CITY OF NEWBERG
CITY RECORDER INDEX NO. 2026

CONTRACT MODIFICATION (CHANGE ORDER)

CITY OF NEWBERG
Community Development Dept.
Engineering Division
414 E. First St., P.O. Box 970
Newberg, OR 97132
(503) 537-1214

Project Name: **Chehalem Dr. Sewage Pump Station**
Project No.: **6322**
Schedule: July-04
P.O. No. **500266**

Sheet: **Cover** of **Two**
Date: 7/13/2004
Change Order No.: 6322-~~4~~ 5
Contractor: Clackamas Construction, Inc.

CHANGE ORDER SUMMARY Cover Sheet

PREVIOUS CHANGE ORDERS

APPROVED BY OWNER	Additions $	Deductions $
TOTAL	$6,000.00	

THIS CHANGE ORDER

NUMBER	APPROVED (date)		
6322-1	9/30/2003	$6,000.00	$3,405.00
6322-2		$500.00	
6322-3		$1,500.00	
6322-4		$1,645.00	$240.00
6322-5		$1,040.52	
		$10,685.52	$3,645.00
Net Change by Change Orders			$7,040.52

The following modifications to the Contract are hereby ordered:(use additional pages if necessary)

Method of Payment: Per individual detail change order sheets.

Purpose of Change Order: See individual detail change order sheets (attached).

Contract Amount	
Original	$338,835.00
Prev. Change Orders (Add/Deduct)	$6,000.00
This Change Order (Add/Deduct)	$1,040.52
Revised Contract Amount	$345,875.52

Contract Time (Calendar Days)		
Original Duration	147	Days
Previous Change Orders (Add)	0	Days
This Change Order (Add)	0	Days
Revised Contract Time	147	Days
Revised Completion Date is:		

CITY OF NEWBERG

Reviewed by: RE Knorr Date: 7/19/04
Project Manager

Date: 7/20/04
Division Manager

Date: 7/21/04
Community Development Director

Date: 7/26/04
City Manager

CONTRACTOR: Clackamas Construction, Inc.

BY: Bobbie Moher Date: 7/13/04

Original Contract Authorization Amount: $338,835.00
City Mgr. can approve max. 10% incr.: $372,718.50
Purchase Order No. 500266
City Council Resolution No. 2003-2458

CONTRACT MODIFICATION (CHANGE ORDER)

CITY OF NEWBERG
Community Development Dept.
Engineering Division
414 E. First St., P.O. Box 970
Newberg, OR 97132
(503) 537-1214

Project Name:	Chehalem Dr. Sewage Pump Station	Sheet:	Two of Two
		Date:	7/13/2004
Project No.	6322	Change Order No.:	6322-5
Schedule:	July-04	Contractor:	Clackamas Construction, Inc.
P.O. No.	500266		

CHANGE ORDER SUMMARY

The following modifications to the Contract are hereby ordered:(use additional pages if necessary)

Electrical sub-contractor (DND, Inc.) extra work order requests for approved upon extra work.

THIS CHANGE ORDER		Additions	Deductions
NUMBER	APPROVED (date)	[cubic yards]	
Detail Sheet			
		$1,040.52	

Method of Payment:

Purpose of Change Order: Approved electrical extra work order requests

Net Change by Change Order $1,040.52

Contract Amount		Contract Time (Calendar Days)		
Original	$338,835.00	Original Duration	147	Days
This Change Order (Add/Deduct)	$1,040.52	This Change Order (Add)	0	Days
Revised Contract Amount	$339,875.52	Revised Contract Time	147	Days
		Revised Completion Date is:		

City of Newberg
Community Development Department/Engineering Division
Working Together For a Better Community-Serious About Service

Tuesday, June 22, 2004

DND Electrical, Inc.
C/O Mr. Ed Deraeve, President
P.O. Box 3
1101 Alpine Avenue
McMinnville, OR 97128
(503) 472-4003

RE: 6322 Chehalem Drive Sewage Pump Station Extra Electrical Work Order Requests

Dear Mr. Deraeve:

1. EWO #1 ("Move Disconnect Panel Box") – DND Electrical will be paid for 10 hours of labor @ $71.76 per hour ($717.60). Additional labor hours and contractor support more than off-sets the material supply.

2. EWO #2 ("Install J-box and Terminal Strips for hi-level float") – DND Electrical will not be paid for installing the J-box and terminal strips for the high level float. An alternative float was initially being substituted by the subcontractor that necessitated the need for what was otherwise not required in the original plans and specifications.

3. EWO #3 ("Install Cord Caps on Flygt Supplied Pumps") – DND Electrical will not be paid for installing the Cord Caps on the Flygt Supplied Pumps. Please refer to Sections 16005.1.6; 16005.4.1 and plan sheet 15/16. This work is deemed incidental to the pump installation.

4. EWO #4 ("Battery Charger Installation in Electrical Building") – DND Electrical will be paid for one-half of the 4 hours of labor @ $71.76 per hour ($143.52). Installation was to otherwise occur within the generator-set unit per the plans and specifications and later allowed inside the electrical building.

5. EWO #5 ("Telephone Equipment Installation") – DND Electrical will be paid for 2.5 hours for material and installation of telephone company wire, @ $71.76 per hour ($179.40). Installation of the telephone connection board (TCBD) is clearly called for in the plans and is part of their responsibility. The City had fully facilitated calling Verizon and coordinating their services for DND (4 – 5 hours staff time between time spent on the phone, making site visits verifying their

work, and documenting activity/the account). Installation of the ground wire will be deemed incidental to the installation of the telephone wire, as indicated on the plans, and supported by Sections 16005.1.6 and 16005.4.1 of the specifications.

Total approved of extra work requests equals: $1,040.52.

Thank you!

Sincerely,

Bob Knorr
Project Manager/E.I.T.

Cc: Dan Danicic, P.E., City Engineer; Bobbie Mohler, Asst. PM, Clackamas Constr. Inc.; Ron Staehlin, P.E., Southwood Engineer, Inc.

REK/rek

414 E. First Street P.O. Box 970 Newberg, Oregon 97132 (503) 554-1631 Fax: (503) 537-1277
http://ci.newberg.or.us/ e-mail: knorrbo@ci.newberg.or.us

CITY OF NEWBERG
CITY RECORDER INDEX NO. 2026

City of Newberg

Community Development Department/Engineering Division
Working Together For A Better Community-Serious About Service

INNEROFFICE MEMO

DATE: September 8, 2004

TO: Vault File No. 2026
706322 Chehalem Drive Sewage Pump Station

CC:

FROM: Bob Knorr
Project Manager/E.I.T.

SUBJECT: Change Order Clarification

Only a total of two change orders were actually approved by the City for this project. That would include change order number one ($6000) and change order number five ($1040.52). The contractor's change order requests nos. two, three and four were all applied toward the $6000 change order no. one dollar amount.

CONTRACT MODIFICATION (CHANGE ORDER)

CITY OF NEWBERG
Community Development Dept.
Engineering Division
414 E. First St., P.O. Box 970
Newberg, OR 97132
(503) 537-1214

Project Name: Chehalem Dr. Sewage Pump Station
Project No. 6322
Schedule: September-03
P.O. No.

Sheet: Cover of One
Date: 9/30/2003
Change Order No.: 6322-1
Contractor: Clackamas Construction, Inc.

CHANGE ORDER SUMMARY	Cover Sheet	
PREVIOUS CHANGE ORDERS APPROVED BY OWNER	Additions $	Deductions $
TOTAL	$0.00	

THIS CHANGE ORDER			
NUMBER	APPROVED (date)		
6322-1	9/30/2003	$6,000.00	$0.00
		$6,000.00	$0.00
Net Change by Change Orders			$6,000.00

The following modifications to the Contract are hereby ordered:(use additional pages if necessary)

Remove approximately 120 CY of unsuitable material from the project site in order to construct site subgrade and building slab. Volume calculations are as follows: (20'W x 32'L x 5'H)/27 = 118.52 CY +/-. Contractor's quoted price equals $50 per CY and includes removal, haul and replacement of unsuitable material with crushed rock. Contractor will provide "truck/haul" tickets for the City to review and approve actual quantity of unsuitable material removed.

Method of Payment: Per Individual detail change order sheets ~~(attached).~~

Purpose of Change Order: Unsuitable Foundation Material./ ~~See individual detail change order sheets (attached).~~

Contract Amount	
Original	$ 338,835.00
Prev. Change Orders (Add/Deduct)	$0.00
This Change Order (Add/Deduct)	$6,000.00
Revised Contract Amount	$344,835.00

Contract Time (Calendar Days)	
Original Duration	147 Days
Previous Change Orders (Add)	0 Days
This Change Order (Add)	0 Days
Revised Contract Time	147 Days
Revised Completion Date is:	

CITY OF NEWBERG

Reviewed by: Robert Knorr Date: 9/30/03
Project Manager

Date: 10/1/03
Division Manager

Date: 10/1/03
Community Development Director

Date: 10/1/03
City Manager

CONTRACTOR: Clackamas Construction, Inc.

BY: Bobbie Mohler Date: 9/30/03

Original Contract Authorization Amount: $338,835.00
City Mgr. can approve max. 10% incr.: $372,718.50
Purchase Order No. (October 2003)
City Council Resolution No. 2003-2458

09/30/2003 15:37 5036636251
SEP 30 '03 03:29PM CITY OF NEWBERG 15035375013
P.2/2

As of: 9/3/2004, 11:03 AM

APPLICATION AND CERTIFICATION OF PAYMENT

CITY OF NEWBERG
Community Development Dept.
Engineering Division
414 E. First St., P.O. Box 970
Newberg, OR 97132
(503) 537-1214

Project Name:	**Chehalem Dr Sewage Pump Station**	Sheet:	1 of 2
		Application Date:	8/1/2004
		Payment No.:	Eight
		Pay Period	August-04
Project No.	706322	Schedule	August
P.O. No.	500266	Contractor:	**Clackamas Construction, Inc.**

CHANGE ORDER SUMMARY

PREVIOUS CHANGE ORDERS APPROVED BY OWNER	Additions $	Deductions $
	$6,000.00	
TOTAL		**$0.00**

SUBSEQUENT CHANGE ORDERS

NUMBER	APPROVED (date)		
6322-1	**9/30/2003**	$6,000.00	$0.00
6322-5	**7/12/2004**	$1,040.52	
	TOTALS	**$7,040.52**	**$0.00**

Net Change by Change Orders **$7,040.52**

Payment Due Date **July-04**

Application is made for Payment, as shown below, in connection with the Contract.

The present status of the account for this Contract is as follows:

ORIGINAL CONTRACT SUM		$ **338,835.00**
Net Change by Change Orders		$ **7,040.52**
CONTRACT SUM TO DATE		$ **345,875.52**
TOTAL COMPLETED & STORED TO DATE		$ **345,875.52**
RETAINAGE @ 0%		$ **0.00**
TOTAL EARNED LESS RETAINAGE		$ **345,875.52**
PREVIOUS CERTIFICATED FOR PAYMENT		$ **339,087.75**
CURRENT PAYMENT DUE (includes retainage listed below)		$ **6,787.77**
CURRENT RETAINAGE DUE		$ **5,747.25**
RETAINAGE PAYMENT 1 (06/07/04):	$11,494.50	
RETAINAGE PAYMENT 2 (07/13/04):	$5,747.25	
Total:	**$17,241.75**	

The undersigned Contractor certifies that the work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by him for work for which previous Certificates for Payment were issued and payments received from the Owner, and that the current payment shown herein is now due.

Original Contract Authorization Amount: $338,835.00
City Mgr. can approve max. 10% incr.: $372,718.50
Purchase Order No. 500266
City Council Resolution No. 2003-2458

CONTRACTOR: _____

BY: _____ Date: _____

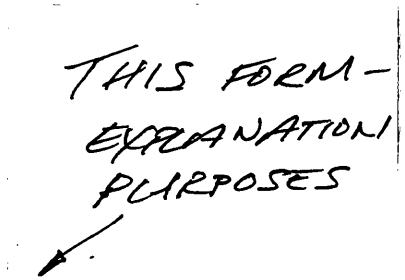
Reviewed by: _____ Date: _____
Project Manager
CITY OF NEWBERG

_____ Date: _____
Division Manager

_____ Date: _____
Community Development Director

_____ Date: _____
City Manager

This Certificate is not negotiable. It is payable only to the payee named herein and its issuance, payment and acceptance are without prejudice to any rights of the Owner or Contractor under their Contract.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EXPLANATION
PURPOSES

PAGE 02
09/30/2003 15:37 5036636251
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P.2/2

CONTRACT MODIFICATION (CHANGE ORDER)

CITY OF NEWBERG
Community Development Dept.
Engineering Division
414 E. First St., P.O. Box 970
Newberg, OR 97132
(503) 537-1214

Project Name: Chehalem Dr. Sewage Pump Station
Project No. 6322
Schedule: September-03
P.O. No.

Sheet: Cover of One
Date: 9/30/2003
Change Order No.: 6322-1
Contractor: Clackamas Construction, Inc.

CHANGE ORDER SUMMARY	Cover Sheet	
PREVIOUS CHANGE ORDERS APPROVED BY OWNER	Additions $	Deductions $
TOTAL	$0.00	

THIS CHANGE ORDER			
NUMBER	APPROVED (date)		
6322-1	9/30/2003	$6,000.00	$0.00
		$6,000.00	$0.00
Net Change by Change Orders			$6,000.00

The following modifications to the Contract are hereby ordered:(use additional pages if necessary)

Remove approximately 120 CY of unsuitable material from the project site in order to construct site subgrade and building slab. Volume calculations are as follows: (20'W x 32'L x 5'H)/27 = 118.52 CY +/-. Contractor's quoted price equals $50 per CY and includes removal, haul and replacement of unsuitable material with crushed rock. Contractor will provide "truck/haul" tickets for the City to review and approve actual quantity of unsuitable material removed.

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Purpose of Change Order: Unsuitable Foundation Material./ ~~See individual detail change order sheets (attached).~~

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Contract Time (Calendar Days)	
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This Change Order (Add)	0 Days
Revised Contract Time	147 Days
Revised Completion Date is:	

CITY OF NEWBERG

Reviewed by: Robert Knorr Date: 9/30/03
Project Manager

Date: 10/1/03
Division Manager

Date: 10/1/03
Community Development Director

Date: 10/1/03
City Manager

CONTRACTOR: Clackamas Construction, Inc.

BY: Bobbie Mahler Date: 9/30/03

Original Contract Authorization Amount: $338,835.00
City Mgr. can approve max. 10% incr.: $372,718.50
Purchase Order No. (October 2003)
City Council Resolution No. 2003-2458

CITY OF NEWBERG, OREGON

COMMUNITY DEVELOPMENT DEPARTMENT

CHEHALEM DRIVE SEWAGE PUMP STATION

MAY 2003

For information regarding this project, contact:

BOB KNORR
PROJECT MANAGER
(503) 554-1631

CITY OF NEWBERG

CONTRACT DOCUMENTS

for the construction of the

CHEHALEM DRIVE
SEWAGE PUMP STATION

****

CONSISTING OF:

BIDDING REQUIREMENTS

CONTRACT FORMS

CONDITIONS OF THE CONTRACT

SPECIFICATIONS

DRAWINGS

****

Exp. 6/30/04

****

SOUTHWOOD ENGINEERING

Philomath, Oregon
May 2003

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PART 1

BIDDING REQUIREMENTS

CITY OF NEWBERG
ADVERTISEMENT FOR BIDS
CHEHALEM DRIVE SEWAGE PUMP STATION PROJECT

Sealed bids for the Chehalem Drive Sewage Pump Station Project will be accepted until **10:00 a.m. on the 19th day of June, 2003**. Bids submitted after this time will not be accepted. Address bids to Bob Knorr, Project Manager at City of Newberg, Community Development Office, P.O. Box 970, 414 E. First Street, Newberg, Oregon 97132. At **2:00 p.m.** on the same day bids will be opened at publicly read allowed.

All bids must be submitted on the prescribed form completely filled out, signed, in a sealed envelope and accompanied by a certified check or bid bond payable to the City of Newberg, Oregon for an amount not less than 10 percent of the total amount of the bid submitted.

Prequalifications of bidders will be required for this project in accordance with ORS Chapter 279.039. The Contractor's Statement of Qualifications form included with the Bid Documents must be submitted to the Owner with the Bid.

Contractors awarded Public Works Contracts of $25,000 or more must pay a fee to the Oregon Bureau of Labor and Industries (BOLI) for each contract. The fee is 0.1% of 1% of the contract price. The fee can be no more than $5,000 and no less than $100 per contract; regardless of the contract size. See General Requirements Section of the bid documents for fee submittal information.

The project contemplated consists of construction of an 8-foot diameter by 23.5 foot deep caisson type duplex submersible pump type pump station, a valve vault, an electrical shelter, a standby engine generator, and other associated work.

The Engineer's Estimate for this project $223,129.05.

Plans, Specifications, Bid Documents and Planholders List are available through Precision Images, 900 SE Sandy Blvd., Portland, Oregon 97214, 503-274-2030. Contractors can also view or place orders online at www.pi-express.com. Documents may be EXAMINED ONLY at Newberg City Hall, 414 E. First Street, Newberg, Oregon 97132 or Southwood Engineering, 3301 Southwood Drive, Philomath, Oregon 97370.

Bidders must determine for themselves, to their own satisfaction, all of the conditions and circumstances affecting the project or the cost of the proposed work by personal examination of the site and the specifications and by such other means as they may choose. It is understood and agreed that information as to conditions or obstructions indicated in the plans or specifications has been obtained by the City from data at hand. There is no expressed or implied agreement that such conditions are fully or correctly shown and the Bidder must take into consideration the possibility that conditions affecting the cost or quantity of work may differ from those indicated.

An optional Prebid Meeting will be held to discuss the Drawings and Specifications and answer questions. The meeting will begin at 10:00 a.m. on the 11th day of June, 2003, at Newberg City Hall, Community Development Office, 414 E. First Street, Newberg, Oregon 97132. A tour of the project site will be provided after the meeting.

No bid will be received or considered unless the bid contains a statement by the bidder as a part of this bid that provisions of ORS 279.350 or 40 USC 276a shall be complied with.

No bid for a construction contract shall be considered unless the bidder is registered with the Construction Contractors Board as required by ORS 701.035 to 701.055. Each Bid must contain a statement as to whether the bidder is a resident bidder, as defined by ORS 279.029.

When applicable all bidding shall comply with Presidents Executive Order No. 11246. All bidders shall comply with the applicable provisions of the Equal Employment Opportunity Act of 1972 and the Civil Rights Act of 1964.

The described work shall be substantially complete within one-hundred eighty (180) days after notice to proceed. Notice to proceed will be issued after the conditions described in City of Newberg Technical Requirements are satisfied.

Any determinations of the lowest responsible bidder and award are subject to review and determination by the City Attorney as to legal sufficiency of any bid submitted. The City of Newberg reserves the right to reject any or all bids, to waive informalities and to accept the bid which is in the best interest of the City. No bidder may withdraw his bid for a period of sixty (60) calendar days after the date set for opening.

Michael Soderquist, P.E., P.L.S. DEE
Community Development Director

Published: **Daily Journal of Commerce**
Wednesday, June 04, 2003
Thursday, June 05, 2003

Revised June 4, 2003

BID

PLACE: **CITY OF NEWBERG, OREGON**

PROJECT: **CHEHALEM DRIVE PUMP STATION PROJECT**

TO: **MAYOR AND CITY COUNCIL**
CITY OF NEWBERG, OREGON
414 E. FIRST STREET
NEWBERG, OREGON 97132

The undersigned, hereinafter called the Bidder, in compliance with your advertisement for bid offers to enter into a Contract with the City of Newberg, Oregon, hereinafter referred to as the Owner, to furnish all labor, materials, equipment, supplies and machinery to construct the project in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below.

The Bidder declares that he has carefully examined the plans and specifications with related documents, that he has personally inspected the site of the proposed work; that he has satisfied himself as to the quantities involved including materials and equipment, and is familiar with all of the conditions surrounding the construction of the proposed project including availability of materials and labor.

The Bidder further declares that the Bid is made according to the provisions and under the terms of the Contract Documents, which are hereby made a part of this Bid, and that the prices below are to cover all expenses incurred in performing the work required under the Contract Documents of which this Bid is a part.

The Bidder agrees that if this Bid is accepted, he will, within ten calendar days after notification of acceptance, execute the Contract with the Owner; and will at that time deliver to the Owner the Performance and Payment Bond and insurance documents required herein, and will, to the extent of his Bid, furnish all labor, equipment and materials necessary to complete the work in the manner, in the time, and according to the methods as specified in the Contract Documents and required by the Community Development Project Manager.

The Bidder further agrees to begin work after receipt of written "Notice to Proceed" from the Owner and to fully complete the project within 180 calendar days. Bidder further agrees to pay as liquidated damages, the sum two hundred fifty dollars ($250.00) for each consecutive calendar day thereafter until the work shall have been finished. Sundays and legal holidays shall be excluded in determining days in default.

