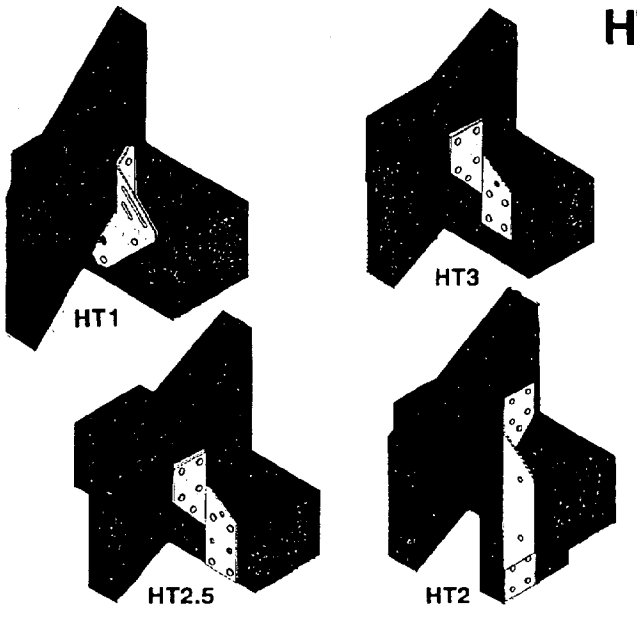


CA50

HT

H TABLE XIX

STK NO	MATERIAL	NAIL SCHEDULE RAFTER	PLATES	STUD	DESIGN LOAD MAX ROOF UPLIFT LBS
HT1	18 GA GAL	4–8d	4–8d	–0–	520
HT2	18 GA GAL	5–8d	–0–	5–8d	370
HT3	18 GA GAL	4–8d	4–8d	–0–	305
HT2.5	18 GA GAL	5–8d	4 to 6–8d	–0–	370

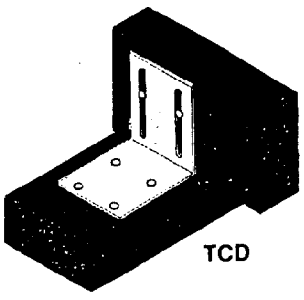


HT1 HT3 HT2.5 HT2

TC TCD

STC/DTC TABLE XIX

STK NO	MATERIAL	DIMENSIONS (INCHES) W	H	D	NAIL SCHEDULE TRUSS	PLATE
TC	16 GA GAL	2	3½	1¼	1–16d	2–16d
TCD	18 GA GAL	3	3	2½	2–16d	4–16d



TCD

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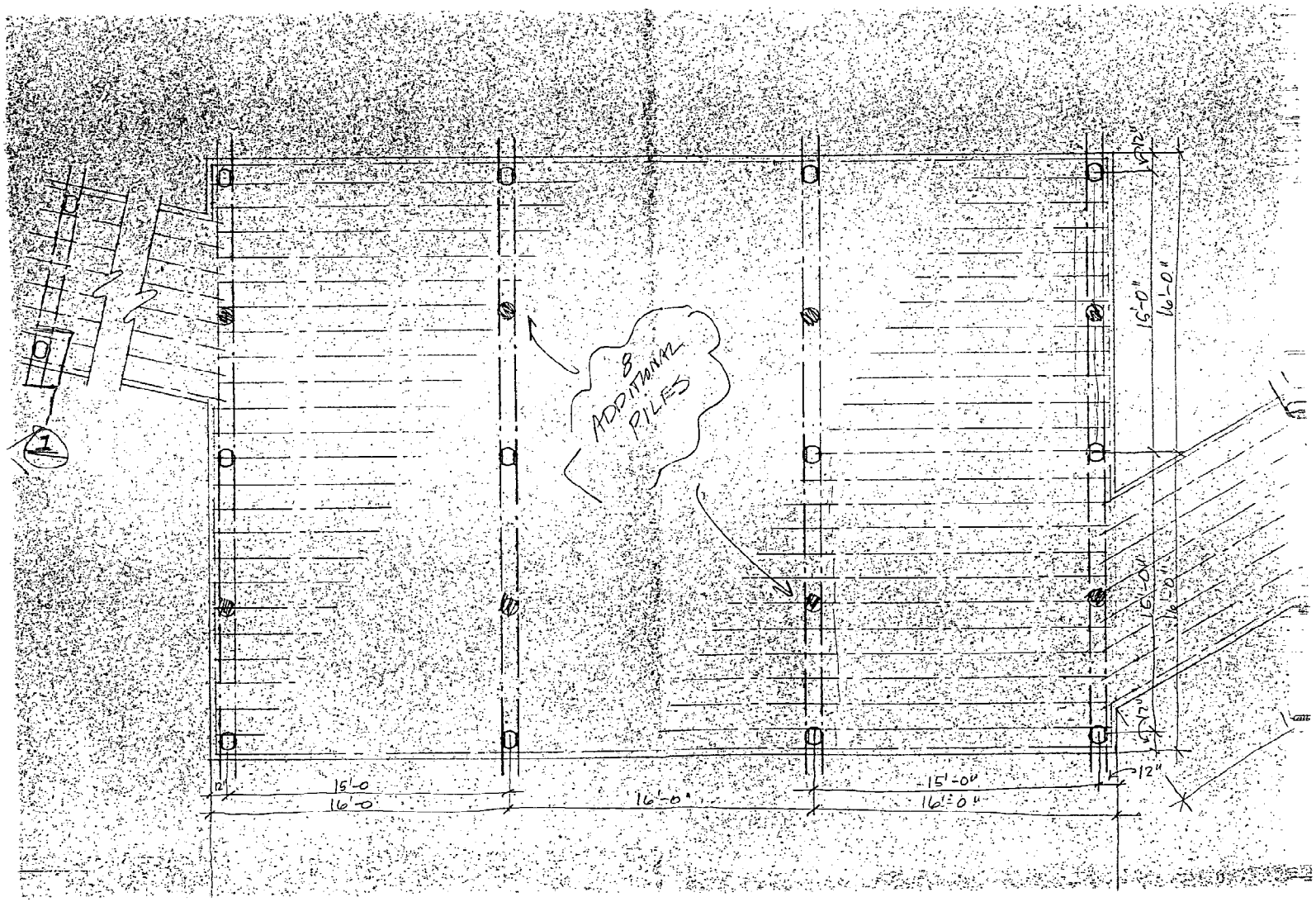