The Bidder further proposes to accept as full payment for the work proposed herein the amounts computed under the provisions of the Contract Documents and based on the following schedule of lump sum or unit price amounts, it being expressly understood that the unit prices are independent of the exact quantities involved. The Bidder agrees that the lump sum prices and unit prices represent a true measure of the labor and materials required to perform the work, including all allowances for overhead and profit for each type and unit of work called for in these Contract Documents.

The undersigned Bidder hereby agrees that the provisions of ORS 279.348 to 279.356 will be complied with, so that the undersigned Bidder and Bidder's subcontractors will pay to their employees not less than the specified minimum prevailing rate of wage as determined by the Oregon Commissioner of the Bureau of Labor and Industries, and further agrees to pay such wages not less than once per week.

The unit prices shall include all labor, materials, equipment, tools, overhead, profit, insurance, etc., to complete the work called for.

It is agreed that if the Bidder is awarded the Contract for the work herein proposed and shall fail or refuse to execute the Contract and furnish the required Performance-Payment Bond within the time herein proposed, then, in that event, the bid security deposited herewith shall be retained by the Owner as liquidated damages.

The Bidder understands that the Owner may reject any or all bids and waive any informalities in the bidding.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of sixty (60) calendar days after the scheduled closing time for receiving bids.

The Bidder acknowledges receipt of the following Addenda.

NO. 1 DATE 6/4/03
NO. 2 DATE 6/9/03
NO. 3 DATE 6/11/03

The name of the Bidder submitting this Proposal is Clackamas Construction, Inc
doing business at P.O. Box 379, Boring, OR, 97009
Street, City, State, Zip
which is the address to which all communications shall be sent.

BIDDER'S PERFORMANCE BOND STATEMENT

Clackamas Construction, Inc, hereinafter referred to as Contractor, is submitting a bid to the City of Newberg pursuant to the City's advertisement for bids dated May 2, 2003 for the **Chehalem Drive Sewage Pump Station Project.**

Contractor certifies that if awarded the Contract, Contractor has the financial ability to obtain a good and sufficient bond issued by a surety to Owner in a sum equal to the amount of the bid providing for the faithful performance of the Contract.

Contractor understands and agrees if Contractor fails to provide the performance bond, the Owner will reject such bid and the bid bond or security submitted with the subject bid will be forfeited. The Surety requested to issue the Performance Bond will be Developers Surety & Indemnity.
(Surety Company)

Contractor hereby authorizes Developers Surety to disclose any information to
(Surety Company)
the Owner concerning Contractor's ability to supply a performance bond in the amount of the Contract.

TOTAL LUMP SUM BID FOR RAW SEWAGE PUMP STATION

Three hundred and thirty eight thousand eight hundred and thirty five and fifty five Dollars

and _____ Cents $ 314,351_338,835

(Amount in words takes precedence)

In witness thereto the undersigned has set his hand this 19 day of June 2003.

Connie Mueller
Signature of Bidder

CONNIE MUELLER
Print Name

President
Title

(If Corporation)

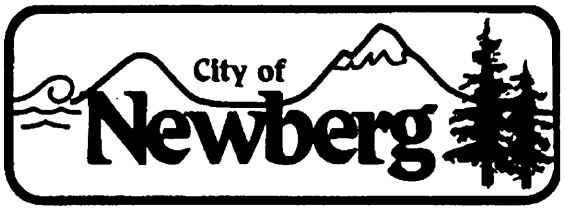
In witness whereof the undersigned corporation has caused this instrument to be executed and the seal affixed by its duly authorized officers this 19 day of June 2003.

Clackamas Construction Inc.
Name of Corporation

By CONNIE MUELLER
Print Name

Attest _____
Secretary

City of Newberg
414 E. First Street
P.O. Box 970
Newberg, OR 97132



Community Development Department/Engineering Division
Working Together For a Better Community-Serious About Service

City Manager
(503) 537-1261
(503) 537-5013 FAX

ADDENDUM

TO PLANHOLDERS

CHEHALEM DRIVE SEWAGE PUMP STATION

ADDENDUM #1
Wednesday, June 04, 2003

The following changes, additions, and/or deletions are hereby made a part of the Contract Documents as fully and completely as if the same were fully set forth therein:

A. ADVERTISEMENT FOR BIDS

Item #	Description of Change
1	**Advertisement, Paragraph 9, Optional Prebid Meeting.** Modify the paragraph to read: "The meeting will begin at 10:00 a.m. on the 11th day of June, 2003 at Newberg City Hall . . .."

Item #	Description of Change
2	**Advertisement, Page 2, Published Dates**. Modify the publishing note to read: "Daily Journal of Commerce, Wednesday, June 4, 2003, Thursday, June 5, 2003."

B. SPECIFICATIONS

Item #	Description of Change
1	**Part 4 – Specifications, Division 2 – Site Work, Section 02240 Dewatering, sub-section 3.1 – GENERAL**. Add an additional item B to read as follows: "B. On Wednesday, June 04, 2003 the ground water elevation was measured from the piezometer tube as installed in Existing Bore Hole B-1. The ground water elevation was measured as being 3.4 feet below existing grade."

Each bidder shall acknowledge receipt of this Addendum No. **1** by signature below and by writing in the addendum number and date on page **2** of the Bid. A bid submitted without acknowledgement may be invalid.

Bobbie Grippi
Bidder's Signature

6/9/03
Date

Clackamas Construction Inc.
Company Name

City of Newberg
414 E. First Street
P.O. Box 970
Newberg, OR 97132

City Manager
(503) 537-1261
(503) 537-5013 FAX

Community Development Department/Engineering Division
Working Together For a Better Community-Serious About Service

ADDENDUM

TO PLANHOLDERS

CHEHALEM DRIVE SEWAGE PUMP STATION

ADDENDUM **#2**
Monday, June 09, 2003

The following changes, additions, and/or deletions are hereby made a part of the Contract Documents as fully and completely as if the same were fully set forth therein:

A. SPECIFICATIONS

Item #	Description of Change
1	**Section 16005-2.8-F – LEVEL ELEMENT AND TRANSMITTER, ULTRASONIC/Sensor Elements**: Add the following: 4. Wet well level sensor and overflow flow sensor shall each have a beam angle of 6 degrees.
2	**Section 16005-2.8-H – LEVEL ELEMENT AND TRANSMITTER, ULTRASONIC/Manufacturer and Product:** Change the entry to "…Model XPS-15F wet well level sensor and Model XPS-15F overflow flow sensor…" from "…Model XPS-15 wet well level sensor and XRS-5 overflow flow sensor….".

B. DRAWINGS

Item #	Description of Change
	Part 5 – Drawings, Sheets, 10, 11, 12, 13, and 14, Electrical Plans. See requested changes below:

1 Sheet 10:

a. Change the location of the "PGE SERVICE ENTRANCE CT CABINET" to the west outside wall of the Electrical Building, 6 inches south of the north corner.

b. Change the location of the "PGE METER BOX" to the west outside wall of the Electrical Building, 6 inches south of the south side of the "PGE SERVICE ENTRANCE CT CABINET" in the new location noted in Item 1.

c. Change the "E" conduit callout to "E: 2-[4"C-E] W/ PULL CORD..." from "E: [4"C-E] W/PULL CORD...".

d. Change the routing of the 2-[4"C-E] PGE Electric Service conduits to a 45 degree angle to the west from the north end of the "PGE SERVICE ENTRANCE CT CABINET" in the new location noted in Item 1.

e. Change Note 1 to "FURNISH, INSTALL, AND CONNECT TWO 4" PVC SCHEDULE 40 CONDUITS..." from "FURNISH, INSTALL, AND CONNECT 4"PVC SCHEDULE 40 CONDUIT...".

f. Change the routing of the "T/E" conduits on the west side of Chehalem Drive from the PGE Power Pole. The new route is from the southwest side of the power pole north through a sweep 90-degree bend to the east with continuation to the east in the right-of-way originally shown. The old route was from the northeast side of the power pole northwest through a sweep 45-degree bend to the east as shown.

2 Sheet 11:

a. On the "Control and SCADA Equipment Schematic":

1. Locate the Model "ACX24" 120V-24V transformer. Move the node and 120V power connections to other devices from the line side of the transformer to the line side of the transformer primary fuse.

2. Delete the daisy chain power circuit to the Flygt Multitrode, Milltronics Multiranger 200, and Monarch Data-Chart 2000 and to Digital Input Modules 1 and 2 and to the High Level Float Switch Box.

3. Delete Input Modules 1 and 2 and their "MSC" to the SCADAPack. Change the routing of the [2#14] conductors from the High Level Float Switch Box to the "SCADAPack" instead of to "Digital Input Module 1".

4. Add a dedicated fuse block, fuse, and power connection [2#14,1#14G] between the fuse block and Flygt Multitrode, Milltronics Multiranger 200, and Monarch Data-Chart 2000 (three fuse blocks, fuses, and power connections). From the node on the line side of the transformer primary fuse, daisy chain a power circuit [2#12,1#12G] to each of the added fuse blocks.

5. From the node on the line side of the transformer primary fuse, add a power circuit [2#12,1#12G] to the High Level Float Switch Box, which has a fuse inside the box as shown on Sheet 14.

6. Add a simplex receptacle, fuse block, and fuse for the Modem Module (refer to the Sheet 13 Facility Plan "Simplex Rcpt for "TCBD""). Add a power circuit from the Simplex Rcpt to the fuse block [2#14,1#14G] and from the fuse block to the line side of the High Level Float Switch Box fuse block [2#12,1#12G].

7. Size, furnish, and install panduit dedicated to 120 volt power and control circuits isolated from panduit dedicated to low voltage (less than 120 volts) and analog circuits.

b. On the "SCADA Equipment Input Schematic":

1. Change the appropriate device label to "SCADAPACK INPUT GROUP 1" from "DIGITAL INPUT MODULE 1".

2. Change the appropriate device label to "SCADAPACK INPUT GROUP 2" from "DIGITAL INPUT MODULE 2".

3 Sheet 12:

a. On the "One-Line Diagram":

1. Locate the conduit callout below the label "PGE ELECTRIC SERVICE FROM EXST POWER POLE". Change the conduit label to "2-[4"C-E]" from "[4"C-E]".

2. Change the "PGE SERVICE ENTRANCE CT CABINET, SEE NOTE 1" label to "PGE SERVICE ENTRANCE CT CABINET (48"x48"x14" DEEP), SEE NOTE 1 AND PGE ELECTRICAL SERVICE REQUIREMENTS (NOVEMBER, 2002, EDITION), PAGE 73".

3. In the box to the left of the "ATS", add the "ASSC =" entry of "10,876A, MAX".

4 Sheet 13:

a. On the Plans:

1. Change the location of the "PGE SERVICE ENTRANCE CT CABINET" to the west outside wall of the Electrical Building, 6 inches south of the north corner.

2. Change the location of the "PGE METER BOX" to the west outside wall of the Electrical Building, 6 inches south of the south side of the "PGE SERVICE ENTRANCE CT CABINET" in the new location noted in Item 1.

5 Sheet 14:

a. On the "Control and SCADA Panel Component Layout":

1. Delete Equipment List Item 8.

2. Revise the component layout. Delete the two Item 8 Digital Input Modules. Note that the Item 5 UPS Power Supply and Item 10 Bell 202 Modem Module have the same dimensions, and the Item 7 PLC has the same dimensions as Items 5 and 10, except its width is double the width of Items 5 and 10.

3. Din rail mount Items 5, 7, & 10 on a vertically mounted din rail in the location shown for Items 5, 7, & 8. Mount Item 5 at the top and Item 10 at the bottom of the din rail.

Each bidder shall acknowledge receipt of this Addendum No. **2** by signature below and by writing in the addendum number and date on page **2** of the Bid. A bid submitted without acknowledgement may be invalid.

Bobbie Grippi
Bidder's Signature

6/10/03
Date

Clackamas Construction Inc.
Company Name

City of Newberg
414 E. First Street
P.O. Box 970
Newberg, OR 97132

City Manager
(503) 537-1261
(503) 537-5013 FAX

Community Development Department/Engineering Division
Working Together For a Better Community-Serious About Service

ADDENDUM

TO PLANHOLDERS

CHEHALEM DRIVE SEWAGE PUMP STATION

ADDENDUM **#3**
Monday, June 16, 2003

The following changes, additions, and/or deletions are hereby made a part of the Contract Documents as fully and completely as if the same were fully set forth therein:

A. SPECIFICATIONS

Item #	Description of Change
1	**Section 05500 – METAL FABRICATIONS AND CASTINGS**

A. Item 2.3A.2g:

Delete Item 2g and insert the following:

g. Furnish recessed padlock clip.

B. Item 2.3A.4a and 4b:

Delete Items 4a and 4b and insert the following:

a. The access covers shall be furnished by the pump manufacturer.

2 **Section 07300 – FIBERGLASS SHELTER**

A. Item 2.2C:

Replace with the following:

Provide stainless steel hasp for padlocking cover.

B. Item 2.2D:

Replace with the following:

Color shall be selected from manufacturers color chart by OWNER.

3 **Section 16230-3.4 – MANUFACTURER'S FIELD SERVICES**:

Add the following:

B. Warranty and Service Agreement

1. Manufacturer to provide two-years of warranty and maintenance services from the time of project completion and acceptance of the generator unit. Service is to include at a minimum the following:
   i. Changing the crankcase oil, lube filters, fuel filters, water filters and all other service checks listed as part of a standard full service regime. Maintenance service shall be performed at manufacturer's recommended intervals, with a minimum of quarterly equipment checks to insure proper fluid levels and operation, and semi-annual full service.
   ii. Initiate the regular operation of the generator through the use of an "automatic exercise clock" that will cause the generator to "exercise" or operate itself on a weekly basis
   iii. Load bank testing 90-days prior to the end of the warrant and service period.

B. DRAWINGS

Item #	Description of Change
1	Sheet 2:

Under NOTES FOR SHEET 4, add the following to Note No. 21:

Provide 12 inches of top soil and 3 inches of bark mulch in planting area.

2 Sheet 3:

Add the following Note No. 4:

4. Contractor shall be responsible for the abandonment of the existing 40 foot bore hole and piezometer.

   The work shall be performed by a licensed, bonded well driller in accordance with State regulations.

3 Sheet 4:

a. Add the following note:

PVC force main shall be AWWA C900, class 150 pipe.

b. On the right side of the drawing, change the note "Engine Generator, See Sheet 9" to read "Engine Generator, See Sheet 10".

4 Sheet 5:

In the Plan Below Grade, change the invert for the 12 inch PVC Gravity Sewer from 170.20 to 182.38.

5 Sheet 7:

a. Under Electrical Building Notes, Item 3, Door, add the following:

1. Contractor to use door handle hardware with interchangeable core.

6 Sheet 14:

In the EQUIPMENT LIST, Note No. 1; in the 3rd line, delete the words "door clamps" and insert the words "three point padlockable handle".

Each bidder shall acknowledge receipt of this Addendum No. **3** by signature below and by writing in the addendum number and date on page **2** of the Bid. A bid submitted without acknowledgement may be invalid.

Bobbie Grippi
Bidder's Signature

6/16/03
Date

Clackamas Construction Inc
Company Name

BIDDER'S DISCLOSURE STATEMENT

The City of Newberg pursuant to OAR 137-040-0017 must reject a bid if the Bidder fails to disclose information regarding its subcontractors.

The City recommends the Bidder disclose subcontract information for any subcontractor as follows:

1. Determine the lowest possible contract price. That price will be the base bid amount less all alternate deductive bid amounts (exclusive of any options that can only be exercised after contract award).

2. Provide the required disclosure information for any first-tier subcontractor whose potential contract services (i.e. subcontractor's base bid amount plus all alternate additive bid amounts, exclusive of any options that can only be exercised after contract award) are greater than or equal to: (1) 5% of that lowest contract price, but at least $15,000; or (2) $500,000 regardless of the percentage. Total all possible work for each subcontractor in making this determination (e.g. if a subcontractor will provide $15,000 worth of services on the base bid and $40,000 on an additive alternate, then the potential amount of subcontractor's services is $55,000. Assuming $55,000 exceeds 5% of the lowest contract price, provide the disclosure for both the $15,000 services and the $40,000 services).

3. A Bidder shall submit the disclosure form required by this rule within four (4) working hours of bid closing in the manner specified herein.

4. Bids which are submitted by bid closing but for which the separate disclosure submittal has not been made by the specified deadline, are not responsive and shall not be considered for contract award.

5. Substitution of affected first-tier subcontractors shall be made only in accordance with ORS 279 (Oregon Laws 1999, Chapter 689, Section 6 HB2895). Agencies do not have a statutory role or duty to review, approve or resolve disputes concerning such substitutions. However, Agencies are not precluded from making related inquiries or investigating complaints in order to enforce Contract provisions that require compliance generally with laws, rules and regulations.

6. This rule shall apply to Public Improvements Contracts first advertised on or after January 1, 2000.

Complete the attached disclosure form or submit a separate form showing subcontractor's name and address, Construction Contractor Board registration number and the subcontract dollar value. If Bidder is not using any subcontractors that are subject to the above disclosure requirements, you are required to indicate "NONE" on the accompanying form.

BIDDER'S DISCLOSURE FORM

Chehalem Drive Sewage Pump Station — *Project name*

Clackamas Construction Inc — *name of prime contractor*

58599 — *CCB number*

6/19/03 2:00 PM — *bid opening date and time*

Firm Name	Allphase Electric
Address	PO Box 1336
City, State, Zip	Millsboro 97123

Firm Name	MARION CONST
Address	PO Box 1228
City, State, Zip	Salem Ore 97309

Firm Name	
Address	
City, State, Zip	

Firm Name	
Address	
City, State, Zip	

Firm Name	
Address	
City, State, Zip	

CONTRACTOR'S STATEMENT OF QUALIFICATIONS

Contractor shall provide the following information and submit this form to the OWNER with the Bid.

1. Name of Organization: Clackamas Construction Inc.

   Address: P.O Box 279, 28890 SE HWY 212
   Boring, OR 97009

   Phone: 503.663.1144 Fax: 503.663.6251

   Email: bobbie5164@aol.com

   Check one of the following:

   _____ An Individual

   _____ Partnership

   _X_ Corporation

   _____ Joint Venture

   _____ Member of Joint Venture

2. If a corporation:

   When incorporated: 8/8/88

   State of incorporation: Oregon

   President: Connie Mueller

   List all officers authorized to execute contracts:

   Connie Mueller
   Jeff Mueller

3. If a partnership:

   Date of organization: _____

   Name and address of partners:

   _____

   _____

   _____

   _____

   _____

   _____

4. Provide the following information regarding Bid, Performance, and Payment Bonds:

   Name of surety company: Developers Surety & Indem.

   Name of agent: Rothrock Agency.