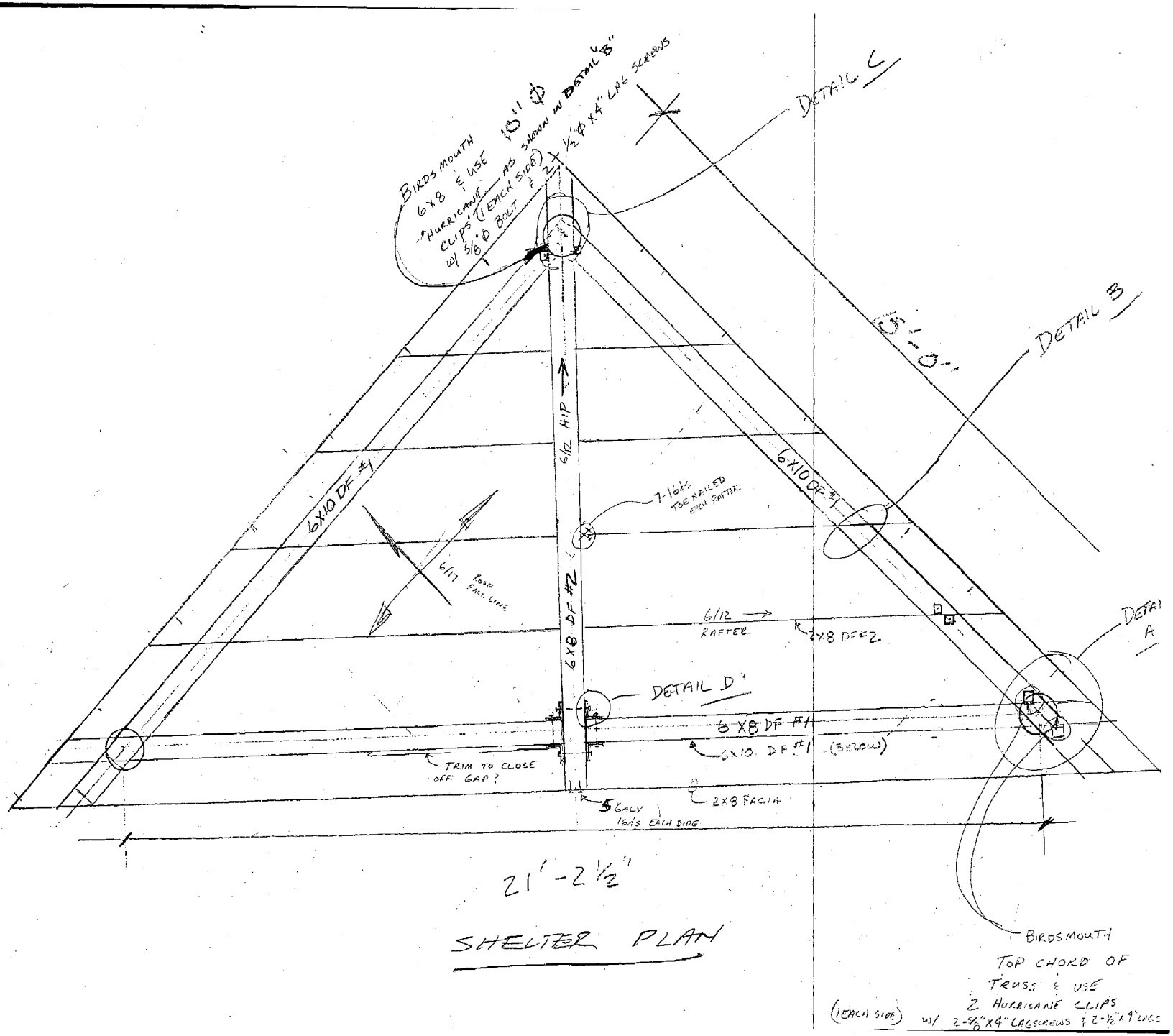
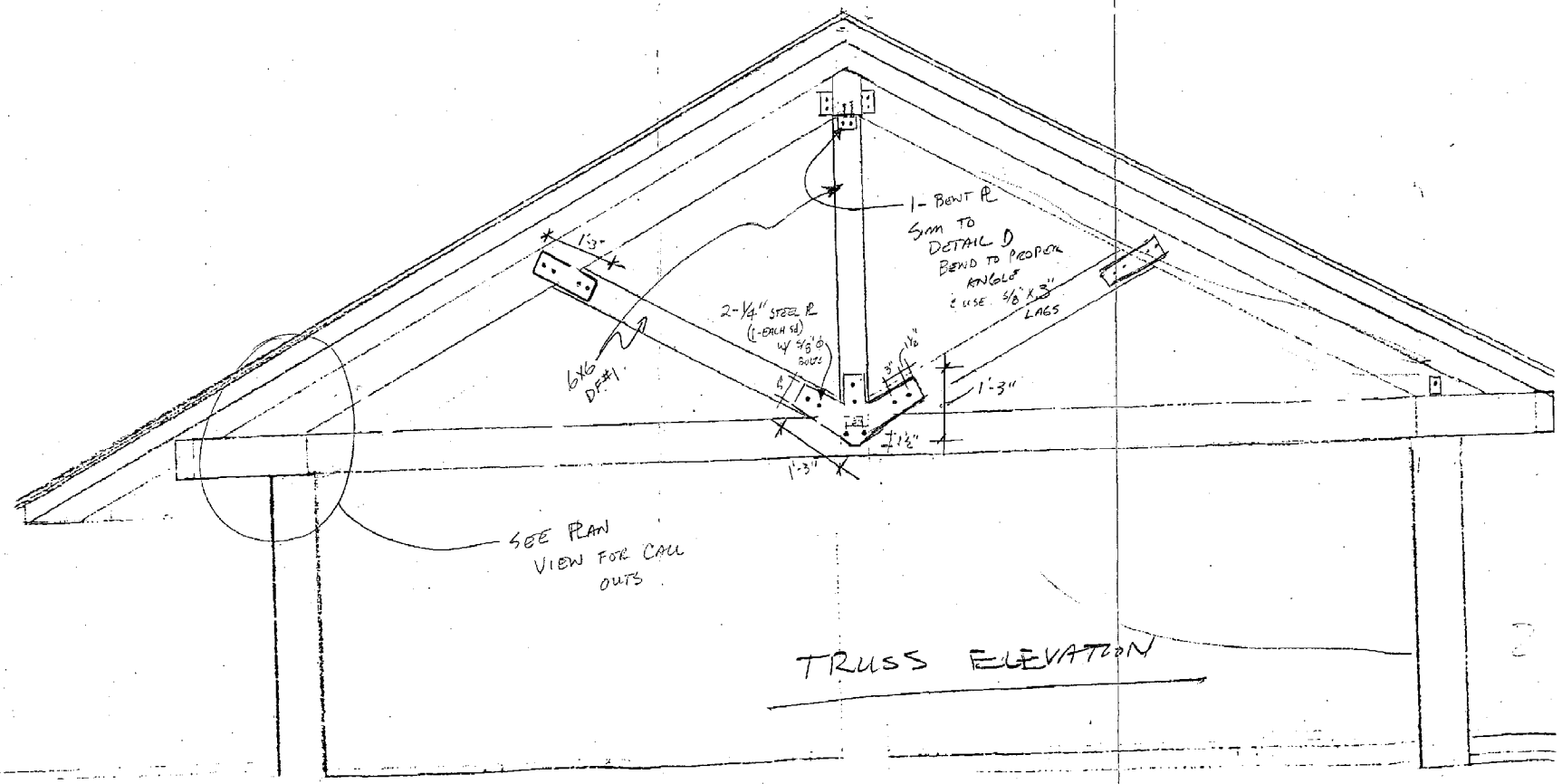