   Address of agent: 4850 SW Scholls Ferry Rd. Ste 109
   Portland, OR 97225

   Agent phone: 503.292.9441

5. Indicate total amount of work the organization is capable of undertaking at any one time:

   $ 10,000,000

6. Enter the years of experience in each of the following classes of work:

Class of Work	Years Experience
1. Caisson type pump stations	Ø
2. Conventional wet pit type pump stations	15
3. Sanitary sewers	15
4. Streets	15
5. Buildings	15

7. List major items of equipment owned by your organization (add attachment if necessary):

Equipment Description	Age in Years
See list attached. MARKED "Available Equipment"	

AVAILABLE EQUIPMENT

EQUIP	DESCRIPTION	YEAR/MODEL	SERIAL #	LICENSE #	CLASS	TYPE	DISP	LOCATION
101	KENWORTH DUMP TRUCK - 1978	1978	161443S	YCRD967	VEHICL	Owned		
102	KENWORTH TRACTOR - 1982	1982	M910577	YCBS834	VEHICL	Owned		
103	AUTOCAR DUMP TRUCK - 1962	1962	DC10264252081	T434637	VEHICL	Owned		
104	CUSTOMBUILT END DUMP TRAILER - 1994	1994	ID008293		VEHICL	Owned		
107	FORD F250 PICKUP - 1988 (JEFF)	1988	1FTHF26M0JPA29479	PLA681	VEHICL	Disposed	Sold	
109	'88 FORD F350 UTILITY TRK (SHOP)	1988	2FDKF37H4JCB34326	VGV135	VEHICL	Owned		
115	MACK WATER TANK TRUCK - 1980	1980	RS685LS53876		VEHICL	Owned		
120	LUFKIN 27' VAN TRAILER (JOB) - 1972	1972	36642		VEHICL	Owned		
121	FRUEHAUF 50 TON LOWBOY - 1985	1985	1H7C4426FF044303	HQ45358	VEHICL	Owned		
122	COMET VAN TRAILER - 1981	1981	1C0V28017BA027833	HP74559	VEHICL	Owned		
124	SHOP TRUCK W/BOOM - 1985 (SOLD)	1985 FORD F600	1FDNF60H4FVA19140	T510783	VEHICL	Disposed	Sold	
125	PETERBILT 359 T/A DUMP TR. -1986	1986	1XP9LB9X9GP199155	YCPW598	VEHICL	Owned		
126	1989 FREIGHTLINER DUMP TRUCK	1989 C120064	1FUP2CYB9KH340258	YCRD981	VEHICL	Owned		
127	PUP TRAILER	COLUMBIA	2E02078222	HR92342	VEHICL	Owned		
128	TRAILMAX TILT TRAILER	1999/TD54T	1G9KS3735XA065277	HR65393	VEHICL	Owned		
129	1991 GMC PICKUP	1991	1GTEC14H3ME517806	VTL407	VEHICL	Disposed	Sold	
130	1994 FORD PICKUP (JEFF)	1994/F250	1FTHX26K6RKA75208	UCM320	VEHICL	Owned		
131	TRUCKWELD PUP TRAILER	TRUCKWELD	TW5771569		VEHICL	Owned		
132	1994 CHEVY PU FLATBED (DIESEL) (RON)	1994 GK3	1GBJK34F3RE126260	T535665	VEHICL	Owned		
133	1994 BIG TEX TRAILER	1994/BIG TEX FB	16VCX1824R1H50407	N102597	VEHICL	Owned		
134	1989 FORD F150 PU (MATT)	1989 F150	1FTEF14N4KPA25557		VEHICL	Owned		
135	1990 FORD MECHANICS TRUCK	1990/FSD	2FDLF47G7LCA91556	T500160	VEHICL	Owned		
2000	HYUNDAI 200LC EXCAVATOR	1990 200LC	E-HX200-90E-0917		CONEQP	Owned		
2002	CASE ROLLER	1102/1103 SM84"	840308102		CONEQP	Owned		
2004	HYSTER FORKLIFT	CHALLENGER 60	C5D5139J		CONEQP	Owned		
2005	CEMENT BUGGY	1985			CONEQP	Owned		
2006	TANDEM ROLLER	ROSCO	4263		CONEQP	Owned		
2007	KOBELCO SK50UR MINI EXCAVATOR (SOLD)	1994/SK50UR	YJ2624		CONEQP	Disposed	Sold	
2008	1995 CASE SKID LOADER/BOBCAT	1995 1838	JAF0151662		CONEQP	Owned		
2009	JOHN DEERE 544G WHEEL LOADER	1995/544G	DW544GB550429		CONEQP	Owned		
200B	COLEMAN GENERATOR				SHOP/2	Disposed	Lost	
200B2	MULTIQUIP GENERATOR	3200	36567		SHOP/2	Owned		
200C	ROTOHAMMER				SHOP/2	Owned		
200F	DIAPHRAGM PUMP	WACKER 3IN	621601032		SHOP/2	Owned		
200F1	WACKER DIAGPRAHM PUMP		621601288		SHOP/2	Disposed	Junked	
200I	MISC TOOLS				SHOP/2	Owned		
200J	BRUSH RAKE				SHOP/2	Owned		
200M	60 LB JACKHAMMER				SHOP/2	Owned		
200N	WATER PUMP	3 IN	089934		SHOP/2	Owned		
201	CAT D8H CRAWLER TRACTOR - 1974	1974	46A21531		CONEQP	Owned		
2010	KOMATSU 250 OFF ROAD ROCK TRUCK	HA250	N-61047		CONEQP	Owned		
2011	1972 TEREX TWIN POWERED SCRAPER	1972	58532	VIN8VA191988	CONEQP	Owned		
2012	HITACHI 400LC-3 EXCAVATOR	400LC-3	1665388		CONEQP	Owned		
2013	BOBCAT 331 EXCAVATOR	331	S12917269		CONEQP	Owned		
2014	INTL. BULLDOZER TD15C	TD15C	424001U003327		CONEQP	Disposed	Sold	
2015	ROLLER COMPACTOR CHAMPION	540P SUPER PAC	1136		CONEQP	Owned		
2016	CASE 1840 SKID STEER	1840			CONEQP	Owned		
202	CHAMPION GRADER D565T - 1974	1974	7304		CONEQP	Owned		
203	CASE 1450B CRAWLER TRACTOR - 1986	1986	8383143		CONEQP	Owned		

EQUIP	DESCRIPTION	YEAR/MODEL	SERIAL #	LICENSE #	CLASS	TYPE	DISP	LOCATION
204	BACKHOE 580 K CASE	1994 EX 4X4	JJG0179900		CONEQP	Owned		
205	FORD 555B BACKHOE - 1975	1975	10673EHA21437	T417980	CONEQP	Owned		
206	TEREX MOTOR SCRAPER	TS14	29978		CONEQP	Owned		
207	TEREX MOTOR SCRAPER	TS14	39247		CONEQP	Owned		
208	HITACHI EXCAVATOR 120 - 1989	1989	31052		CONEQP	Owned		
209	HYUNDAI 200 EXCAVATOR - 1991	1991	EHX2009311		CONEQP	Owned		
210	INTERNATIONAL 412 SCRAPER - 1979	1979	542003U015407		CONEQP	Owned		
211	JOHN DEERE CRAWLER 450C DOZER - 1981	1981	356602		CONEQP	Owned		
212	KOMATSU WA300C LOADER - 1985	1985	10698		CONEQP	Owned		
213	LASER LEVEL, SPECTOR PHYSICS - 1988	1988/25789			SHOP/2	Owned		
214	LASER LEVEL, UNA 30 LEICA	1995/560111	673159		SHOP/2	Owned		
215	HITACHI EX200-3 EXCAVATOR - 1995	1995 EX200-3	14C82117		CONEQP	Owned		
216	MITSUBISHI 180 EXCAVATOR - 1987	1987/MS180LC-8	9060		CONEQP	Owned		
217	REX ROLLER - 1970	1970/SP700	7HZ197		CONEQP	Owned		
218	TRAILMOBILE DOLLY - 1967	1967	C22751	HP32637	CONEQP	Owned		
219	D4-H BULLDOZER W/RIPPER - 1990	1990 D-4H	8PB02897		CONEQP	Owned		
220C	WACKER JUMPING JACK	BS62Y	654503319		SHOP/2	Owned		
220D	WACKER JUMPING JACK	BS62Y	5428055		SHOP/2	Owned		
221	ROCK BUCKET				SHOP/2	Owned		
221A	CAT E 1 200 BUCKET	66 INCH			SHOP/2	Owned		
222	FORK LIFT WAGNER SCOPEMOBILE	SCOPEMOBILE	h1135bt		CONEQP	Owned		
223	WACKER 3 IN TRASH PUMP	1990	506804078		SHOP/2	Owned		
223A	WACKER 3 IN TRASH PUMP		506801980		SHOP/2	Disposed	Junked	
225	PLATE COMPACTORS				SHOP/2	Owned		
226	TRENCH SHIELD R#7486	814SW4			SHOP/2	Owned		
227	SAMSUNG HYDRAULIC EXCAVATOR - 1993	1993 / MX10LC-2	HAY1616		CONEQP	Owned		
229B	STIHL CUT OFF (CHOP) SAW	1997 850-6-109	127592370		SHOP/2	Disposed	Junked	
229C	STIHL CUT OFF CHOP SAW	1997 850-6-16	131818890		SHOP/2	Disposed	Junked	
230	STIHL CHAINSAW				SHOP/2	Disposed	Junked	
231	SULLAIR 125CFM COMPRESSOR				SHOP/2	Owned		
232	BUCKET 30 IN. TO FIT CAT				SHOP/2	Owned		
233	BUCKET 66 IN. TO FIT CAT	1996 ACCURATE			SHOP/2	Owned		
234	QUICK CHANGE BUCKET (USED W/SAMSUNG)	1997			SHOP/2	Owned		
235	QUICK CHANGE CLEANUP BKT.				SHOP/2	Owned		
236	ROCK HAMMER STANLEY MB 1200 BRAKER	STANLEY MB 1200			SHOP/2	Owned		
237	LASER LEVEL LASERPLANE 500	1997/L500	6960		SHOP/2	Owned		
238	TRANSIT LASER LEVEL W/LENKER ROD	1997/BTL200	231		SHOP/2	Owned		
239	BUCKET DITCHING 60"	ACCURATE			SHOP/2	Owned		
240	LASER ROD W/CASE, DIRECT EXCVTN CUT&FILL	1998 SE5077-CF			SHOP/2	Owned		
241	LASERPLANE 350 LASER	1992 350	21992		SHOP/2	Owned		
242	NIKON LEVEL				SHOP/2	Owned		
243	BERGER LEVEL 200B T/L				SHOP/2	Owned		
244	HOMELITE 2" WATER PUMP				SHOP/2	Disposed	Lost	
245	ROTARY ASPHALT ULTRA CUT	1998	4368		SHOP/2	Owned		
246	SHORING MANHOLE 4X8 FT.	EFFICIENCY			SHOP/2	Owned		
247	SHORING MANHOLE 8X8 FT.	EFFICIENCY			SHOP/2	Owned		
248	QUICK CHANGE BUCKET SYSTEM -HITACHI 200	1998			SHOP/2	Owned		
249	TRANSIT ROD				SHOP/2	Owned		
250	CONFINED AIR SPACE TESTER				SHOP/2	Owned		

EQUIP	DESCRIPTION	YEAR/MODEL	SERIAL #	LICENSE #	CLASS	TYPE	DISP	LOCATION
251	BEAM ALIGNER STAND, TRIPOD STAND, GRADE	STICKS			SHOP/2	Owned		
252	WACKER JUMPING JACK	BS60Y	542601003		SHOP/2	Disposed	Junked	
253	WACKER JUMPING JACK	BS60Y	579913587		SHOP/2	Disposed	Junked	
254	BUCKET 60" DITCHING	ACCURATE			SHOP/2	Owned		
255	BUCKET 54" DITCHING	ACCURATE			SHOP/2	Owned		
256	STANLEY HOE PAK	HS6000			SHOP/2	Owned		
257	QC BKT TO BE USED/W HYUNDAI 200LC	1998			SHOP/2	Owned		
258	HOMELITE 3500 WATT GENERATOR	USED			SHOP/2	Owned		
259	SPECTRA PHYS L350 LASER EYE W/LENKER ROD	1999/SP1275	25337		SHOP/2	Owned		
260	SOKKIA C40 LEVEL		57137		SHOP/2	Owned		
261	STIHL 034AV 20" GAS POWER CUTTER	STIHL 034AV			SHOP/2	Owned		
262	HOLLAND PLATE COMPACTOR	1999			SHOP/2	Owned		
263	WACKER PD3A 3" DIAPHRAM PUMP	1994	621602897		SHOP/2	Owned		
264	PICKUP TOOL BOXES (2)				SHOP/2	Owned		
265	BACKHOE BUCKET 12"				SHOP/2	Owned		
266	LIGHT TOWER				SHOP/2	Owned		
267	FUEL TANK & TRAILER	APPROX. 800 GALS			SHOP/2	Owned		
268	CUT OFF SAW 12" STIHL	STIHL TS350	37518525		SHOP/2	Disposed	Junked	
269	VAULT/MANHOLE PICKER (2) 2 LEG				SHOP/2	Owned		
270	MANHOLE/VAULT PICKER (1) 3 LEG				SHOP/2	Owned		
271	SPEC.PREC. L500C LEVEL	L500C	25066		SHOP/2	Owned		
272	24 IN. BUCKET				SHOP/2	Owned		
273	2 IN. TRASH PUMP	MULTIQUIP	20ITA1826		SHOP/2	Owned		
274	2 IN. TRASH PUMP MULTIQUIP	QP202TH	202TH-3220		SHOP/2	Owned		
275	SPECTRA 1177 LASER EYE REC/DIR ELEV ROD	SPECTRA 1177	36931		SHOP/2	Owned		
276	BUILDERS TRANSIT LEVEL 200B	200B			SHOP/2	Owned		
277	SHEEP FOOT COMPACTOR				SHOP/2	Owned		
278	14" STIHL CUTOFF SAW	2001/TS460-14	48146449		SHOP/2	Disposed	Lost	
279	LASER EYE RECEIVER	1275	73075		SHOP/2	Owned		
280	SONIC TRACER W/POLE	ST2-20	4151		SHOP/2	Owned		
281	SOKKIA C330 AUTO LEVEL W/TRIPOD	7385-75	326586		SHOP/2	Owned		
282	UTILITY TRAILER (FUEL TRLR)				SHOP/2	Owned		
283	STIHL 14" CUT OFF SAW	2001/TS460-14	49318441		SHOP/2	Owned		
284	DITCHING BUCKET 72"				SHOP/2	Owned		
285	DITCHING BUCKET 60"				SHOP/2	Owned		
286	DIGGING BUCKET 40"				SHOP/2	Owned		
287	BUCKET 44"				SHOP/2	Owned		
288	STIHL 14" GAS CUTOFF SAW	9500 4.67 H.P.	TS460-14		SHOP/2	Owned		
289	ALLIED HYDRAULIC HAMMER	ALLIED	740		SHOP/2	Owned		
290	WATER PUMP - HONDA 3"	HONDA			SHOP/2	Owned		
291	POST HOLE DIGGER				SHOP/2	Owned		
292	CLAMP BUCKET				SHOP/2	Owned		
293	FORKS				SHOP/2	Owned		
294	CHAIN SAW (STIHL)	STIHL 021-16	253736787		SHOP/2	Owned		
295	DIESEL FUEL TANK USED AT JOB SITES				SHOP/2	Owned		
300	BOLT BINS				SHOP/3	Owned		
301	JACK STANDS				SHOP/3	Owned		
301A	TIRE JACK				SHOP/3	Owned		
301B	TIRE JACK				SHOP/3	Owned		

EQUIP	DESCRIPTION	YEAR/MODEL	SERIAL #	LICENSE #	CLASS	TYPE	DISP	LOCATION
302	PARTS WASHER				SHOP/3	Owned		
303	DRILL PRESS GRINDER WORKBENCH				SHOP/3	Owned		
304	CUTTING TABLE WITH VISE				SHOP/3	Owned		
306	WELDER				SHOP/3	Owned		
307	HYD. TRANSMISSION JACK				SHOP/3	Owned		
308	COFFING CHAIN HOIST				SHOP/3	Owned		
309	SET OF PITTSBURGH END WRENCHES				SHOP/3	Owned		
310	KAM 1 IN DRIVE H.D. SOCKET SET				SHOP/3	Owned		
311	FILE AND STORAGE CABINETS				SHOP/3	Owned		
312	JENNY 1000 STEAM CLEANER				SHOP/3	Owned		
313	BRUSHCUTTER	1996/ZSTIFS44	234302858		SHOP/3	Owned		
314	STIHL DEBRIS BLOWER - GAS POWERED	1997 BG75	236740506		SHOP/3	Owned		
315	FUEL TANK & STAND				SHOP/3	Owned		
316	MATMATER MECHANIC SHOP VACUUM				SHOP/3	Owned		
317	AIR COMPRESSOR - EMGLO AIR STREAM				SHOP/3	Owned		
318	WASHER 3000 PSI COLD	635-3-4	8802113		SHOP/3	Owned		
319	RUGER MANUAL HOIST	USED	6LD3477		SHOP/3	Owned		
320	WERNER 24FT EXTENSION LADDER				SHOP/3	Owned		
321	IMPACT WRENCH 3/4"	CP-772H			SHOP/3	Owned		
322	CLUTCH JACK CADDY W/ADAPTERS	KLINE/CC2000	2745		SHOP/3	Owned		
323	STIHL CHAIN SAW MS026	MS026	254709023		SHOP/3	Owned		

8. Do you intend to rent equipment for this project? If so, list the equipment:

If NEEDED.

9. List the major projects similar to this project undertaken in the last five years (list most recent projects first) (add attachment if necessary):

	Owner Name and Address	Name and Location of Project	Date Completed	Contract Amount
1.	City of Lake Oswego P.O. Box 369 Lake Oswego, OR	Robinson Point San. lift Oakter. Dr. Lake Oswego	5/30/03	226,067.84
2.				
3.				
4.				
5.				

6. _____ _____ _____ _____

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12. _____ _____ _____ _____

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13. _____ _____ _____ _____

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14. _____ _____ _____ _____

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_____ _____ _____ _____

15. _____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

10. List the construction experience of all owners, officers, partners, and principal individuals in the organization:

	Name	Position	Type of Work	Years of Experience
1.	CONNIE Mueller.	President	MGMT/FINAL.	60%
2.			ADMIN	40%
3.	JEFF MUELLER	Sec/Tres.	FIELD OPS	40%
4.			ESTIMATING PROJ. COOR	60%
5.				
6.				
7.				
8.				

11. Signature of Office: [signature]

Printed name of Officer: Jeff Moeller

Title: Sec / Treas

Date: 6/18/03

BID BOND

KNOW ALL MEN BY THESE PRESENTS That we Clackamas Construction, Inc. herein after called Principal, and Developers Surety and Indemnity Company, a corporation authorized to transact a general surety business in the State of Oregon, herein after called "Surety", are held firmly bound unto the City of Newberg, Oregon, hereinafter called "Owner" in the penal sum of TEN PERCENT OF THE TOTAL AMOUNT BID Dollars ($ 10% of Bid) lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

WHEREAS, the Principal is herewith submitting their Bid Proposal for the construction of the Chehalem Drive Sewage Pump Station Project of which said Bid is made a part hereof as if fully incorporated herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if the Obligee does not award a contract to the Principal within the time specified in the Contract Documents for the work described in said bid, or in the alternate if the bid submitted by the Principal be accepted and the contract be conditionally awarded to the Principal and if the Principal shall execute the proposed contract and shall furnish the Performance and Payment Bond as required by the Bidding and Contract Documents within the time fixed by said Documents, then this obligation shall be void, otherwise to remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that the obligation of said surety and this bond shall be in no way impaired or affected by any extension of the time within which the Obligee may accept such bid; and said Surety does hereby waive notice of any extension.

IN WITNESS WHEREOF, said Principal and said Surety have caused these presents to be duly signed and sealed this 19 day of June 2003.

PRINCIPAL	**SURETY**
CLACKAMAS CONSTRUCTION, INC.	DEVELOPERS SURETY AND INDEMNITY COMPANY
Principal company (SEAL)	*Surety* (SEAL)
by: Connie Mueller Pres	by:
authorized signer for Principal	*attorney-in-fact**
CONNIE MUELLER	Roger C. Rothrock
please print	*please print*

*Provide additional documentation from Surety, appointing and/or authorizing signer to perform every act necessary on behalf of said Surety.

POWER OF ATTORNEY FOR
DEVELOPERS SURETY AND INDEMNITY COMPANY
INDEMNITY COMPANY OF CALIFORNIA

PO BOX 19725, IRVINE, CA 92623 • (949) 263-3300

KNOW ALL MEN BY THESE PRESENTS, that except as expressly limited, DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA, do each, hereby make, constitute and appoint:

Roger C. Rothrock, Judy Rothrock, jointly or severally

as their true and lawful Attorney(s)-in-Fact, to make, execute, deliver and acknowledge, for and on behalf of said corporations, as sureties, bonds, undertakings and contracts of suretyship giving and granting unto said Attorney(s)-in-Fact full power and authority to do and to perform every act necessary, requisite or proper to be done in connection therewith as each of said corporations could do, but reserving to each of said corporations full power of substitution and revocation, and all of the acts of said Attorney(s)-in-Fact, pursuant to these presents, are hereby ratified and confirmed.

This Power of Attorney is granted and is signed by facsimile under and by authority of the following resolutions adopted by the respective Board of Directors of DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA, effective as of November 1, 2000:

RESOLVED, that the Chairman of the Board, the President and any Vice President of the corporation be, and that each of them hereby is, authorized to execute Powers of Attorney, qualifying the attorney(s) named in the Powers of Attorney to execute, on behalf of the corporations, bonds, undertakings and contracts of suretyship; and that the Secretary or any Assistant Secretary of the corporations be, and each of them hereby is, authorized to attest the execution of any such Power of Attorney;

RESOLVED, FURTHER, that the signatures of such officers may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signatures shall be valid and binding upon the corporation when so affixed and in the future with respect to any bond, undertaking or contract of suretyship to which it is attached.

IN WITNESS WHEREOF, DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA have severally caused these presents to be signed by their respective Executive Vice President and attested by their respective Secretary this 8th day of January, 2002.

By: _____
David H. Rhodes, Executive Vice President

By: _____
Walter A. Crowell, Secretary

DEVELOPERS SURETY AND INDEMNITY COMPANY CORPORATE SEAL OCT. 10 1936 IOWA

INDEMNITY COMPANY OF CALIFORNIA INCORPORATED OCT. 5 1967 CALIFORNIA

STATE OF CALIFORNIA)
)SS.
COUNTY OF ORANGE)

On January 8, 2002, before me, Antonio Alvarado, personally appeared David H. Rhodes and Walter A. Crowell, personally known to me (or proved to me on the basis of satisfactory evidence) to be the persons whose names are subscribed to the within instrument and acknowledged to me that they executed the same in their authorized capacities, and that by their signatures on the instrument the entity upon behalf of which the persons acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

WMD1 ANTONIO ALVARADO COMM. # 1300303 Notary Public - California ORANGE COUNTY My Comm. Expires APRIL 10, 2005 WMD1

CERTIFICATE

The undersigned, as Chief Operating Officer of DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA, does hereby certify that the foregoing Power of Attorney remains in full force and has not been revoked, and furthermore, that the provisions of the resolutions of the respective Boards of Directors of said corporations set forth in the Power of Attorney, are in force as of the date of this Certificate.

This Certificate is executed in the City of Irvine, California, the 19th day of June, 2003.

By _____
David G. Lane, Chief Operating Officer

THE INSCODICO GROUP

DISCLOSURE RIDER

Terrorism Risk Insurance Act of 2002

The Terrorism Risk Insurance Act of 2002 created a three-year program under which the Federal Government will share in the payment of covered losses caused by certain events of international terrorism. The Act requires that we notify you of certain components of the Act, and the effect, if any, the Act will have on the premium charged for this bond.

Under this program, the Federal Government will cover 90% of the amount of covered losses caused by certified acts of terrorism, as defined by the Act. The coverage is available only when aggregate losses resulting from a certified act of terrorism exceed $5,000,000.00. Insurance carriers must also meet a variable deductible established by the Act. The Act also establishes a cap of $1,000,000,000.00 for which the Federal Government or an insurer can be responsible.

Participation in the program is mandatory for specified lines of property and casualty insurance, including surety insurance. The Act does not, however, create coverage in excess of the amount of the bond, nor does it provide coverage for any losses that are otherwise excluded by the terms of the bond, or by operation of law.

No additional premium has been charged for the terrorism coverage required by the Act.

Developers Surety and Indemnity Company
Indemnity Company of California
17780 Fitch
Irvine, CA 92614
(949) 263 3300
www.inscodico.com

BIDDER'S STATUS OF RESIDENCY

Chehalem Drive Sewage Pump
project name

Clackamas Construction Inc. 503.663.1144
name of contracting company *telephone*

P.O. Box 279, Boring, OR 97009 503.663.6251
business address *fax*

Oregon law, as set forth in ORS 279.029, requires that the Owner, in determining the lowest responsible Bidder for the Project listed above, must add a percent increase on the Bid of a nonresident Bidder equal to the percent, if any, of the preference given to that Bidder in the State in which that Bidder resides. Consequently, each Bidder must indicate whether it is a resident or nonresident Bidder.

A "resident Bidder" is a Bidder that has paid unemployment taxes or income taxes in the State of Oregon during the 12 calendar months immediately preceding submission of this Bid, has a business address in Oregon, and has stated in its Bid that it is a "resident Bidder

A "nonresident Bidder" is a Bidder who is not a resident Bidder.

The undersigned states that it is: (check one)

☒ A resident Bidder
☐ A nonresident Bidder

List the State in which Bidder resides: Oregon.

Bobbie Grippi
signature of person completing form

Bobbie Grippi
print name

Asst. Proj. Mgr.
title

June 18, 2003
date

BIDDER'S ELIGIBILITY
FOR A PUBLIC WORKS CONTRACT

Chehalem Drive Sewage Pump Station
project name

Bobbie Grippi
signature of authorized signer

Bobbie Grippi
print name

Asst Proj. Mgr.
title

with legal authority from

Clackamas Const. Inc.
name of contracting company

503 663.1144
telephone

P.O. Box 279, Boring OR 97009
business address

503. 663.6251
fax

hereinafter referred to as Contractor, certifies that the Contractor is eligible to receive a public works contract, as set forth in ORS 279.361 and verifies that every subcontractor for the above referenced Project complies with the same Statutes. The Contractor agrees, if awarded a contract, that every subcontractor will be required to provide certification to be filed with the City prior to such subcontractor commencing any subcontract work under the contract. (A blank form for the certification, entitled "Subcontractor's Eligibility For A Public Works Subcontract" is included.)

Bobbie Grippi
signature of person completing form

Bobbie Grippi
print name

Asst Proj Mgr.
title

June 18, 2003
date

PREVAILING WAGE RATES

The provisions of ORS 279.334, 187.010 to 187.020 and 279.356 are applicable to work under this CONTRACT. In accordance with ORS 279.352, the prevailing minimum hourly rates of wage as determined by the Bureau of Labor shall be paid to workers in each trade or occupation employed in the performance of the work under this CONTRACT.

The CONTRACTOR is required to pay a fee to the Bureau of Labor and Industries pursuant to the Provisions of ORS 279.352(2). The fee is one-tenth of one percent of the price of this Contract, but not less than $100 nor more than $5,000, regardless of the Contract price.

A copy of the PREVAILING WAGE RATES is included herein.

Contractors and subcontractors on public works projects with a total price of less than $25,000 are not required to pay employees the prevailing wage rate.

END OF SECTION

PREVAILING WAGE RATES

for

Public Works Contracts in Oregon

BOLI

OREGON BUREAU OF LABOR AND INDUSTRIES

Jack Roberts
Commissioner
Bureau of Labor and Industries

Effective: January 1, 2003

JACK ROBERTS
COMMISSIONER

SUITE 1045
800 NE OREGON, # 32
PORTLAND, OREGON 97232

BUREAU OF LABOR AND INDUSTRIES

December 30, 2002

Under Oregon law, the Commissioner of the Bureau of Labor and Industries publishes the state's prevailing wage rates twice annually, in January and July, with quarterly updates in April and October. The rates are determined using a statewide construction industry wage survey of occupations and crafts performing commercial, heavy and highway construction in 14 specific geographic regions of the state. The 2002 survey collected over 920,000 hours of construction employment wage information reported by contractors for a peak week of employment between June 23 and August 17, 2002.

Prevailing wage rates are the minimum wages that must be paid to all workers employed in the construction, reconstruction, major renovation or painting of all public works, unless specifically exempted by state law. Copies of these rates must be incorporated into all bid specifications when the advertisement for such public works contracts is issued. A provision that prevailing wage rates must be paid must also appear in the contract. The rates in effect at the time the bid specifications are first advertised are those that apply for the duration of the project, with one exception: If, during the bidding process, the prevailing wage rates change, the public contracting agency has the option of amending the bid specifications to reflect such changes.

If you identify any errors in the rates published, please bring them to the attention of the Prevailing Wage Rate Coordinator in Portland at (503) 731-4709. If you have any questions about the manner in which the prevailing wage rates are enforced, contact the Wage and Hour Division in Portland at (503) 731-4074, or any of the bureau's field offices.

Jack Roberts

JACK ROBERTS
Commissioner
Bureau of Labor & Industries

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All forms necessary to comply with ORS 279.348 through ORS 279.375 may be found in the back of this booklet. Contractors are encouraged to use and keep on file the forms provided as master copies for use on future prevailing wage rate projects.

All of the information in this booklet can be accessed and printed from the Internet at: www.boli.state.or.us.

Pursuant to ORS 279.348 to ORS 279.380, the prevailing wage rates contained in this booklet have been adopted for use on public works contracts in Oregon. Additional copies of this booklet are available for $2.00 each.

For specific information or questions regarding the prevailing wage law, you may obtain a "Prevailing Wage Rate Laws" handbook by contacting the nearest Oregon Bureau of Labor and Industries office listed below. An order form is at the back of the booklet.

BOLI Office Locations		
Eugene	1400 Executive Parkway, Suite 200 Eugene, OR 97401	(541) 686-7623
Medford	700 E. Main, Suite 105 Medford, OR 97504	(541) 776-6270
Portland	800 NE Oregon St., #32 Portland, OR 97232	(503) 731-4074
Salem	3865 Wolverine St. NE, Bldg. E-1 Salem, OR 97305	(503) 378-3292

HOW TO LOOK UP A RATE

1. **When was the project first advertised for bid?**
   The rates in effect at the time the bid specifications are first advertised are those that apply for the duration of the project.

2. **What type of work is being performed by the employee?**
   Find the definition that most closely matches the actual work being performed by the worker. If you have any questions about work classifications, contact BOLI at the number below.

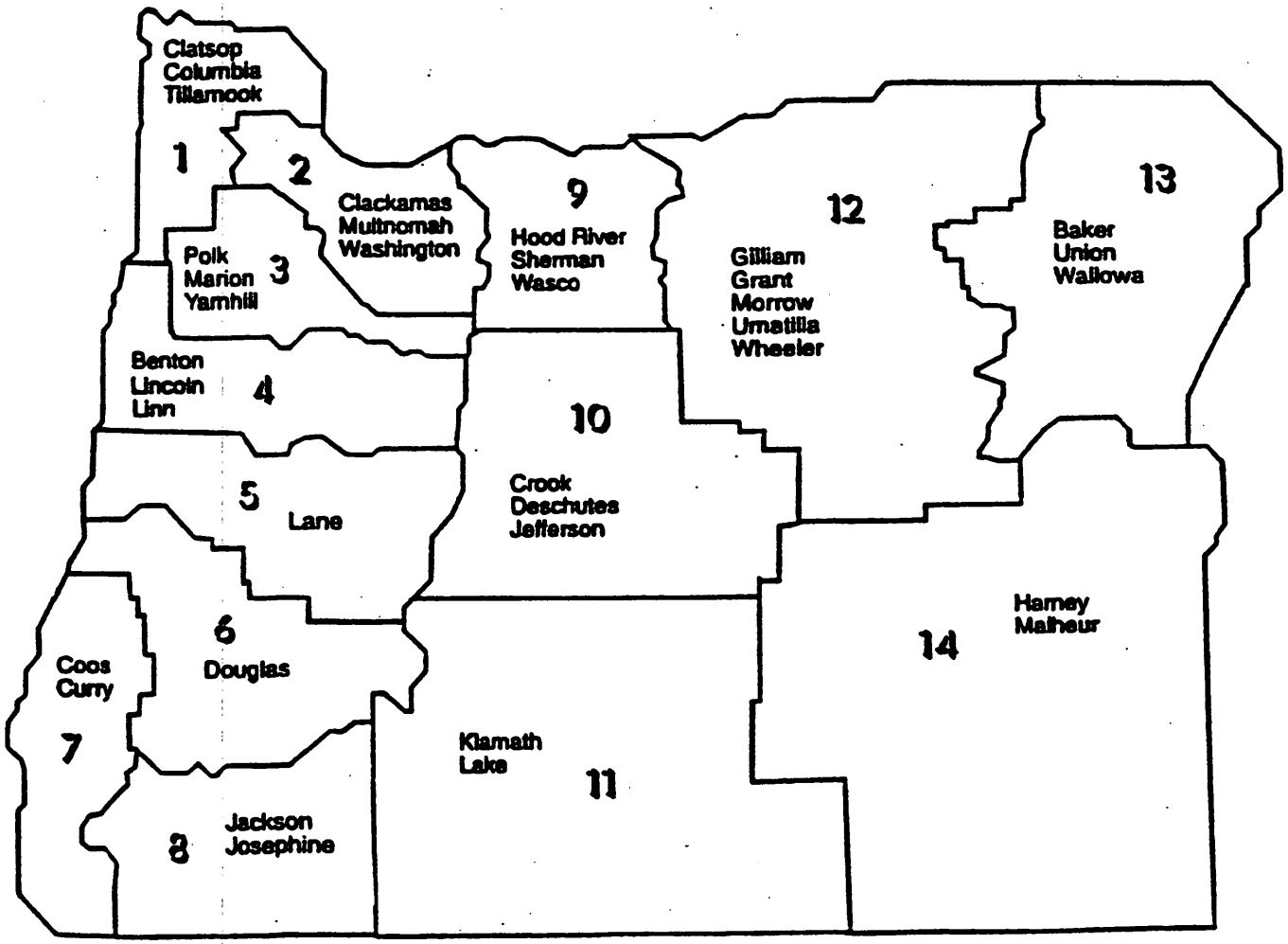
3. **Where is the work being performed – what region?**
   Find the occupation in the correct region pages associated with the county where the project construction is taking place.

4. **Is there a rate listed next to the classification?**
   If so, use it.

5. **If the book directs you to "See Appendix," go to the back of the book and use the rate listed in the Appendix pages.** It may include a group number and/or zone pay.

6. **If you still don't know, CALL BOLI at (503) 731-4709.**

PREVAILING WAGE RATE REGIONS



DEFINITIONS OF COVERED OCCUPATIONS

1. **Asbestos Workers/Insulators**

Install insulation on mechanical systems for thermal and acoustical purposes. Also install fire stop penetrations on electrical and mechanical systems.

Mechanical systems include pipes, boilers, ducts, flues, breaching, grease ducts and acid ducts. This also includes all labor connected with the handling and distribution of materials for these systems.

*NOTE: See also #16 - **Hazardous Materials Handlers**.*

2. **Boilermakers**

Construct, assemble, maintain and renovate stationary steam boilers and boiler house auxiliaries. Align structures or plate sections to assemble boiler frame tanks or vats, following blueprints. Work involves use of hand and power tools, plumb bobs, levels, wedges, dogs or turnbuckles. Assist in testing assembled vessels. Direct cleaning of boilers and boiler furnaces. Inspect and reconstruct boiler fittings, such as safety valves, regulators, automatic-control mechanisms, water columns, and auxiliary machines.

3. **Bricklayers/Stonemasons**

Bricklayers

Lay building materials, such as brick, structural tile, concrete, cinder, glass, gypsum and terra cotta block (except stone), to construct or renovate walls, partitions, arches, sewers, and other structures. Include Refractory Brickmasons when working on site of construction.

Stonemasons

Build stone structures, such as piers, walls, and abutments. Lay walks, curbstones, or special types of masonry for vats, tanks and floors.

4. **Carpenters**

Construct, erect, install and renovate structures, fixtures and equipment of wood, plywood and wallboard using carpentry tools and woodworking machines.

Carpenters, 1

Includes Auto Nailing Machine Operators, Form Strippers, Floor Layers, Stationary Power Saw Operators. Includes installation of furniture systems by attaching furniture to floor or walls. Includes Framers. Also includes scaffold erection if 14 feet or over, unless erecting for Masons or Plasterers.

*NOTE: See also #36 - **Tenders to Masons** and #37 - **Tenders to Plasterers.***

Carpenters, 2

Includes Cabinet and Shelving Installers, Floor Finishers, Wall & Ceiling Insulators, and Irritating Insulation. Includes Finishers.

Drywall/Acoustical Carpenters

Includes Ceiling Tile Installers and Acoustical Carpenters (excludes carpet, wood or hard tile installers). Drywall Installers apply plasterboard or other wallboard to ceilings and interior walls.

Carpenters (Continued)

Marine Carpenters

Includes Bridge, Dock and Wharf Builders, Piledrivermen, Boom Men, and Marine Piledrivers.

5. **Cement Masons**

Apply cement, sand, pigment or marble chips to floors, stairways and cabinet fixtures to finish and attain durable and decorative surfaces, according to specifications and drawings. Finish surfaces to remove imperfections from freshly poured concrete walls, roads, walkways and ornamental stone facings of concrete structural products. Include Concrete Rubbers.

Cement Mason includes finishing, hand chipping, patching, grouting, end pointing, screed setting, plugging, filling bolt holes, dry packing, setting curb forms, planks, stakes, lines and grades. Also includes grinding of concrete done as preparatory to patching or when done to produce a finished concrete product.

Composition Worker includes installation of epoxy and other resinous toppings and power machine operation.

Includes Cement Masons working on suspended, swinging and/or hanging scaffold.

*NOTE: Tenders to Cement Masons are found under #19 -**Concrete/Cement Laborers.***

6. **Divers & Divers' Tenders**

Divers

Work underwater supplied with air, usually by a pipeline from the surface. Lay foundations for bridge piers, reconstruct underwater walls, and use underwater cutting and welding tools and the cement gun. May also do underwater carpentry, steel plating and shipwright's work.

Divers' Tenders

Work on the surface to monitor gauges for divers.

7. **Dredgers**

Operate power-driven dredge to mine sand, gravel or other materials from bays, lakes, ponds, rivers or streams, and to excavate and maintain navigable channels in waterways (excludes Floating Construction Equipment – see #30 - **Power Equipment Operators**). This classification includes Assistant Engineers (including Machinists, Mechanics, Oilers, Watch Engineers, and Welders), Assistant Mates ("Deckhands"), Boatmen, Fill Equipment Operators, and Levermen.

8. **Drywall Applicators** (Drywall/Wetwall) See #4 - **Carpenters, Drywall/Acoustical Carpenters.**

9. **Drywall Tapers**

Seal joints between plasterboard and other wallboards to prepare wall surface for painting or papering.

10. Electricians

Install, in new construction or reconstruction, electrical wiring, equipment and fixtures. Insure that work is in accordance with relevant codes. Includes all inside wiring or cable splicing. May read blueprints.

Electrical Material Handlers

Handle and maintain order of all electrical material, tools and equipment on job site, delivering materials to licensed electricians. Must not install electrical material or utilize equipment (i.e. switch gear, motor control centers, transformers, motors, light fixtures, etc.).

NOTE: This classification applies exclusively to electrical materials. The Electrical Material Handler may perform clean-up work in connection with the work of an electrical contractor.

11. Elevator Construction

Installers and Mechanics

Assemble, install and renovate electric and hydraulic freight and passenger elevators, escalators and dumbwaiters.

Assistants to Mechanics

Work at direction of Elevator Mechanics.

12. Fence Erectors (Metal)

Erect and renovate ***metal*** fences, fence gates and ornamental metal fencing around highways, industrial and commercial establishments, using hand and power tools.

*NOTE: See also #19 – **Laborers, Group 1** for **Wood Fence Builders.***

13. Flaggers

Control vehicular traffic by means of brightly colored flags and/or signs.

14. Floor Covering Layers (Soft tile, linoleum and carpet) See #34 - **Soft Floor Layers.**

15. Glaziers

Install glass in windows, skylights, storefronts or on surfaces such as building fronts, interior walls, or ceilings at construction sites.

16. Hazardous Materials Handlers/Mechanics

The removal of all regulated materials from mechanical systems is exclusively the work of Hazardous Materials Handlers, unless the mechanical systems are going to be scrapped. Laborers do all removal of regulated materials on mechanical systems to be scrapped and any non-mechanical (walls, ceiling, floors, beams, etc.) insulation. Laborers also do loading of any regulated material after it has been removed, bagged, and tagged, as well as cleanup at the removal site and all work done at the disposal site. Persons performing the removal of contained regulated materials are classified as Laborers (#19).

NOTE: Regulated materials are those materials that are regulated for the purpose of protecting the environment or for personal protection by EPA, OSHA, DEQ, or Federal OSHA.

17. Highway and Parking Stripers

Paint highway and parking structural surfaces of streets, highways, parking lots, airports, curbs, etc., using manually or mechanically propelled machines, brushes, rollers, and/or spray guns. Include Installers of any device or application of any material used in lieu of paint for traffic delineation, such as buttons, tapes, plastics, rumble bars, etc.

18. Ironworkers

Bridge, Structural, Ornamental & Reinforcing Metal Workers

Raise, place, install and erect all structural steel beams, columns, steel joists and trusses, including prefabricated or pre-cast beams to form completed structures and structural frameworks. The erection and structural steel work of pre-engineered metal buildings, including bolting of members, girts, perlins, and attaching sheet metal siding, roofing, insulation, down spouts, gutters, and flashing to same. Reinforcing metal work such as performing layout work for rods within project area. Fastening rods in place with wire or pliers, bending or adjusting as required, using cutting, welding or rod bending machine. Performing layout work and placing steel in concrete forms, including prefabricated assembly for placement complete in forms. Fabrication, and installation of ornamental metal such as balconies, stairs, walkways, catwalks, and handrails. May spin suspension bridge cables or perform other related ironwork duties.

19. Laborers, Material Movers (Hand), Flaggers

Include all General Laborers, Material Movers, and Flaggers, not classified separately.

NOTE: Use Laborer classifications for moving materials and incidental assistance. Use Tender classifications when the primary duty is to assist a particular occupational class. (See #36 and #37 for Tender classifications.) Also includes scaffold erection when scaffold is under 14 feet and is not for the Mason or Plasterers trade.