8 ADDITIONAL PILES
15'-0
16'-0
16'-0"
15'-0"
16'-0"
12"



SHELTER PLAN



TRUSS ELEVATION

SECTION 06150

PILES, WOOD

PART 1 - GENERAL

1. SCOPE AND CLASSIFICATION :

1.1 Scope. This specification covers preservative treated ~~and untreated~~ piles ~~and poles~~.

1.2 Classification. The piles ~~and poles~~ shall be of ~~the following types~~, and ~~classes as specified (see 6.2)~~:

~~Type I Piles Untreated.~~

Type II - Piles, Treated.

2. SUBMITTALS:

~~1.2.1~~ 2.1 Manufacturer's Certificates of Conformance or Compliance: Submit certificates of conformance or compliance attesting that the materials and components meet the requirements specified.

2.2 Pile Placing Plan and schedule: (SEE INSET "A")

PART 2 - PRODUCTS

2 MATERIALS AND COMPONENTS

2.1 Piles: Piles shall be round timber from stems of trees of Douglas Fir (Pacific coast) in accordance with ASTM D25.

2.1.1 Lengths. Piles shall be furnished in the lengths required for the installations as shown on the drawings and as specified.

INSET "A"

2.2 Pile Placing Plan and Schedule:
The contractor shall provide a detailed plan discussing how piles will be installed, installation schedule, ~~and~~ environmental protection and site access requirements to the engineer for review and approval prior to commencement of the work.

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2.1.2

~~3.2.2~~ Circumferences and diameters. The circumferences and diameters of piles shall be as specified in ASTM D25. Pile tip diameter shall be 10" minimum.

2.1.3 Type II, treated piles. Type II piles shall be clean-peeled and shall be treated in accordance with the requirements of American Wood-Preservers Association Standard C1 "All Timber Products - Preservative Treatment by pressure process." Water-borne preservatives with a minimum retension of .6 pcf shall be used. The thickness of the sap wood shall be not less than 1 inch. Creosote Solutions 2.1.4 shall not be used.

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~~3.2.4~~ Identification marking. Each pile shall be branded or marked with the typical brand and key data as prescribed in AWPA Standard M6. The data shall be legibly and permanently burn-branded into the pile or be included on a recessed, noncorrosive metal tag applied to the pile. The code letters shall not be less than 5/8 inch high, if burn branded, and not less than 1/8 inch high if on a metal tag. The piles shall have the required data burn-branded or tagged on the butt face and in addition ~~in two places~~ on the pile approximately 5 feet ~~and 10 feet~~ from the butt.

augered in by

PART 3 - EXECUTION

3.1 INSTALLATION: Piles may be installed by driving from the surface or, at the contractors option, by driving in pre augering. Jetting will not be allowed. Piles shall be installed tip first at the locations and to the lines and grades as specified and as shown on the drawings. Piles shall be set as nearly plumb as possible but in no case shall ~~exceed~~

piles vary from plumb by more than 2 inches in 10 feet. Piles shall be located within 2 inches of the locations as shown on the plans. Driving shall be accomplished with a steam or diesel hammer * ~~shall be used~~.