Applicators
Asbestos Removal (Scrapped and Contained)
Asphalt Rakers
Asphalt Spreaders
Batch Weighmen
Bit Grinders
Broomers
Brush Burners/Cutters
Brush Cutters
Burners
Car and Truck Loaders
Carpenter Tenders
Cement/Concrete Laborers (hand)
Change-House Men
Chipper Operators
Choke Setters
Choker Splicers
Clary Power Spreaders
Clean-Up Laborers
Clean Up Laborers (Building)
Clean Up Nozzlemen-Green Cutters
Concrete Curing Laborers
Concrete Power Buggymen
Concrete Saw Operators
Crusher Feeders
Demolition, Wrecking (Charred Materials)
Demolition, Wrecking, Moving (Building)
Demolition, Wrecking, Moving (Industrial)
Doping & Wrapping Pipe
Drill Doctors
Drill Operators
Driller Assistants
Drillers
Dry-Shack Men
Dumpers, Road Oiling Crew
Dumpmen for Grading Crew
Elevator Feeders
Erosion Control Specialists
Fine Graders
Fire Watchers
Flaggers (*NOTE: See #13 – **Flaggers**.*)
Form Strippers
General Laborers
Grade Checkers
Guardrail, Median Rail
Gunite / Sandblasting Pot Tenders
Gunite Nozzleman Tenders
Gunite Nozzlemen
Handlers or Mixers of materials of an irritating nature, including cement and lime
High Scalers
Landscape Laborers – see #20
Laser Beam Operators

Laborers (Continued)

Laser Beam Operators (tunnel), applicable when employee is assigned to move, set up, align laser beam
Levermen or Aggregate Spreaders
Loading Spotters
Loop Installers
Manhole Builders
Material Yard Men
Motormen - Dinky Locomotive
Nippers and Timbermen
Nuclear Plant Workers (lead shield)
Pipe Layers (all types)
Post Hole Diggers (air, gas or electric)
Powderman Helpers
Powdermen
Power Saw Operators
Power Tool Operators
Pumpcrete Nozzlemen
Railroad Track Laborers
Ribbon Setters
Rip Rap Men (hand placed)
Road Pump Tenders and Movers
Sandblasting Operators (wet)
Sandblasting Operators (dry)
Scaffold Tenders
Sewer Laborers
Sewer Timbermen
Shield Operators
Signalmen
Skipmen
Slopers
Spraymen
Stake Chasers
Stake Setters
Stockpilers
Strippers
Tampers
Tie Back Shoring Laborers
Timber Fallers / Buckers (hand labor)
Toolroom Men (job site)
Track Liners
Tugger Operators
Tunnel – Chuck Tenders
Tunnel Bull Gang Laborers (above ground)
Tunnel Miners
Tunnel Muckers /Brakemen/ Concrete Crew/Bull Gang (underground)
Tunnel Powdermen
Vibrating Screed
Vibrators (all)
Water Blasters
Weight-Man-Crushers
Welders
Wood Fence Builders

20. Landscape Construction

Beautification of a plot of land by changing its natural features through the addition or modification of lawns, trees and bushes.

Landscape Laborers/Technicians

Perform seeding, planting, mulching, land clearing and topsoil spreading by the use of hand tools. With hand tools and power equipment less than 90 horsepower: clear land, trench to maximum depth of three feet below finish grade, hydroseed, apply chemicals and fertilizers. Till, spread and grade topsoil. Establish lawns and plant trees, shrubs and plants. Install, service, or replace above ground and under ground lawn or landscape irrigation systems. Install French drains or other subsurface water collection systems to a maximum depth of three feet below finish grade. Install, service, or repair low voltage outdoor landscape lighting and irrigation valves. Assemble or place pre-manufactured and custom fabrication trelliswork, play equipment, benches and picnic tables.

21. Lathers (Drywall/Wetwall)

Fasten wooden, metal or rockboard lath to walls, ceilings and partitions of buildings to provide supporting base for plaster, fireproofing or acoustical material.

22. Limited Energy Electricians

May only be used for electrical work not exceeding 100 va in class II and III installations (as defined in Article 725 of the National Electrical Code). This classification includes computer cabling, telephone and cable television line installation, and security alarm installation.

23. Line Constructors

Install and reconstruct cable or wires used in electrical power or distribution systems. Install insulators, erect wood poles and light or heavy-duty transmission towers. This classification includes cable splicers and troubleshooters. Excludes repairers of transformers and substation equipment and telephone and telegraph communications workers.

Cable Splicers, Leadmen, Pole Sprayers

Splice and/or terminate power cables which are designed to be used for voltages above 2,000. Splice and/or terminate gas or liquid filled power cables when part of a distribution system outside of buildings.

This classification also includes:

Certified Lineman Welders
Groundmen
Head Groundmen
Heavy Line Equipment Men
Jackhammer Men
Line Equipment Men
Linemen
Pole Sprayers
Powdermen
Tree Trimmers

24. Marble Setters

Cut, tool and set marble slabs in floors and walls of buildings and renovate and polish slabs previously set in buildings. Trim, face and cut marble to specified size using power sawing, cutting and facing equipment and hand tools. Drill holes in slabs and attach brackets. Spread mortar on bottom of slab and on sides of adjacent slabs. Set blocks in position, tamp them into place, and anchor bracket attachments with wire. Fill joints with grout. Remove excess grout from marble with sponge. Clean and bevel cracks or chips on slabs using hand tools and power tools. Heat cracked or chipped area with blowtorch and fill defect with composition mastic that matches grain of marble. Polish marble and other ornamental stone to high luster, using power tools or by hand.

25. Marine Carpenters (See #4 - **Carpenters, Marine Carpenters**)

26. Millwrights/Machine Erectors

Work as mechanics specializing in setting and aligning or removing mechanical, hydraulic, pneumatic, electrical machinery (new and used) in commercial and industrial sites.

27. Painters

Paint walls, equipment, buildings, bridges, and other structural surfaces, using brushes, rollers and spray guns. May mix colors or oils to obtain desired color or consistency. Also apply wall coverings.

Include Painters: Brush, Roller, Machine (Spray and Sandblasting)

28. Plasterers and Stucco Masons

Apply coats of plaster onto interior or exterior walls, ceilings, or partitions or buildings to produce finished surface according to blueprints, architect's drawings or oral instructions.

Nozzlemen
Swinging Scaffold
All Other Work

29. Plumbers and Steamfitters/Pipefitters

Assemble, install, alter, and replace pipe systems (metal, plastic, ceramic, composition, etc.) that carry water, steam, air or other liquids or gases. Fabricate on site and install piping and tubing systems, which are to conduct water, steam, air, and other fluids or gases in and around buildings. Also install vacuum piping systems. Install drainage and sewage lines (laterals) from buildings to the point of attachment to mains. Install plumbing fixtures such as sinks, faucets, drinking fountains, commodes, etc. Install refrigeration equipment. Perform cutting, welding and burning which is incidental to the work of plumbing or pipefitting, except as is described under lead burner. May do other work in connection with the installation and testing of heating and cooling apparatus and control devices.

*NOTE: See also #35 – **Sprinkler Fitters**.*

30. Power Equipment Operators (equipment used on construction site)

Asphalt Paving Equipment: Asphalt Paver Operators, Asphalt Plant Operators, Roller Operators, Screed Operators (any asphalt mix)

Operate equipment used for applying asphalt or other material compositions to roadbeds, airport runways, taxiways and street paving. Includes asphalt paving machine operators, asphalt plant operators, screed operators and roller operators (any asphalt mix, breakdown or finish). Excludes any residential work.

Asphalt/Concrete Profilers: Roto-Mill, Pavement Profiler Operators, Concrete Planer, Grinder or Grooving Machine Operators

Operate equipment used for the removal of excess surface material (concrete, asphalt) during paving, texturing or other work on road surfaces (either concrete or asphalt). Classification includes removal and recycling of asphalt road surface material.

Auxiliary Equipment: Operators of Compressors, Generators, Pumps

Control, maintain or operate various auxiliary equipment, such as compressors, condensers, electricity generators, feedwater heaters, filters and pumps that transfer or supply water, fuel, lubricants, gasses, air, liquids, slurries and auxiliary power for turbines, generators, boilers, power equipment at the construction site. Operate other auxiliary equipment not otherwise classified (tool grinders, conveyor tender).

Blade: Blade/Grader Operators

Operate Blade/Grader machine or vehicle equipped with blades to remove, distribute, grade and level earth, aggregate or other material to a specific grade, slope or elevation.

Bulldozer, Rubber-Tired Scraper, Material Haulers: Bulldozer Operators, Rubber-Tired Scraper Operators and Material Haulers (including "Cat Wagons", DJB's, Volvos and other similar models)

Operate machines or off road vehicles that push, remove, pick up, distribute or haul rock, earth, debris and other material on construction sites.

Compactors/Rollers (not asphalt): Operators

Operate Compactors, Rollers or similar equipment used for compacting crushed rock, dirt or other fill material on construction site (includes airport runways, taxiways and roadbeds).

Power Equipment Operators (Continued)

Concrete: Batch Plant and or Wet Mix Operators, Concrete Finishing Machine, Brooming, Tining or Wire Mat Machine Operators, Concrete Spreader/Placer Operators, Pump Operators (concrete or grout), Concrete Slip Form Paving Machine Operators (for installing curbs/gutters, guardrails and/or street paving), Concrete Curing Equipment Operators, Concrete Saw Operators.

Operate equipment used for applying, curing, finishing, mixing, pumping, sawing or spreading of concrete; installing concrete curbs/gutters, sidewalks or guardrails, and concrete street or highway paving.

Crane Operators (Hydraulic, Tower, Whirley, Lattice Boom, Dragline & Clamshell); Signalmen

Operate boom and cable equipment to lift and move materials, machines, or other items in a variety of directions on a construction site. Includes operations, remote or otherwise, such as hoisting, piledriver, clamshell, dragline, skip box or bucket to place material.

Crushing: Crusher Plant Operators or Oilers

Operate machinery used to crush rock or recycled materials into aggregates for use in asphalt, concrete, base and fill materials for use in highways, streets, airports and construction sites.

Drilling: Earth Boring Machine Operators (horizontal & vertical), Directional Drilling (includes well drilling)

Operate equipment used to drill or bore for any construction purpose, including preparation for the installation of foundations, pipe, utilities and soil stabilization.

Floating Construction Equipment

Operators of Floating Crane (or "Derrick Barge"), Clamshell or Pile Driver used in conjunction with a construction project, Underwater Equipment Operators (excludes Dredging Operations, which is a separate classification; See #7).

Operate any floating equipment. Classification includes any assistants to operators (such as Boatmen, Deckhands, Diesel-Electric Engineers, Firefighters, etc.); underwater equipment operators, remote or otherwise.

Fork Lifts: Industrial Lift Truck Operators and Material Handlers

Operate industrial lift trucks or loaders equipped with forks used to unload, load, place, stack and distribute materials on a construction site.

Front End Loaders, Hydraulic Hoes, Excavators

Operate machinery equipped with scoops, shovels or buckets to excavate, load or move dirt, aggregate and other materials.

Guardrail Equipment: Guardrail Punch Operators (all types), Guardrail Punch Oilers, Operators of Combination Guardrail Machines (Punch, Auger, etc.)

Operate any power equipment used to install guardrails.

Power Equipment Operators (Continued)

Repairmen, Heavy Duty (Mechanics, Welders) and Oilers

Repair heavy equipment at the construction site (such as cranes, bulldozers, loaders, excavators, etc.). This classification includes any mobile heavy equipment mechanics employed by the contractor. This also includes maintenance workers who change parts, lubricate machinery, and perform other routine maintenance functions at the construction site.

Sweepers

Include Broom Operators, self-propelled, Sweeper Operators (Wayne type) self-propelled.

31. **Riggers**

NOTE: Classify riggers in the craft performing the work for which rigging is incidental. For example, a carpenter doing rigging is classified as a carpenter; an ironworker doing rigging is classified as an ironworker.

32. **Roofers: General roofing materials and irritable bituminous materials**

(For sheet metal roof, see #33 - **Sheet Metal Workers**).

Cover roofs of commercial structures with slate, asphalt, wood and related materials using brushes, knives, punches, hammers and other tools. May spray roofs, sidings and walls with material to bind, seal, insulate or soundproof sections of structures.

33. **Sheet Metal Workers and Sheet Metal Duct Installers**

On a construction site, fabricate, assemble, install and replace sheet metal products and equipment, such as control boxes, drainpipes and furnace casings. Work may involve any of the following: set up and operate fabricating machines to cut, bend and straighten sheet metal; shape metal over anvils, blocks or forms using hammer; operate soldering and welding equipment to join sheet metal parts; inspect; assemble and smooth seams and joints of burred surfaces. Install prefabricated sheet metal ducts used for heating, air conditioning or other purposes in commercial buildings and similar structures. **(Includes metal roofs)**

34. **Soft Floor Layers**

Floor Covering Layers (soft tile, linoleum and carpet)

Apply blocks, strips or sheets of shock-absorbing, sound-deadening or decorative coverings to floors and cabinets. Includes laying soft tile and linoleum. Lay carpets or rugs in buildings.

35. **Sprinkler Fitters**

Install all piping and auxiliary devices which are necessary for the complete installation of sprinkling systems for fire protection in buildings. Excludes systems operated with steam.

*NOTE: See also #29 – **Plumbers and Steamfitters/Pipefitters.***

DEFINITIONS OF COVERED OCCUPATIONS

36. Tenders to Mason Trades: Brick and Stonemasons, Mortar Mixers, Hod Carriers

Directly assist Brickmasons and Stonemasons by performing duties of lesser skill. Duties include mixing, supplying and holding materials or tools, and cleaning work area and equipment. Performed on block walls and may include scaffolding work. Erect scaffolding for Masons, any height.

*NOTE: Exclude cement and concrete flat work and cement pumping which is performed by concrete/cement laborers. (See #19 for **Laborer** classifications.)*

37. Tenders to Plasterers: Assistants to Plasterers and Stucco Masons

Assist plasterers or stucco masons by performing duties of lesser skill. Duties include supplying or holding materials or tools and cleaning work area and equipment. Erect scaffolding for Plasterers, any height.

*NOTE: Exclude construction or maintenance laborers who do not primarily assist plasterers or stucco masons (See #19 for **Laborer** classifications).*

38. Tile Setter/Terrazzo Worker: Hard Tile Setters

Apply tile to walls, floors, ceilings and promenade roof decks following design specifications. Apply glazed, unglazed, mosaic and other ceramic tiles which are used as a surface on floors, walls, ceilings, and other surfaces and which must be set to a specified grade. Apply and float all setting beds into which these tiles are set. Level and plumb these tiles to the specified grade.

*NOTE: Tenders for tile setters and terrazzo workers are classified under #39 - **Tile, Terrazzo and Marble Finishers***

39. Tile, Terrazzo and Marble Finishers

Supply and mix construction materials for Marble Setter, Terrazzo Worker and Tile Setter. Apply grout and finish surface of installed marble, terrazzo and tile. Mix mortar and grout, move mortar and grout manually or using wheelbarrow. Clean installed marble, terrazzo and tile surfaces, work and storage areas. May renovate and fill chipped, cracked or broken pieces. May assist Marble Setter, Terrazzo Worker, and Tile Setter. Grind and polish surfaces.

40. Truck Drivers, Heavy or Tractor-Trailer

Drive a tractor-trailer combination or a truck with a capacity of at least 3 tons, to transport goods or materials.

Group 1

A-frame or Hydra-Lift Truck w/load bearing surface
Battery Rebuilders
Bus or Man-Haul Drivers
Concrete Buggy Drivers (power operated)
Drivers
Dump Trucks, side, end and bottom dumps up to and including 10 cu. yds., including semi-trucks and trains or combinations thereof
Fork Lifts used in loading, unloading and transporting material on job site
Fuel Truck Drivers
Lift Jitney Drivers
Loader and/or Leverman on concrete dry batch plant, manually operated
Lubrication Men
Pilot Car Drivers
Slurry Truck Drivers or Levermen
Solo Flat Bed Drivers (and misc. body trucks)
Steam Cleaner or combination
Tiremen
Transit Mix & Wet or Dry Mix Truck Drivers, 5 cu. yds. and under

Truck Drivers Group 1 (Continued)

Truck and Truck Mechanic Assistants
Wash Rack Operators
Water Wagons, up to 3,000 gallons

Group 2

Dumpsters or similar equipment
Flaherty Spreader Drivers or Levermen
Low Bed Equipment, Flat Bed Semi-Truck & Trailer or doubles drivers transporting equipment or wet or dry materials
Lumber Carriers, Driver-Straddle Carriers used in loading, unloading and transportation of material on job site
Oil Distributor Drivers or Levermen
Transit Mix and Wet or Dry Mix Truck Drivers, over 5 cu. yds. and including 7 cu. yds.
Water Wagons, 3,000 to 5,000 gallons

Group 3

Body Repairmen
Dump Trucks, side, end and bottom dumps over 10 cu. yds. and including 30 cu. yds., including semi-trucks and trains or combinations thereof
Transit Mix and Wet or Dry Mix Trucks over 7 cu. yds. and including 11 cu. yds.
Truck Mechanics – Welders – Body Repairmen
Water Wagons, 5,000 to 10,000 gallon

Group 4

Dump Trucks, side, end and bottom dumps over 30 cu. yds. and including 50 cu. yds., including semi-trucks and trains or combinations thereof
Transit Mix and Wet or Dry Mix Trucks, over 11 cu. yds. and including 15 cu. yds.
Water Wagons, 10,000 to 15,000 gallons

Group 5

Dump Trucks, side, end and bottom dumps over 50 cu. yds. and including 60 cu. yds., including semi-trucks and trains or combinations thereof

Group 6

Dump Trucks, side, end and bottom dumps over 60 cu. yds. and including 80 cu. yds., including semi-trucks and trains or combinations thereof

Group 7

Dump Trucks, side, end and bottom dumps over 80 cu. yds. and including 100 cu. yds., including semi-trucks and trains or combinations thereof

41. Welders

NOTE: Classify welders in the craft performing the work for which welding is incidental. For example, a carpenter doing hand welding is classified as a carpenter; an ironworker doing welding is classified as an ironworker.

PREVAILING WAGE RATES

OCCUPATIONS
BY
REGIONS

JANUARY 1, 2003

AMENDMENT TO OREGON DETERMINATION 2003-01

REGION #3

Marion, Polk and Yamhill Counties

OCCUPATION	PREVAILING WAGE RATE	FRINGE RATE
Asbestos Workers/Insulators	See Appendix	See Appendix
Boilermakers	See Appendix	See Appendix
Bricklayers/Stonemasons	See Appendix	See Appendix
Carpenters 1 & 2	$21.01	$7.46
Cement Masons	$21.13	$8.90
Divers/Divers' Tenders	See Appendix	See Appendix
Dredgers	See Appendix	See Appendix
Drywall Applicators/Acoustical Carpenters (Drywall/Wetwall)	See Appendix	See Appendix
Drywall Tapers (Painters and Drywall Tapers)	See Appendix	See Appendix
Electricians	See Appendix	See Appendix
Elevator Constructors, Installers and Mechanics	See Appendix	See Appendix
Fence Constructors (not metal)	$18.57	$6.24
Fence Erectors (metal)	$16.89	$3.19
Flaggers (Laborers)	See Appendix	See Appendix
Floor Covering Layers (soft tile, linoleum and carpet)	$20.89	$4.11
Glaziers	See Appendix	See Appendix
Hazardous Materials Handlers/Mechanics	See Appendix	See Appendix
Highway and Parking Stripers	See Appendix	See Appendix
Ironworkers	See Appendix	See Appendix
Laborers and Material Movers (Hand)	$18.57	$6.24
Landscape Laborers/Technicians	$14.02	$2.63
Lathers (Drywall/Wetwall)	See Appendix	See Appendix
Limited Energy Electricians	See Appendix	See Appendix
Line Constructors	See Appendix	See Appendix
Marble Setters	See Appendix	See Appendix
Marine Carpenters	See Appendix	See Appendix
Millwrights; Machine Erectors	$21.53	$7.49
Painters	See Appendix	See Appendix
Plasterers and Stucco Masons (Plasterers)	See Appendix	See Appendix
Plumbers and Steamfitters/Pipefitters (Plumbers)	See Appendix	See Appendix
Power Equipment Operators I:	$20.47	$5.37
Auxiliary Equipment: Compressors, Generators, Pumps		
Compactors/Roller Operators: (not asphalt)		
Crushing: Crusher Plant Operators or Oilers		
Drilling: Earth Boring Machine Operators (horizontal & vertical), Directional Drilling		
Fork Lifts: Industrial Lift Truck Operators and Material Handlers		
Repairmen, Heavy Duty (Mechanics, Welders) & Oilers		
Sweepers		

AMENDMENT TO OREGON DETERMINATION 2003-01

REGION #3

Marion, Polk and Yamhill Counties

OCCUPATION	PREVAILING WAGE RATE	FRINGE RATE
Power Equipment Operators II:	$21.68	$5.88
Asphalt Paving Equipment: Asphalt Paver Operators, Asphalt Plant Operators, Roller Operators, Screed Operators (any asphalt mix)		
Asphalt/Concrete Profilers: Roto-Mill, Pavement Profiler Operators, Concrete Planers, Grinder or Grooving Machine Operators		
Blade: Blade/Grader Operators		
Bulldozers, Rubber-Tired Scrapers, Material Haulers: Bulldozer Operators, Rubber-Tired Scraper Operators, and Material Haulers (including "Cat wagons", DJB's, Volvos and other similar models)		
Concrete: Batch Plant and or Wet Mix Operators, Concrete Finishing Machine, Brooming, Tining or Wire Mat Machine Operators, Concrete Spreader/Placer Operators, Pump Operators (concrete or grout), Concrete Slip Form Paving Machine (for installing curbs/gutters, guardrails, and/or street paving), Concrete Curing Equipment, Concrete Saw		
Front End Loaders, Hydraulic Hoes, Excavators		
Power Equipment Operators III:	See Appendix	See Appendix
Crane Operation: Hydraulic, Tower, Whirley, Lattice Boom, Dragline & Clamshell, Signal Men		
Floating Construction Equipment: Floating Crane (or "Derrick Barge"), Clamshell or Pile Driver used in conjunction with a construction project, Underwater Equipment Operators (excluding Dredging Operations, which is a separate classification - see "Dredgers").		
Guardrail Equipment: Guardrail Punch Operator (all types), Guardrail Punch Oiler, Combination Guardrail Machines, Punches, Augers, etc.		
Riggers	Receive rate for craft performing operation to which rigging is incidental.	Receive rate for craft performing operation to which rigging is incidental.
Roofers	See Appendix	See Appendix
Sheet Metal Duct Installers; Sheet Metal Workers	$20.34	$8.53
Sprinkler Fitters	See Appendix	See Appendix
Telephone and Data Cabling (Limited Energy Electricians)	See Appendix	See Appendix
Tenders to Mason Trades: Brick and Stonemasons	See Appendix	See Appendix
Tenders to Plasterers and Stucco Masons	See Appendix	See Appendix
Tile, Terrazzo, Brick and Marble Finishers	See Appendix	See Appendix
Tile Setter/Terrazzo Workers: Hard Tile Setters	See Appendix	See Appendix
Tree Trimmers (Line Constructors)	See Appendix	See Appendix
Truck Drivers	$16.00	$4.33
Welders (Incidental)	Receive rate for craft performing operation to which welding is incidental.	Receive rate for craft performing operation to which welding is incidental.

APPENDIX
JANUARY 1, 2003

NOTE: THE APPENDIX SECTION IS TO BE USED ONLY FOR REGIONS/TRADES SPECIFIED IN PAGES 16 THROUGH 43. REFER TO PAGES 16 THROUGH 43 BEFORE USING RATES IN THIS SECTION.

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TRADE	BASIC HOURLY RATE	FRINGE
ASBESTOS WORKERS	**28.96**	**10.54**

Installation of insulation on mechanical systems* for Thermal and Acoustical purposes, also the installation of fire stop penetrations on electrical and mechanical systems.

Removal of regulated material on mechanical systems* which are not going to be scrapped. **

HAZARDOUS MATERIALS HANDLERS/ MECHANICS	**15.00**	**5.90**

*Mechanical systems include pipes, boilers, ducts, flues, breaching, grease ducts and acid ducts. This also includes all labor connected with the handling and distribution of materials for these systems.

**The removal of all regulated materials from mechanical systems is exclusively the work of Hazardous Materials Handlers, unless the mechanical systems are going to be scrapped. Laborers do all removal of regulated materials on mechanical systems to be scrapped and any non-mechanical (walls, ceilings, floors, beams, etc.) insulation. They also do loading of any regulated materials after it has been removed, bagged and tagged, as well as cleanup at the removal site and all work done at the disposal site. Persons performing the removal of regulated materials are classified as Group 3 Laborers.

NOTE: Regulated materials are those materials that are regulated for the purpose of protecting the environment or for personal protection by EPA, OSHA, DEQ or Federal OSHA.

BOILERMAKERS	**27.22**	**13.55**

BRICKLAYERS/STONEMASONS
(This trade is tended by "Tenders to Masons")

Area 1	**26.62**	**10.10**

(Add $0.75 per hour to Fringe for Refractory repair work.)

Area 2	**25.40**	**9.75**

(Add $0.75 per hour to Fringe for Refractory repair work.)

BRICKLAYERS/STONEMASONS (Continued)

Area 1

Benton (a)	Columbia	Marion	Tillamook
Clackamas	Lincoln (a)	Multnomah	Washington
Clatsop	Linn (a)	Polk	Yamhill

Area 2

Benton (b)	Klamath	Lake	Lane
Lincoln (b	Linn (b)		

a) North Half b) South Half

CARPENTERS

Zone 1 (Base Rate)

Group 1	**26.12**	**10.05**
Group 2	**26.27**	**10.05**
Group 3	**26.62**	**10.05**
Group 4	**26.77**	**10.05**
Group 5	**26.62**	**10.05**
Group 6	**26.77**	**10.05**
Group 7	**27.12**	**10.05**

Zone Differential for Carpenters
(Add to Zone 1 Rate)

Zone 2	**.85**
Zone 3	**1.25**
Zone 4	**1.70**
Zone 5	**2.00**
Zone 6	**3.00**
Zone 7	**5.00**

Zone 1: Projects within 30 miles of city hall in the cities listed below.
Zone 2: More than 30 miles but less than 40 miles.
Zone 3: More than 40 miles but less than 50 miles.
Zone 4: More than 50 miles but less than 60 miles.
Zone 5: More than 60 miles but less than 70 miles.
Zone 6: More than 70 miles but less than 100 miles.
Zone 7: More than 100 miles from the city hall of the employee's home local.

Reference Cities for Group 1 and 2 Carpenters

Albany	Goldendale	Medford	Roseburg
Astoria	Grants Pass	McMinnville	St. Helens

TRADE	BASIC HOURLY RATE	FRINGE	TRADE	BASIC HOURLY RATE	FRINGE

CARPENTERS (Continued)

Reference Cities for Group 1 and 2 Carpenters (Cont.)

Baker	Hermiston	Newport	Salem
Bend	Hood River	Oregon City	The Dalles
Brookings	Klamath Falls	Ontario	Tillamook
Burns	LaGrande	Pendleton	Vancouver
Coos Bay	Lakeview	Portland	
Corvallis	Longview	Port Orford	
Eugene	Madras	Reedsport	

Zones for Groups 3 and 4 Carpenters are determined by the distance between the project site and **either**

1) the worker's residence; ***or***

2) City Hall of a reference city

for the appropriate group shown, whichever is closer.

Reference Cities for Group 3 and 4 Carpenters

Eugene	Medford	Portland	Vancouver
Longview	North Bend	The Dalles	

Zones for Groups 5, 6 and 7 Carpenters are determined as follows:

1. For those workers who reside within Zone 1 of a reference city below, their zone pay differential shall be computed based upon the distance from the city hall of that city to the project site.

2. For those workers who reside nearer to the project than is the city hall of any reference city below, the mileage from their residence to the project may be used in computing their zone pay differential.

3. The zone pay differential for all other projects shall be computed from the city hall of Longview, North Bend, or Portland, whichever is closer to the project.

Reference Cities for Groups 5, 6 and 7

Astoria	Klamath Falls	Newport	Roseburg
Bend	Longview	North Bend	Salem
Eugene	Medford	Portland	The Dalles

CARPENTERS (Continued)

Group 1

Auto. Nailing Machine Carpenters
Form Strippers
Manhole Builders
Non-irritating Insulation
Cabinet & Shelving Installers (wood or steel)

Group 2

Floor Layers & Finishers
Stationary Power Saw Operators
Wall & Ceiling Insulators
Irritating Insulation

Group 3

Millwrights
Machine Erectors
Machinists

Group 4

Millwright/Welders (Certified Welders receive $0.25/hour over Group 3)

Group 5

Bridge, Dock & Wharf Builders
Piledrivermen

Group 6

Boom Men

Group 7

Marine Piledriver

CEMENT MASONS

(This trade is tended by "Concrete Laborers")

Zone 1 (Base Rate)

Group 1	**22.24**	**11.70**
Group 2	**22.68**	**11.70**
Group 3	**22.68**	**11.70**
Group 4	**23.13**	**11.70**

Group 1 Cement Masons, finishing, hand chipping, patching, grouting, end pointing, screed setting, plugging, filling bolt holes, dry packing, setting curb forms, planks, stakes, lines and grades. Grinding of concrete done as preparatory to patching or when done to produce a finished concrete product.

Group 2 Composition Workers (includes installation of epoxy and other resinous toppings), and Power Machine Operators.

Group 3 Cement Masons working on suspended, swinging and/or hanging scaffold.

TRADE	BASIC HOURLY RATE	FRINGE	TRADE	BASIC HOURLY RATE	FRINGE

CEMENT MASONS (Continued)

Group 4 Cement Masons performing work of both Group 2 and Group 3 at the same time.

Zone Differential for Cement Masons
(Add to Zone 1 Rate)

Zone 2	.65
Zone 3	1.15
Zone 4	1.70
Zone 5	3.00

Zone 1: Projects within 30 miles of city hall in the cities listed below.
Zone 2: More than 30 miles, but less than 40 miles.
Zone 3: More than 40 miles, but less than 50 miles.
Zone 4: More than 50 miles, but less than 80 miles.
Zone 5: More than 80 miles.

Reference Cities

Bend	Longview	Portland	The Dalles
Corvallis	Medford	Salem	Vancouver
Eugene			

DIVERS & DIVERS' TENDERS

Divers	62.50	9.54
Divers' Tenders	28.08	9.54

1) For those workers who reside within a reference city below, their zone pay shall be computed from the city hall of the city wherein they reside.

2) For those workers who reside nearer to a project than is the city hall of any reference city below, the mileage from their residence may be used in computing their zone pay differential.

3) The zone pay for all other projects shall be computed from the city hall of Portland.

Zone Differential for Divers/Divers' Tenders
(Add to Zone 1 Rate)

Zone 2	.85
Zone 3	1.25
Zone 4	1.70
Zone 5	2.00
Zone 6	3.00
Zone 7	5.00

DIVERS & DIVERS' TENDERS (Continued)

Zone 1: Projects within 30 miles of city hall in the cities listed below.
Zone 2: More than 30 miles, but less than 40 miles.
Zone 3: More than 40 miles, but less than 50 miles.
Zone 4: More than 50 miles, but less than 60 miles.
Zone 5: More than 60 miles, but less than 70 miles.
Zone 6: More than 70 miles, but less than 100 miles.
Zone 7: More than 100 miles from the city hall of the employee's home local.

Reference Cities for Divers/Divers' Tenders

Astoria	Klamath Falls	Newport	Roseburg
Bend	Longview	North Bend	Salem
Eugene	Medford	Portland	The Dalles

Depth Pay and Enclosure Pay are added to the Divers' Basic Hourly Rate to obtain the Total Hourly Rate for the Diver.

Basic Hourly Rate	+	Hourly Depth Pay	+	Hourly Enclosure Pay	=	Divers' Total Hourly Pay

Divers' Depth Pay:

Depth of Dive	Hourly Depth Pay
50 – 100 ft.	([Total ft– 50] x $1.00)/hr.
100 – 150 ft.	$ 50 + ([Total ft–100] x $1.50)/hr.
150 – 200 ft.	$125 + ([Total ft–150] x $2.00)/hr.

Divers' Enclosure Pay (working without vertical escape):

Distance Traveled In the Enclosure	Hourly Enclosure Pay
5 - 50 ft.	$ .50/hr.
50 – 100 ft.	$ .63/hr.
100 – 150 ft.	$ 2.13/hr.
150 – 200 ft.	$ 4.63/hr.
200 – 300 ft.	$ 4.63 + ([total ft-200] X $.05)/hr.
300 – 450 ft.	$ 9.63 + ([total ft-300] X $.10)/hr.
450 – 600 ft.	$24.63 + ([total ft-450] X $.20)/hr.

DREDGERS

Zone 1 (Base Rate)

TRADE	BASIC HOURLY RATE	FRINGE
Leverman (Hydraulic, Dipper, Floating Clamshell)	32.43	8.50
Asst. Engineer (including Watch Engineer, Welder, Mechanic, Machinist)	30.25	8.50
Tenderman (Boatman, Attending Dredge Plant); Fireman	29.25	8.50
Fill Equipment Operator	28.44	8.50
Assistant Mate (Deckhand); Oiler	27.35	8.36

Zone Differential for Dredgers
(Add to Zone 1 Rate)

Zone 2	2.00
Zone 3	3.00

Zone 1: Center of job site not more than 30 miles from the city hall of Portland.
Zone 2: More than 30 miles but not more than 50.
Zone 3: Over 50 miles.

DRYWALL/WETWALL

TRADE	BASIC HOURLY RATE	FRINGE
Drywall (Acoustical and Drywall Applicator)	25.23	10.76
Wetwall (Lather)	24.94	11.05

ELECTRICIANS

Area 1

TRADE	BASIC HOURLY RATE	FRINGE
Electricians	24.44	7.81
Cable Splicers	27.32	7.94

Area 2

TRADE	BASIC HOURLY RATE	FRINGE
Electricians	28.75	10.59
Cable Splicers	30.19	10.64

Area 3

TRADE	BASIC HOURLY RATE	FRINGE
Electricians	27.25	10.67

ELECTRICIANS (Continued)

Area 4

TRADE	BASIC HOURLY RATE	FRINGE
Electricians	29.44	11.59
Cable Splicers	32.39	11.68
Electrical Material Handler	13.30	5.48

Area 5

TRADE	BASIC HOURLY RATE	FRINGE
Electricians	31.00	12.76
Cable Splicers	31.25	12.77
Electrical Material Handler	17.52	8.38

Zone Pay for Area 5 Electricians
(Add to Basic Hourly Rate)

Zone 1	31-50 miles	1.00
Zone 2	51-70 miles	3.00
Zone 3	71-90 miles	5.00
Zone 4	91 or more	8.50

There shall be a 30-mile free zone from downtown Portland City Hall and a similar 15-mile free zone around the following cities:

Astoria	Seaside	Tillamook
Hood River	The Dalles	

Further, the free zone at the Oregon coast shall extend along Hwy 101 west to the ocean Hwy 101 east 10 miles if not already covered by the above 15-mile free zone.

Area 6

TRADE	BASIC HOURLY RATE	FRINGE
Electricians	27.00	9.81
Cable Splicers	27.00	9.81

Reference Counties

Area 1	Area 2	Area 3
Malheur	Baker	Coos
	Gilliam	Curry
	Grant	Lincoln
	Morrow	Douglas (a)
	Umatilla	Lane (a)
	Union	
	Wallowa	
	Wheeler	

TRADE	BASIC HOURLY RATE	FRINGE RATE	TRADE	BASIC HOURLY RATE	FRINGE RATE

ELECTRICIANS (Continued)

Area 4	Area 5	Area 6
Benton	Clackamas	Harney
Crook	Clatsop	Jackson
Deschutes	Columbia	Josephine
Jefferson	Hood River	Klamath
Lane (b)	Multnomah	Lake
Linn	Sherman	Douglas (b)
Marion	Tillamook	
Polk	Wasco	
Yamhill (c)	Washington	
	Yamhill (d)	

a) Those portions lying **west** of a line running North and South from the NE corner of Coos County to the SE corner of Lincoln County.
b) Those portions lying **east** of a line running North and South from the NE corner of Coos County to the SE corner of Lincoln County.
c) South half
d) North half

ELEVATOR CONSTRUCTORS

	Area 1	
Mechanic	**32.57**	**8.34 + a**
Helper	**22.80**	**8.08 + a**
Probationary	**16.28**	**.44**
	Area 2	
Mechanic	**33.92**	**10.49 + a**

a) Plus 8% of basic hourly rate for employees with more than 5 years of service; 6% of basic hourly rate for 6 months to 5 years of service.

Reference Cities

Area 1	Area 2
Baker	All
Umatilla	Remaining
Union	Counties
Wallowa	

FLAGGERS See Laborers, Group 5

GLAZIERS	**27.35**	**8.36**

Add $1.00 to base rate if safety belt is required by State safety regulations.

Add $4.00 to base rate for work done from a non-motorized single-man bosun chair.

Benton	Harney	Malheur	Tillamook
Clackamas	Lane	Marion	Washington
Clatsop	Lincoln	Multnomah	Yamhill
Columbia	Linn	Polk	

HIGHWAY / PARKING STRIPERS		
	23.36	**5.75**
IRONWORKERS	**26.97**	**11.30**

Structural, Reinforcing, Ornamental, Riggers, Signal men

LABORERS

Zone 1 (Base Rate):

Group 1	**22.18**	**7.40**
Group 2	**22.69**	**7.40**
Group 3	**23.08**	**7.40**
Group 4	**23.41**	**7.40**
Group 5	**19.61**	**7.40**

Note: A Hazardous Waste Removal Differential must be added to the base rate if work is performed inside the boundary of a Federally Designated Hazardous Waste Site. A Group 1 base rate is used for General Laborer on such a site. For further information on this, call the Prevailing Wage Rate Coordinator at (503) 731-4723.

Zone Differential for Laborers
(Add to Zone 1 Rate)

Zone 2	**.65**
Zone 3	**1.15**
Zone 4	**1.70**
Zone 5	**2.75**

TRADE	BASIC HOURLY RATE	FRINGE	TRADE	BASIC HOURLY RATE	FRINGE

LABORERS (Continued)

Zone 1 – Projects within 30 miles of city hall in the cities listed below.
Zone 2 – More than 30 miles but less than 40 miles.
Zone 3 – More than 40 miles but less than 50 miles.
Zone 4 – More than 50 miles but less than 80 miles.
Zone 5 – More than 80 miles.

Reference Cities

Albany	Burns	Hermiston	Portland
Astoria	Coos Bay	Klamath Falls	Roseburg
Baker City	Eugene	Medford	Salem
Bend	Grants Pass	Pendleton	The Dalles

Group 1

Asphalt Spreader
Batch Weighman
Broomer
Brush Burner/Cutter
Car & Truck Loader
Carpenter Tender
Change-House Man
Chipper Operator (a)
Choker Setter
Clean up Laborer ***
Curing, Concrete
Demolition, wrecking, moving (Industrial)***
Driller Assistant
Dry-shack Man
Dumpers, road oiling crew
Dumpman for Grading crew
Elevator Feeder
Erosion Control Specialist
Fine Grader
Fire Watch
Form Stripper (b)
General Laborer ***
Guardrail, Median Rail (c)
Leverman or Aggregate Spreader (d)
Loading Spotter
Material Yard Man (e)
Powderman Assistant
Railroad Track Laborer
Ribbon Setter (f)
Rip Rap Man (Hand Placed)
Road Pump Tender/Mover
Scaffold Tender
Sewer Laborer
Signalman
Skipman
Sloper
Sprayman
Stake Chaser
Stockpiler
Tie Back Shoring
Timber Faller/Bucker (Hand Labor)
Toolroom Man (Job Site)
Traffic Control Supervisor (Certified)
Weight-Man Crusher (g)
Wood Fence Builder

a) Pittsburg or similar types
b) Not swinging stages
c) Reference Post, Guide Post, or Right of Way Marker
d) Flaherty, and similar types
e) Including electrical
f) Including steel forms
g) Aggregate when used

LABORERS (Continued)

Group 2

Applicator (a)
Brush Cutter (b)
Burner
Choker Splicer
Clary Power Spreader (c)
Clean up Nozzleman - Green Cutter (d)
Concrete Laborer
Concrete Power Buggyman
Crusher Feeder
Demolition/Wrecking (e)
Gunite Nozzleman Tender
Gunite or Sandblasting Pot Tender
Handler/Mixer (f)
Doping & Wrapping Pipe
Post Hole Digger, Air, Gas or Electric
Power Tool Operator (g)
Ribbon Setter (head)
Rip Rap Man (head) (hand placed)
Sand Blasting (wet)
Stake Setter
Tamper

a) Including Pot Tender for same, applying protective material by hand or nozzle on utility lines or storage tanks on project.
b) Power Saw
c) And similar types of spreaders
d) Concrete, rock, etc.
e) Charred Materials
f) Of all materials of an irritating nature including cement and lime
g) Includes, but not limited to: Dry Pack Machine, Jackhammer, Chipping Guns, Paving Breakers

Group 3

Asbestos Removal
Bit Grinder
Concrete Saw Operator
Drill Doctor
Drill Operator (a)
Laser Beam (b)
Manhole Builder
Nipper & Timberman
Nuclear Plant Worker – Lead Shield
Power Saw Operator (c)
Sand Blasting (dry)
Sewer Timberman
Track Liner (d)
Tugger Operator
Vibrating Screed
Vibrator (all)
Water Blaster
Welder

a) Air Tracks, Cat Drills, Wagon Drills, Rubber-mounted Drills, and other similar types.
b) Pipe laying applicable when employee assigned to move, set up align Laser Beam
c) Bucking and falling
d) Anchor Machines, Ballast Regulators, Multiple Tampers, Power Jacks

TRADE	BASIC HOURLY RATE	FRINGE	TRADE	BASIC HOURLY RATE	FRINGE

LABORERS (Continued)

Group 4

Asphalt Raker	Pipe Layer (all)
Gunite Nozzleman	Powderman
Grade Checker	Pumpcrete Nozzleman
High Scaler, Stripper, Driller (a)	Shield Operator
Laser Beam (Tunnel), applicable when employee assigned to move, set up, align laser beam	Tunnel Bull Gang (above ground)
Loop Installation	Tunnel Chuck Tender
Motorman-Dinky Locomotive	Tunnel Miner
	Tunnel Mucker/Brakeman/ Concrete Crew/Bull Gang (underground)
	Tunnel Powderman

a) Covers work in swinging stages, chairs or belts, under extreme conditions unusual to normal drilling, blasting, barring-down, or sloping and stripping.

Group 5

Clean up Laborer (building only)***
Demolition, Wrecking & Moving (building only)***
Flagger

***Laborers can tear off roofs, clean up or handle roofing material only when at least one new story is added or in demolition work, where no re-roofing will occur.