If pre-auger drilling is used the auger bit shall be at least 2 inches smaller in diameter than the pile tip and the depth of the auger pile shall not be greater than 5 feet. ~~less than the embedment length.~~

Piles shall be driven ~~or [illegible]~~ to refusal but not less than ~~the~~ 7 feet below the elevation of the lowest ground surface as measured 3 feet in any direction from the pile. Refusal shall be determined from the following driving formula:

(INSERT B)

Care shall be taken to protect the pile butt from excessive damage during installation

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INSET "B"

$$Q = \frac{a\,E_r}{S + S_o}$$

Where:

$$S_o = \left[\frac{a\,E_r\,L}{2\,A\,E}\right]^{1/2}$$

And:

Q = Ultimate pile capacity in pounds, = 36,000 lb.

E_r = Rated hammer energy in foot-pounds,

a = Hammer efficiency = $\frac{\text{delivered energy}}{\text{rated energy}}$, ~~(typically about 0.8)~~

L = Length of pile in feet,

A = Cross sectional area of pile in square inches,

E = Modulus of elasticity of pile material in psi,

S = Final set, penetration per blow in feet.

~~Refusal for [illegible] piles shall be determined in the field by the engineer based on equipment used and pile behavior.~~

by using leaders, pile bands, driving caps or similar devices. After driving, piles shall be cut off square ~~[illegible]~~ with the axis of the pile true to grade at a distance well below any mushrooming or splitting. Wasted portions of piles shall become the property of the contractor and shall be removed from the site. Piles shall be cut and drilled to accept the cross members as shown on the drawings. Cut surfaces shall recieve a ~~preservative~~ treatment of water-borne preservative salts compatable with the initial treatment. This treatment shall be applied in two seperate, liberal coats by paint brush.

3.2 SOIL CONDITIONS:

INSET C

3.3 ENVIRONMENTAL PROTECTION: *

Care shall be taken to protect the existing vegetation and dune conditions adjacent to the construction site. The contractor shall confine all activities

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INSET "C"

3.2 SOIL CONDITIONS: The project area topography consists of gently sloped, grass covered sand dunes that range in elevation from about 8 to 18 feet above sea level. Scattered logs lie among the dunes and the contractor is cautioned that buried logs may be encountered during pile driving operations. ~~Piles hitting buried debris shall be removed and new piles driven at the direction of the engineer.~~ *

~~Hart Crowser visited this site on June 7 and 8, 1988, and accomplished~~ Hand explorations were conducted at random locations along the proposed ~~alignment~~ alinement. Site soils were observed to be loose, damp, gray, uniformly graded fine sands. Scattered thin roots were observed throughout the depth of the explorations. The density of the subsurface soils was determined by probing with a 1/2-inch-diameter steel rod. Typically, probing depths ranged between 2 and 6 feet indicating a "loose" condition. The upper limit of this range was more commonly observed when probing occurred near the top of the individual sand dunes.

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as much as possible to the actual alinement of the structure including additional areas as may be required for vehicle turn out to allow passing. The contractor shall minimize vehicle traffic in the construction site to those vehicles required for delivery of materials and those required for actual construction. No private vehicles will be allowed in the dune area. The contractor shall not bulldoze or change the surface condition of the dune field under or adjacent to the structure except as required for access to perform work and only after approval of the engineer. Details of the specific measures to accomplish the work and at the same time protect the environment shall be included in the Pile Placing Plan and Schedule.

3.4 ~~MEASUREMENT~~ PAYMENT. Payment shall be made at the proposal unit price for TIMBER PILES including all labor, materials and equipment required complete, as specified. Piles which do not meet the requirements of the specification shall be removed and replaced at no cost to the owner.

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SECTION 06100

ROUGH CARPENTRY

PART 1 - GENERAL

1.0 GENERAL REQUIREMENTS:

1.1 Grading and Marking: Materials shall bear the grademark, stamp or other identifying marks indicating grades of material and rules or standards under which produced. Such identifying marks on material shall be in accordance with the rule or standard under which the material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification. The inspection agency for lumber shall be certified by the Board of Review, American Lumber Standards Committee, to grade species used. Except for structural laminated members, plywood, and lumber; bundle marking or certificates will be permitted in lieu of marking each individual piece.

1.2 Sizes: Lumber sizes shall conform to Prod. Std. PS 20. Lumber used below the decking shall be rough sawn, lumber used for the decking and above the decking shall be surfaced on four sides as shown on the drawings. *

Size references, unless otherwise specified are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced.