LIMITED ENERGY ELECTRICIANS

May only be used for electrical work not exceeding 100 va in Class II and III installations (as defined in Article 725 of the National Electrical Code):

Area 1	**24.44**	**7.94**
Area 2	**25.00**	**8.48**
Area 3	**19.81**	**7.99**
Area 4	**21.26**	**7.59**
Area 5	**25.15**	**9.30**
Area 6	**21.00**	**6.13**

Area 1	Area 2	Area 3
Malheur	Baker	Coos
	Gilliam	Curry
	Grant	Douglas (a)

LIMITED ENERGY ELECTRICIANS (Continued)

Area 2 (Cont.)	Area 3(Cont.)
Morrow	Lane (a)
Umatilla	Lincoln
Union	
Wallowa	
Wheeler	

Area 4	Area 5	Area 6
Benton	Clackamas	Harney
Crook	Clatsop	Jackson
Deschutes	Columbia	Josephine
Jefferson	Hood River	Klamath
Lane (b)	Multnomah	Lake
Linn	Sherman	Douglas (b)
Marion	Tillamook	
Polk	Wasco	
Yamhill (c)	Washington	
	Yamhill (d)	

(a) Those portions lying **west** of a line running North and South from the NE corner of Coos County to the SE corner of Lincoln County.
(b) Those portions lying **east** of a line running North and South from the NE corner of Coos County to the SE corner of Lincoln County.
(c) South half
(d) North half

LINE CONSTRUCTION

Area 1

Group 1	**37.95**	**9.17**
Group 2	**33.88**	**9.02**
Group 3	**20.27**	**6.93**
Group 4	**29.14**	**7.07**
Group 5	**25.41**	**6.93**
Group 6	**23.72**	**6.87**

Area 2

Cable Splicer	**30.51**	**8.17**
Journeyman Lineman	**27.65**	**7.94**
Line Equip. Oper.	**23.41**	**7.61**
Groundman	**17.09**	**5.96**

TRADE	BASIC HOURLY RATE	FRINGE	TRADE	BASIC HOURLY RATE	FRINGE

LINE CONSTRUCTION (Continued)

Area 1 All counties except Malheur County
Area 2 Malheur County

Group 1	Group 2
Cable Splicer	Certified Lineman
Leadman Pole Sprayer	Welder
Lineman	Heavy Line Equipment Man
Pole Sprayer	
Group 3	**Group 4**
Tree Trimmer	Line Equipment Man
Group 5	**Group 6**
Head Groundman	Groundman
Jackhammer Man	
Powderman	

MARBLE SETTERS (Includes Granite)
(This trade is tended by "Tile, Terrazzo, Brick & Marble Finishers")

Area 1	**27.62**	**10.10**
Area 2	**26.40**	**9.75**

Area 1

Baker	Hood River	Multnomah	Wallowa
Benton (a)	Lincoln (a)	Polk	Wasco (a)
Clackamas	Linn (a)	Sherman	Washington
Clatsop	Malheur (a)	Tillamook	Yamhill
Columbia	Marion	Umatilla	
Gilliam	Morrow	Union	

Area 2

Benton (b)	Douglas	Josephine	Linn (b)
Crook(b)	Grant	Klamath	Malheur
Coos	Harney	Lake	Wasco (b)
Curry	Jackson	Lane	Wheeler
Deschutes	Jefferson	Lincoln (b)	

a) North Half
b) South Half

PAINTERS & DRYWALL TAPERS

Commercial Painting	**20.40**	**5.18**

Includes painting upon or within any structure, facility, surface or item which is established or constructed for conducting commerce, profit or non-profit

Industrial Painting	**21.00**	**5.18**

Includes painting upon or within any structure, facility, surface or item which is established or constructed for conducting industrial related commerce. Industrial related commerce relates to manufacturing plants, process plants, tank farms, factories, ship yards, and other similar structures all of which contain excessive use of metal components in their construction.

Add $0.75 to base rate for work over 60 ft. high on swing stage, mechanical climber, spider or bucket truck for both commercial and industrial painting.

Drywall Taper	**26.11**	**9.12**

PLASTERERS
(This trade is tended by "Tenders to Plasterers")

Nozzleman	**27.64**	**7.13**
Swinging Scaffold	**26.64**	**7.13**
All Other Work	**25.64**	**7.13**

PLUMBERS & STEAMFITTERS/PIPEFITTERS

Area 1 (Both)	**23.54**	**8.02**

Add $2.21 per hour to basic hourly rate if it is possible for worker to fall 30 ft. or more, or if required to wear a fresh-air mask or similar equipment.

Zone Differential for Area 1 Plumbers & Steamfitters/Pipefitters
(Add to Zone 1 Rate)

Zone 2	**1.20** per hour
Zone 3	**1.70** per hour
Zone 4	**2.50** per hour
Zone 5	**3.55** per hour
Zone 6	**30.32** per day

TRADE	BASIC HOURLY RATE	FRINGE	TRADE	BASIC HOURLY RATE	FRINGE

PLUMBERS & STEAMFITTERS/PIPEFITTERS (Continued)

Zone 1: Projects within 15 miles of city hall in the cities listed below.
Zone 2: More than 15 but less than 30.
Zone 3: More than 30 but less than 40.
Zone 4: More than 40 but less than 50.
Zone 5: More than 50 but less than 100.
Zone 6: More than 100 miles.

Reference Cities for Area 1:
Boise, Idaho
Twin Falls, Idaho

With distances in Zone 6, 100 miles and beyond, there shall be a minimum of one hundred fifty-one dollars and sixty cents ($151.60) per week or thirty dollars and thirty-two cents ($30.32) per day worked.

Area 2 (Both)	**28.95**	**13.49**
Area 3 (Both)	**31.73**	**12.77**

Area 1	Area 2	Area 3
Baker	Grant (b)	All Remaining
Harney (a)	Morrow	Counties
Malheur	Umatilla	
	Union	
	Wallowa	

a) Except Northwest Portion
b) Except Southwest Portion

POWER EQUIPMENT OPERATORS

Zone 1 (Base Rate)

Group 1	**29.30**	**8.95**
Group 2	**28.07**	**8.95**
Group 3	**27.31**	**8.95**
Group 4	**26.79**	**8.95**
Group 5	**26.19**	**8.95**
Group 6	**23.84**	**8.95**

Note: A Hazardous Waste Removal Differential must be added to the base rate if work is performed inside the boundary of a Federally Designated Waste Site. For information on this differential, call the Prevailing Wage Rate Coordinator at (503) 731-4723.

POWER EQUIPMENT OPERATORS (Cont.)

Zone Rates

Zone 2	**1.50**
Zone 3	**3.00**

For the Following Metropolitan Counties:

Multnomah, Clackamas, Marion, Yamhill, Washington and Columbia:

- **See map on page 61 for Zone 1 of this classification**

(A) All jobs or projects located in Multnomah, Clackamas and Marion counties, west of the western boundary of Mt. Hood National Forest and west of mile post 30 on Interstate 84 and west of mile post 30 on State Hwy 26 and west of mile post 30 on Hwy 22 and all jobs located in Yamhill County, Washington County and Columbia County shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located in the area outside the identified boundary above, but less than 50 miles from the Portland City Hall shall receive Zone 2 pay for all classifications.

(C) All jobs or projects located more than 50 miles from the Portland City Hall, but outside the identified border above, shall receive Zone 3 pay for all classifications.

For the Following Cities:

Albany; Bend; Coos Bay; Eugene; Grants Pass; Klamath Falls; Medford and Roseburg:

(A) All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 2 for all classifications.

TRADE | BASIC HOURLY RATE | FRINGE | TRADE | BASIC HOURLY RATE | FRINGE

POWER EQUIPMENT OPERATORS (Cont.)

(C) All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 3 pay for all classifications.

ASPHALT

Group
- 6 Plant Oiler
- 6 Plant Fireman
- 6 Pugmill Operator *(any type)*
- 6 Truck mounted asphalt spreader, w/screed
- 6 Raker
- 5 Extrusion Machine Operator
- 5 Roller Operator *(any asphalt mix)*
- 5 Asphalt Burner and Reconditioner Operator *(any type)*, 84
- 5 Roto-Mill, pavement profiler, ground man
- 4 Screed Operator
- 4 Asphalt Paver Operator
- 4 Diesel-Electric Engineer, Plant
- 4 Roto-Mill, pavement profiler, operator, under six (6) ft. lateral cut
- 2 Roto-Mill, pavement profiler, operator, six (6) ft. lateral cut and over
- 2 Asphalt Plant Operator *(any type)*

CLEARING

Group
- 4 Log Skidder
- 4 Chipper *(Assistant to Engineer if required)*
- 4 Incinerator *(Assistant to Engineer if required)*
- 4 Stump Splitter *(loader mounted or similar type)*
- 4 Stump Grinder *(loader mounted or similar type)*
- 4 Tub Grinder *(used for wood debris)*
- 4 Land Clearing Machine *(track mounted forestry mowing & grinding machine)*
- 4 Hydro Axe *(loader mounted or similar type)*

CRANE

Group
- 6 Tugger or Coffin Type Hoist Operator
- 6 Truck Crane Oiler-Driver
- 6 Oiler

POWER EQUIPMENT OPERATORS (Cont.)

CRANE (Cont.)

Group
- 6 Fireman, all equipment
- 6 A-Frame Truck Operator, single drum
- 5 Hoist Operator, single drum
- 5 Helicopter Hoist Operator
- 5 Elevator Operator
- 5 Boom Truck Operator
- 5 A-Frame Truck Operator, double drum
- 4 Lift Slab Machine Operator
- 4 Hoist Operator, two (2) drum
- 4 Hoist Operator, three (3) or more drums
- 4 Hoist Operator, stiff leg, guy derrick or similar type, fifty (50) ton and over
- 4 Derrick Operator, under 100 tons (two operators required when swing control is remote from hoist)
- 4 Chicago Boom and similar types
- 4 Cherry Picker or similar type crane-hoist, five (5) ton capacity or less
- 4 Cableway Operator, up to twenty-five (25) ton
- 4 Bridge Crane Operator, Locomotive, Gantry, Overhead
- 4 Boom type lifting device, five (5) ton capacity or less
- 2 Cableway Operator, twenty-five (25) ton and over
- 1 Helicopter Operator, when used in erecting work

HYDRAULIC CRANE OPERATOR

Group
- 5 Hydraulic Boom Truck Operator, Pittman
- 4 Hydraulic Crane Operator, under fifty (50) tons
- 3 Hydraulic Crane Operator, fifty (50) tons through 89 tons (with luffing or tower attachment takes Group 2 classification)
- 2 Hydraulic Crane Operator, ninety (90) tons through 199 tons (with luffing or tower attachment takes Group 1 classification)
- 1 Hydraulic Crane Operator, two hundred (200) tons and over (with luffing or tower attachment shall receive the Group 1 classification plus 5%)

TRADE	BASIC HOURLY RATE	FRINGE	TRADE	BASIC HOURLY RATE	FRINGE

POWER EQUIPMENT OPERATORS (Cont.)

TOWER/WHIRLEY OPERATOR

Group
- 2 Tower Crane Operator
- 2 Whirley Operator, under ninety (90) ton
- 1 Whirley Operator, ninety (90) ton and over

LATTICE BOOM CRANE OPERATOR

Group
- 4 Lattice Boom Crane Operator, under fifty (50) tons
- 3 Lattice Boom Crane Operator, fifty (50) tons through 89 tons, (& less than 150 ft. boom)
- 2 Lattice Boom Crane Operator, ninety (90) tons through 199 tons, (and/or 150 ft-200 ft boom)
- 1 Lattice Boom Crane Operator, two hundred (200) tons through 299 tons, (and/or over 200 ft. boom)
- 1 Lattice Boom Crane Operator, two hundred (200) tons through 299 tons, with over 200 ft. boom shall receive the Group 1 classification rate plus 5%
- 1 Lattice Boom Crane Operator, three hundred (300) tons through 399 tons shall receive Group 1 classification rate plus 5%
- 1 Lattice Boom Crane Operator, three hundred (300) tons through 399 tons, with over 200 ft. boom shall receive the Group 1 classification rate plus 10%
- 1 Lattice Boom Crane Operator, four hundred (400) tons and over, shall receive the Group 1 classification rate plus 10%

DRILLING

Group
- 6 Drill Assistant
- 6 Directional Drill Locator
- 6 Auger Oiler
- 5 Directional Drill Operator less than 20,000 LBS. pullback
- 5 Churn Drill and Earth Boring Machine Operator
- 4 Drill Doctor
- 4 Boring Machine Operator
- 4 Driller – Percussion, Diamond, Core, Cable, Rotary and similar type

POWER EQUIPMENT OPERATORS (Cont.)

DRILLING (Cont.)

- 4 Cat Drill *(John Henry)*
- 4 Directional Drill Operator over 20,000 LBS pullback

FLOATING EQUIPMENT

Group
- 6 Deckhand
- 6 Boatman
- 5 Fireman
- 4 Piledriver Operator *(not crane type)*
- 4 Licensed Boatman
- 4 Jack Operator, elevating barges, Barge Operator, self-unloading
- 4 Floating Crane *(derrick barge)* Operator, less than 30 ton
- 4 Floating Clamshell, etc. Operator, under 3 cu. yd.
- 4 Diesel-Electric Engineer
- 2 Floating Crane (derrick barge) Operator, 30 ton but less than 150 ton
- 2 Floating Clamshell, etc. Operator, 3 cu. yd. and over
- 1 Floating Crane, two hundred fifty (250) ton and over shall receive the Group 1 classification rate plus 5%.
- 1 Floating Crane, three hundred fifty (350) ton and over shall receive the Group 1 classification rate plus 10%.
- 1 Floating Crane, 150 ton and over but less than 250 ton

FORK LIFT

Group
- 6 Self-Propelled Scaffolding Operator Construction job site *(excluding working platform)*
- 6 Fork Lift or Lumber Stacker Operator, construction job site
- 6 Ross Carrier Operator, construction job site
- 5 Lull Hi-Lift Operator or similar type
- 5 Fork Lift, over five (5) ton and/or Robotic
- 3 Rock Hound Operator

TRADE	BASIC HOURLY RATE	FRINGE	TRADE	BASIC HOURLY RATE	FRINGE

POWER EQUIPMENT OPERATORS (Cont.)

GUARDRAIL EQUIPMENT

Group
- 6 Oiler, combination guardrail machines
- 6 Oiler
- 6 Guardrail Punch Oiler
- 6 Auger Oiler
- 4 Guardrail Punch Operator *(all types)*
- 4 Guardrail Auger Operator *(all types)*
- 4 Combination Guardrail machines, i.e. Punch, Auger, etc.

HYDRAULIC HOES-EXCAVATORS

Group
- 5 Hydraulic Backhoe Operator, wheel type (Ford, John Deere, Case type)
- 5 Hydraulic Backhoe Operator, track type up to and including 20,000 LBS
- 4 Robotic Hydraulic Backhoe Operator, track and wheel type up to and including 20,000 LBS. with any or all attachments.
- 4 Excavator Operator over 20,000 LBS. through 80,000 LBS.
- 3 Excavator Operator over 80,000 LBS. through 130,000 LBS
- 2 Excavator Operator over 130,000 LBS and above

LOADERS

Group
- 6 Bucket Elevator Loader Operator, Barber-Greene and similar types
- 6 Bobcat, Skid Steer (under 1 yard)
- 5 Loaders, rubber-tired type, 25,000 LBS
- 5 Elevating Loader Operator, Athey and similar types
- 5 Elevating Grader Operator, Tractor towed requiring Operator or Grader
- 4 Loader Operator, front end and overhead, 25,000 LBS and less than 60,000 LBS
- 4 Elevating Grader Operator by Tractor Operator, Sierra, Euclid or similar types
- 4 Belt Loaders Kolman and Ko Cal types
- 3 Loader Operator, 60,000 LBS and less than 120,000 LBS
- 2 Loader Operator, 120,000 LBS and above

POWER EQUIPMENT OPERATORS (Cont.)

PILEDRIVERS

Note: Crane rates apply when driving or pulling piling

Group
- 4 Hammer Operator
- 4 Piledriver Operator *(not crane type)*

PIPE LINE – Sewer Water

Group
- 6 Tar Pot Fireman
- 6 Tar Pot Fireman *(power agitated)*
- 6 Hydraulic Pipe Press Operator
- 5 Hydra Hammer or similar types
- 5 Pavement Breaker Operator
- 4 Pipe Cleaning Machine Operator
- 4 Pipe Doping Machine Operator
- 4 Pipe Bending Machine Operator
- 4 Pipe Wrapping Machine Operator
- 4 Boring Machine Operator
- 4 Back Filling Machine Operator

RAILROAD EQUIPMENT

Group
- 6 Brakeman
- 6 Oiler
- 6 Switchman
- 6 Motorman
- 6 Ballast Jack Tamper Operator
- 5 Locomotive Operator, under 40 tons
- 5 Ballast Regulator Operator
- 5 Ballast Tamper Multi-Purpose Operator
- 5 Track Liner Operator
- 5 Tie Spacer Operator
- 5 Shuttle Car Operator
- 5 Locomotive Operator, 40 tons and over

REMOTE CONTROL

Group
- 4 Vacuum Blasting Machine Operator/Mechanic
- 4 Ultra High Pressure Water Jet Cutting Tool System Operator/Mechanic
- 4 Concrete Cleaning Decontamination Machine Operator

TRADE | BASIC HOURLY RATE | FRINGE | TRADE | BASIC HOURLY RATE | FRINGE

POWER EQUIPMENT OPERATORS (Cont.)

REMOTE CONTROL (Cont.)

- 2 Remote controlled earth-moving equipment
- 2 Master Environmental Maintenance Mechanic
- 2 Heavy Equipment Robotics Operator
- 2 Heavy Equipment Robotics Mechanic

SHOVEL, DRAGLINE, CLAMSHELL, SKOOPER, ETC., OPERATOR

Group
- 6 Oiler
- 6 Grader Oiler
- 6 Grade Checker
- 6 Fireman
- 4 Diesel-Electric Engineer
- 4 Stationary Drag Scraper Operator
- 4 Shovel, Dragline, Clamshell, Operator under 3 cu. yd.
- 4 Grade-all Operator
- 3 Shovel, Dragline, Clamshell, Operator 3 cu. yds., but less than 5 cu. yds.
- 2 Shovel, Dragline, Clamshell, Operator, 5 cu. yds. and over

SIGNALMAN

Group
- 6 Helicopter Radioman *(ground)*
- 6 Bell Boy, phones, etc., Operator

SURFACING (BASE) MATERIAL

Group
- 6 Tamping Machine Operator, mechanical, self-propelled
- 6 Roller Operator, grading of base rock *(not asphalt)*
- 6 Hydrographic Seeder Machine Operator, straw, pulp or seed
- 5 Roller Operator, Oiling, C.T.B.
- 5 Rock Spreaders, self-propelled
- 5 Pulva-Mixer or similar types
- 5 Lime Spreading Operator, construction job site
- 5 Chip Spreading Machine Operator

POWER EQUIPMENT OPERATORS (Cont.)

SURFACING (BASE) MATERIAL (Cont.)

- 4 Blade Mounted Spreaders, Ulrich and similar types

TRENCHING MACHINE

Group
- 6 Oiler
- 6 Grade Oiler
- 5 Trenching Machine Operator, maximum digging capacity 3 ft. depth
- 4 Trenching Machine Operator, maximum digging capacity over 3 ft. depth
- 4 Back Filling Machine Operator
- 2 Wheel Excavator, under 750 cu. yds. Per hour
- 2 Canal Trimmer
- 2 Wheel Excavator, over 750 cu. yds. per hour
- 2 Band Wagon *(in conjunction with wheel excavator)*

TUNNEL

Group
- 4 Mucking Machine Operator
- 6 Dinkey
- 6 Conveyor Operator *(any type)*
- 4 Shield Operator
- 6 Air Filtration Equipment Operator

UNDERWATER EQUIPMENT

Group
- 2 Underwater Equipment Operator, remote or otherwise, when used in construction work

ROOFERS

Area 1

Roofers	**23.65**	**6.23**
Handling coal tar pitch	**26.02**	**6.23**
Remove fiberglass insulation	**26.02**	**6.23**

Clackamas Clatsop Columbia Multnomah
Tillamook Washington

TRADE	BASIC HOURLY RATE	FRINGE

ROOFERS (Continued)

Area 2 (a)*

Roofers		18.05	6.90
Douglas	Marion	Polk	Yamhill

Area 2 (b)*

Roofers		17.05	5.80
Benton	Lane	Lincoln	Linn

* Add $2.00 to basic hourly rate for application, spudding and cutting or removal of coal tar products.

* Add $0.50 per hour to base hourly rate for application, spudding and cutting or removal of fiberglass insulation.

SHEET METAL WORKERS

Area 1 29.23 11.83

Add $1.00 to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add $1.00 to base rate for work with lead or installing material in a plant that uses lead in any form to manufacture a product (excluding soldering).

Add $1.00 to base rate for work performed in a confined space as defined by OSHA.

Area 2 21.71 9.33

Add $1.75 to base rate for work performed whenever it is possible for worker to fall 30 ft. or more.