1.3 Moisture Content: At the time lumber and other materials are delivered and when installed in the work their moisture content shall be as follows:

1.3.1 Treated and Untreated Lumber 2 Inches or Less in Thickness, Except Roof Planking: 19 percent maximum.

1.3.2 Treated and Untreated Lumber Over 2 Inches in Thickness: 25 percent maximum.

2. SUBMITTALS:

2.1 Submit shop drawings for fabricated steel fasteners. Shop drawings shall

indicate materials, details of construction, methods of fastening, and erection details.

3.4. DELIVERY AND STORAGE: Materials shall be delivered to the site in undamaged condition, stored in fully covered, well ventilated areas, and protected from extreme changes in temperature and humidity.

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PART 2 - PRODUCTS

4 MATERIALS: Materials shall conform to the following requirements:

4.1 Accessories and Nails:

4.1.1 Fabricated Steel Fasteners: Fasteners shall be produced from steel conforming to ASTM A-36. Welding shall be in accordance with AWS D1.1. All steel fasteners shall be hot-dip galvanized after fabrication.

4.1.2 Through Bolts: shall be galvanized conforming to ASTM A 307, size as indicated on the drawings, complete with nuts and washers.

4.1.3 Lag Bolts, cut washers and misc hardware: Shall be galvanized the type as best suited for the intended use, and size.

4.1.4 Nails: Shall be hot dipped galvanized ~~and installed in accordance with the nailing schedule shown in table 1 at the end of this section, unless otherwise noted.~~

4.2 LUMBER: Lumber, visually graded in accordance with the National Design Specification for wood construction, shall be as follows:

2x8 ; S4S ; Treated ; #2 Douglas Fir

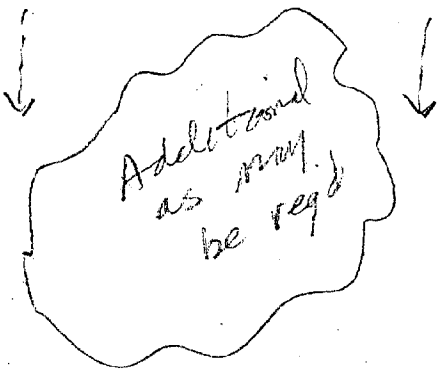
4x4 ; S4S ; Treated ; #1 Douglas Fir

2x12 ; Rough Sawn ; Treated ; #2 Douglas Fir

4x14 ; Rough Sawn ; Treated ; #1 Douglas Fir

6x6, 6x8, 6x10 ; S4S ; Treated ; #1 Douglas Fir

1x4 ; S4S ; untreated ; Standard ; Hem Fir, Douglas Fir



5. PRESSURE TREATMENT. *

Pressure treated wood, where indicated ~~on the drawings~~, shall be pressure treated with ammoniacal copper arsenite in accordance with APWA Specification TI-W-571 "Chemonite" process and identified on each piece, to 0.40 pounds per cubic foot, APWA Standard C1 and C2. Creosote solutions shall not be used.

Part 3 - EXECUTION

6. INSTALLATION: *

The Contractor shall verify all dimensions before commencing the work. All work shall be erected plumb, level and true in accordance with ~~details~~ the drawings and good practice.

All work shall be well-tied, anchored, bolted or spiked together to develop the full strength of the members. This work shall be in accordance with the recommended practices set forth in the Western Woods Use Book as published by Western Wood Products Association and in accordance with the best practices of the trade. ~~All framing and studding shall be nailed with not less than 16d wire nails.~~ Nailing shall be in accordance with the nailing schedule shown in table 1 at the end of this section, unless otherwise noted.

Surfaces which are cut or drilled after treatment shall receive a field treatment in accordance with AWPA M-4. Cut ends ~~and~~, wasted portions of lumber, ~~packaging~~ and other construction debris shall become the property of the contractor and shall be removed from the site.

7 PAYMENT: *

All work included in this section of the Specifications shall be paid for under the lump sum price bid for CARPENTRY in the Proposal.

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TABLE I NAILING SCHEDULE

CONNECTION	NAILING
2x 8 DECKING TO JOISTS	FACE NAIL 3-16d
1 x _ ROOF SHEATHING	FACE NAIL 2-8d
2x8 RAFTERS TO RIDGE	TOE NAIL 7-16d
____ HANDRAIL	FACENAIL 2-16d
2x12 BLOCKING TO JOISTS	TOE NAIL 4-16d

Additional o.s needed

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