Add $1.75 to base rate for work performed in an area where epoxy resins or other injurious chemicals are being applied.

Area 3 25.22 11.59

Add $1.00 to base rate for work where it is necessary to wear a chemically activated face mask.

SHEET METAL WORKERS (Continued)

Add $1.00 to base rate for work where employees are required to wear a fresh air mask due to nuclear related work.

Add $0.45 to base rate for work on a swinging stage, swinging scaffold or bosun chair in excess of 30 feet above the ground.

Area 4 25.01 10.90

Area 5 24.15 10.82

Area 1	Area 2	Area 3	Area 4	Area 5
Clackamas	Baker	Morrow	Douglas	Coos
Clatsop		Umatilla	Lane	Curry
Columbia		Union		
Gilliam		Wallowa		
Grant				
Multnomah				
Tillamook				
Washington				
Wheeler				

SOFT FLOOR LAYERS 22.28 8.68

Soft tile, linoleum and carpet

SPRINKLER FITTERS 27.65 10.05

TENDERS TO MASON TRADES
23.79 7.40

Tenders to Bricklayers and Stone Masons, Mortar Mixers

Add $0.50 to base rate for refractory work.

Add to base rate an amount equal to that received for safety belt requirements or other unusual job conditions by the mechanic this worker is tending.

TENDERS TO PLASTERERS
22.54 7.40

TRADE	BASIC HOURLY RATE	FRINGE	TRADE	BASIC HOURLY RATE	FRINGE

TILE SETTER/TERRAZZO WORKERS 23.90 8.23

This trade is tended by "Tile, Terrazzo, Brick & Marble Finishers."

Add $0.50 to base rate if safety belt required by State safety regulations.

Add $1.00 to base rate if work involves epoxy, furnane, alkor acetylene black grouting or waterproof membrane.

TILE, TERRAZZO, BRICK & MARBLE FINISHERS 17.99 6.17

Assists Tile Setter, Bricklayers, Marble Masons and Terrazzo Workers by striking, sawing, cleaning, washing or grouting. Does not lay or set any material.

Add $0.50 to base rate if safety belt required by State safety regulations.

Add $1.00 to base rate if work involves epoxy, furnane, alkor acetylene black grouting or waterproof membrane.

Add $0.75 to fringe for refractory repair work.

TRUCK DRIVERS

Group 1	22.60	9.50
Group 2	22.72	9.50
Group 3	22.85	9.50
Group 4	23.11	9.50
Group 5	23.33	9.50
Group 6	23.49	9.50
Group 7	23.69	9.50

Group 1

A-Frame or Hydra-Lift Truck w/load bearing surface
Battery Rebuilder
Bus or Man-Haul Driver
Concrete Buggies (power operated)
Driver
Dump Trucks, side, end and bottom dumps up to and including 10 cu. yards, including semi-trucks and trains or combinations thereof

TRUCK DRIVERS (Continued)

Group 1 (Continued)

Fork Lifts used in loading, unloading and transporting material on job site
Fuel Truck Driver
Lift Jitneys
Loader and /or Leverman on concrete dry batch plant manually operated
Lubrication Man
Pilot Car
Slurry Truck Driver or Leverman
Solo Flat Bed and miscellaneous body trucks
Steam Cleaner or combination
Tireman
Transit Mix & Wet or Dry Mix Trucks, 5 cu. yds & under
Truck and Truck Mechanic Assistant
Wash Rack
Water Wagon up to 3,000 gallons

Group 2

Dumpsters or similar equipment
Flaherty Spreader Driver or Leverman
Low Bed Equipment, Flat Bed Semi-Truck & Trailer or doubles transporting equipment or wet or dry materials
Lumber Carrier, Driver-Straddle Carrier used on job site
Oil Distributor Driver or Leverman

Group 3

Body Repairman
Dump Trucks, side end and bottom dumps over 10 cu. yds and including 30 cu. yds, including semi-trucks and trains or combinations thereof.
Transit Mix and Wet or Dry Mix Trucks over 7 cu. yds and including 11 cu. yds.
Truck Mechanic –Welder –Body Repairman
Water Wagons, 5,000 to 10,000 gallons

Group 4

Dump Trucks, side, end and bottom dumps over 30 cu. yds and including 50 cu. yds. including semi-trucks and trains or combinations thereof

TRADE	BASIC HOURLY RATE	FRINGE	TRADE	BASIC HOURLY RATE	FRINGE

TRUCK DRIVERS (Continued)

Group 4 (Continued)

Transit Mix and Wet or Dry Mix Trucks, over 11 cu. yds and including 15 cu. yds
Water Wagons, 10,000 to 15,000 gallons

Group 5

Dump Trucks, side, end and bottom dumps over 50 cu. yds and including 60 cu. yds, including semi-trucks and trains or combinations thereof.

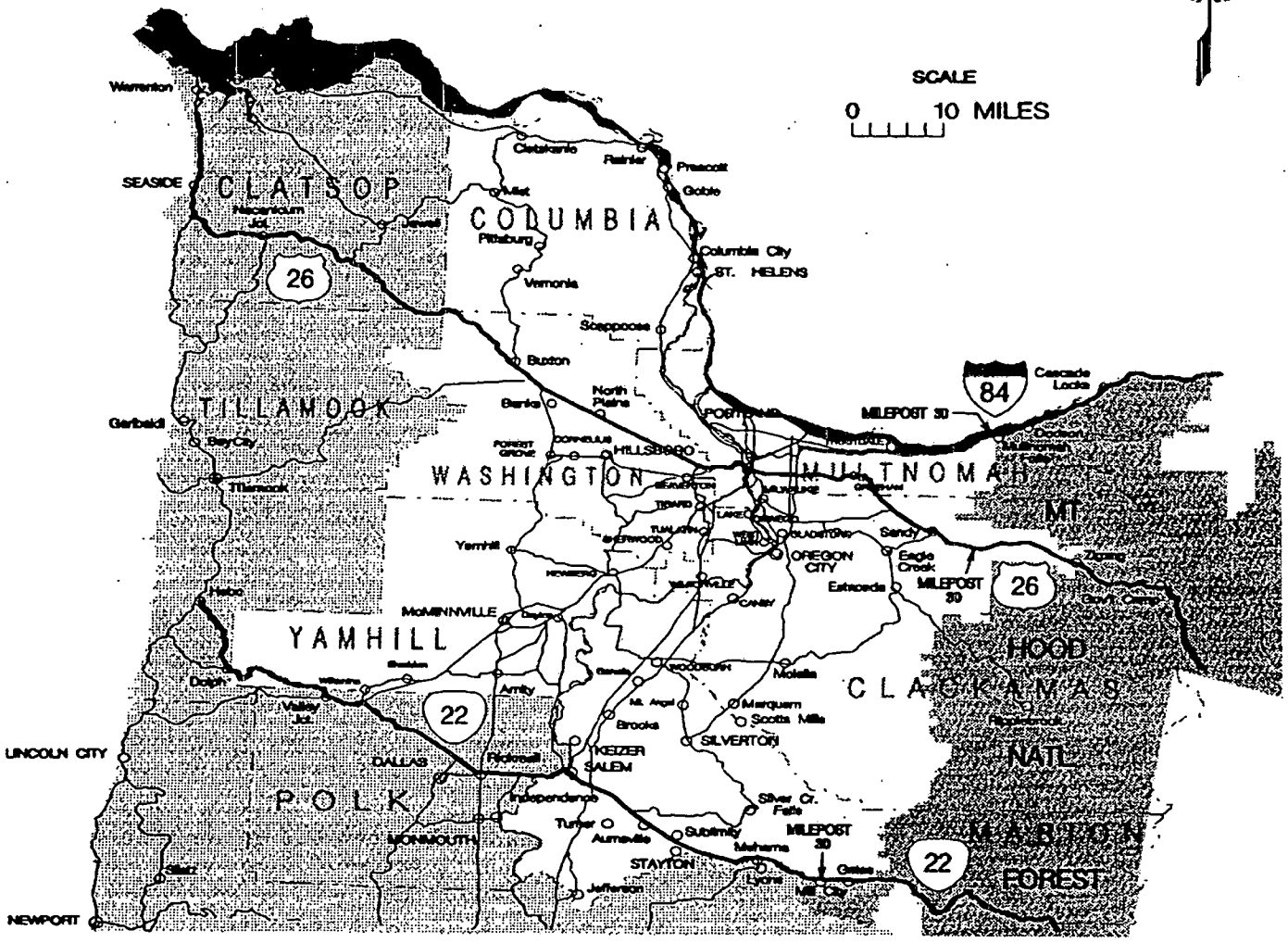
Group 6

Dump Trucks, side, end and bottom dumps over 60 cu. yds. and including 80 cu. yds including semi-trucks and trains or combinations thereof.

Group 7

Dump Trucks, side, end , and bottom dumps over 80 cu. yds and including 100 cu. yds., including semi-trucks and trains or combinations thereof.

Power Equipment Operators
Zone 1



LIST OF CONTRACTORS INELIGIBLE TO RECEIVE PUBLIC WORKS CONTRACTS PUBLICATION DATE: JANUARY 16, 2003

To: All Oregon Contracting Agencies

Pursuant to ORS 279.361, contractors on this list are ineligible to receive public works contracts subject to the Prevailing Wage Rate Law. These contractors and subcontractors, as well as any firm, corporation, partnership or association in which the contractor or subcontractor has a financial interest are ineligible to receive public works contracts until removed from this list.

If you have questions regarding the list or for the most current information regarding persons ineligible to receive prevailing wage contracts, please contact the Prevailing Wage Rate Coordinator, (Portland) (503) 731-4709.

CONTRACTOR NAME	DATE PLACED	REMOVAL DATE
1. **Joseph K. Adesida** 5331 NE Killingsworth Street Portland, OR 97218	March 14, 2002	March 13, 2005
2. **Tracy Alexander** 16004 SW Tualatin-Sherwood, Suite 256 Sherwood, OR 97140	May 15, 2000	May 14, 2003
3. **American Pipe Lining, Inc.** 7945 Dunbrook Road, Suite C San Diego, CA 92126	October 29, 2002	October 28, 2005
4. **Avery Backhoe, Inc.** 3414 NE 52nd Street, #B Vancouver, WA 98661	January 16, 2002	January 15, 2005
5. **Sanford Beals** 61000 Brosterhous Road #373 Bend, OR 97703	October 11, 2000	October 10, 2003
6. **Black Hawk, Inc. dba** **Columbia Construction Company** **Steven W. Francis** P.O. Box 352 Longview, WA 98632	December 4, 2000	December 3, 2003
7. **Robert Blair and Barbara Blair aka Barbara Groce** **dba Mid Valley Mechanical** 34058 Oakville Road Albany, OR 97321	October 29, 2002	October 28, 2005
8. **Cameron Creations** **Steven Cameron** **Nancy Cameron** PO Box 2 Lowell, OR 97452	May 25, 2000	Not to be Removed
9. **Cascade Concrete Construction, Inc.** 1262 Duncan Creek Road Skamania, WA 98648	December 4, 2000	December 3, 2003
10. **Curtis A. Chaves** 1262 Duncan Creek Road Skamania, WA 98648	December 4, 2000	December 3, 2003
11. **Collier Company, Inc., of Oregon** 2305-C Ashland Street #407 Ashland, OR 97520	February 26, 2002	February 25, 2005
12. **Jeannie M. Collier** 262 Prairie Landing Drive Eagle Point, OR 97524	February 26, 2002	February 25, 2005

LIST OF CONTRACTORS INELIGIBLE TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 16, 2003
PAGE 2

13. **Stephen E. Collier** 262 Prairie Landing Drive Eagle Point, OR 97524	March 14, 2002	September 13, 2003
14. **Collier Mechanical Contractors, Inc.** **Aaron Collier** PO Box 743 North Bend, OR 97459	March 29, 2001	March 28, 2004
15. **Diamond Drywall** 61000 Brosterhous Road #373 Bend, OR 97703	December 4, 2000	December 3, 2003
16. **Michael Duquette** 19428 Seminole Circle Bend, OR 97702	February 6, 2001	February 5, 2004
17. **Emerald Tower Inc.** c/o Habibollah Matin 6107 SW Murray Blvd. #433 Beaverton, OR 97008	October 29, 2002	October 28, 2005
18. **Energy Exchange, Inc. dba** **Energy Exchange** 4204 SE Crystal Springs Portland, OR 97206	May 10, 2001	May 9, 2004
19. **Four Seasons Heating & Cooling Specialists, Inc.** PO Box 536 224 Leisure Street Glide, OR 97443	October 10, 2001	October 9, 2004
20. **William C. Fraser, Jr.** PO Box 536 224 Leisure Street Glide, OR 97443	October 10, 2001	October 9, 2004
21. **Wayne Fromdahl** 900 NE Butler Market Road #V-2 Bend, OR 97701	October 11, 2000	October 10, 2003
22. **Gregory D. Jones** **Gregg's Custom Carpet Installation** 42958 SE Wildcat Mountain Drive Sandy, OR 97055	October 25, 2000	October 24, 2003
23. **Arthur A. Harding III dba** **Arthur Harding Mason Contractor** **Arthur Harding Masonry** **Art Harding Masonry** 602 SE 28th Avenue Portland, OR 97214	August 2, 2001	August 1, 2004
24. **Bruce D. Huhta** P.O. Box 352 Longview, WA 98632	July 2, 2001	July 1, 2004
25. **I-5 Excavating, Inc. dba** **I-5 Contracting, Inc.** **E. F. Dunn** 3655 Brooklake Road Brooks, OR 97305	July 25, 2001	July 24, 2004
26. **Interstate Concrete, Inc.** 1262 Duncan Creek Road Skamania, WA 98648	December 4, 2000	December 3, 2003

27. **J.B.M. Services, Inc** PO Box 11104 Portland, OR 97211 2420 N Hayden Island Drive, Bldg. E Portland, OR 97214	March 14, 2002	March 13, 2005
28. **Julie M. Loveday, dba** **Jewels Flagging Service** PO Box 2013 Redmond, OR 97756	October 10, 2001	October 9, 2004
29. **Karl Johnson** 576 Clearview Roseburg, OR 97470	September 6, 2000	September 5, 2003
30. **Johnson Builders, Inc.** **Laine Johnson** 3545 SW Falcon Portland, OR 97219	October 25, 2000	October 24, 2003
31. **Kylemac** 4413 Zirkle Court Longview, WA 98632	December 4, 2000	December 3, 2003
32. **LaMear, Inc** **Patrick LaMear** **Connie LaMear** PO Box 4191 Bellevue, WA 9800	February 26, 2002	February 25, 2005
33. **Scott Little** **Rhonda Little** 9106-BN NE Highway 99 Vancouver, WA 98665	April 25, 2000	April 24, 2003
34. **Anthony Lockett, Sr.** 16004 SW Tualatin-Sherwood, Suite 256 Sherwood, OR 97140	May 15, 2000	May 14, 2003
35. **Magic Numbers Estimating, Inc.** 529 S 47th St Springfield, OR 97478	July 15, 2002	July 14, 2005
36. **Don J. McMillin Constructors Inc.** **Donald J. McMillin** 10411 S952 PR Kennewick, WA 99338	May 1, 2002	April 30, 2005
37. **Millennium Interior Contractors, Inc.** 1501 W 8th Street Vancouver, WA 98660	September 16, 2002	September 15, 2005
38. **Steven H. Mori** 1320 Trail Dust Ave. San Diego, CA 92129	October 29, 2002	October 28, 2005
39. **John Nakamura** 7860 SW Hall Blvd. #3 Beaverton, OR 97008	October 29, 2002	October 28, 2005
40. **Heidi Navarre** 5410 103rd Street Vancouver, WA 98686	September 16, 2002	September 15, 2005
41. **North American Construction & Consulting, Inc.** 1863 Pioneer Parkway E, PMB 220 Springfield, OR 97478	July 15, 2002	July 14, 2005

42. **Denise E. Oistad** **Jonathan Oistad** 25829 N. 41st Dr. Glendale, AZ 85310-2438	September 16, 2002	September 15, 2005
43. **Frank Pausz, dba** **Bee Electric Service** 11165 NW Marylee Court Portland, OR 97229-4821	January 16, 2003	January 15, 2006
44. **Frank Pausz** PO Box 1681 Beaverton, OR 97075	January 16, 2003	January 15, 2006
45. **Pedro Ramos, dba** **P & A Painting Enterprises** **P & A Painting Enterprises, Inc.** 3027 NW Overlook Drive, #925 Hillsboro, OR 97124	August 2, 2001	August 1, 2004
46. **Quality Homes N.W., Inc.** 9106-BN NE Highway 99 Vancouver, WA 98665	April 25, 2000	April 24, 2003
47. **Ebrahim Sahebi aka Abrahim Sahebi** 10320 SW Mockingbird Way Beaverton, OR 97007-6176	October 29, 2002	October 28, 2005
48. **Sierra West Corporation** 4960 Industry Dr Central Point, OR 97502	September 16, 2002	September 15, 2005
49. **Michael D. Slover** 4204 SE Crystal Springs Portland, OR 97206	May 10, 2001	May 9, 2004
50. **Keith Testerman dba** **Testerman Masonry** 1940 NE Sams Loop, #4 Bend, OR 97701	June 6, 2000	June 5, 2003
51. **Top Notch Construction & Roofing** **Top Notch Construction** **William George Allmendinger** 84920 Ridgeway Road Pleasant Hill, OR 97455	January 8, 2001	January 7, 2004
52. **Welkin Construction, Inc.** 8000 SW Pfaffle Street Portland, OR 97223	May 1, 2002	April 30, 2005
53. **Welkin Engineering, P.C.** 8000 SW Pfaffle Street Portland, OR 97223	May 1, 2002	April 30, 2005
54. **Western Integrity Drywall** 16004 SW Tualatin-Sherwood, Suite 256 Sherwood, OR 97140	May 15, 2000	May 14, 2003

DAN GARDNER, COMMISSIONER
OREGON BUREAU OF LABOR AND INDUSTRIES

PREVAILING WAGE RATE FORMS

WH-38	Certified Payroll Form
WH-39	Public Work Contract Fee Information Form
WH-40	Public Work Contract Fee Adjustment Form

JANUARY 1, 2003

BUREAU OF LABOR AND INDUSTRIES
PREVAILING WAGE RATE UNIT

INSTRUCTIONS FOR COMPLETING THE PREVAILING WAGE RATE PAYROLL/CERTIFIED STATEMENT FORM

This form may be used by contractors for reporting their payroll as required by ORS 279.354 on public works projects subject to the Prevailing Wage Rate Law. The form contains a certified statement that is required to be signed by the contractor, certifying the accuracy of the information reported on the payroll, including representations pertaining to the provision of fringe benefits to employees by third parties. Contractors are not required to use this form in reporting their payroll, however, the contractor must provide all of the information contained in the form, and the certified statement must be signed and submitted with the contractor's payroll. Detailed instructions concerning the preparation of the form follow:

Complete the box at the top of the form. Check either the prime contractor or subcontractor box. Be sure to enter the date the contract was first advertised for bid. If you are not sure of this date, contact the Public Contracting Agency.

Column 1 - NAME AND ADDRESS OF EMPLOYEE: The employee's full name must be shown on each payroll submitted. The employee's address must also be shown on the first payroll submitted. (The address need not be shown on subsequent payrolls submitted unless the address changes.)

Column 2 - TRADE CLASSIFICATIONS: List the classification found in the Bureau of Labor and Industries' publication "Prevailing Wage Rates for Public Works Contracts in Oregon," that is most descriptive of the work actually performed by the employee. Give the group number for those worker classifications that include such information. Consult the worker classifications and minimum prevailing wage rate schedule set forth in the contract specifications. Use the appropriate prevailing wage rates in effect at the time the contract was first advertised for bid for information regarding trade classifications, base hourly rates, and hourly fringe benefits. Indicate which workers are apprentices, if any, and give their current percentage, trade classification, and group number when applicable. If an employee works in more than one worker classification, use the highest rate for all hours worked, or use separate line entries to show hours worked, rate of pay, and fringe benefit for each classification.

Column 3 - DAY AND DATE: Enter the day of the week (M, T, W, Th, F, S, and Sn) in the top row of boxes, and the corresponding date below.

HOURS WORKED EACH DAY: Enter the total number of "straight time" hours worked in the row marked "S." Hours worked over 8 in a day or work performed on Saturdays, Sundays, and legal holidays should be entered as overtime ("OT") hours worked. Contractors who have adopted a written work schedule of four consecutive ten-hour days, Monday through Thursday or Tuesday through Friday may enter hours worked over 10 in a day as overtime hours.

Column 4 - TOTAL HOURS: Enter separately the total number of straight time and overtime hours worked by each listed employee and classification during this pay period. The total number of straight time hours worked should be entered in the lower box ("S"); the total number of overtime hours worked should be entered in the top box ("OT").

Column 5 – BASE HOURLY RATE OF PAY: Enter the base hourly rate and the overtime hourly rate (if any) paid the employee in the appropriate straight time and overtime boxes. (Payment of not less than one and one half times the base or regular rate of pay, not including fringe benefits, is required to be paid in overtime pursuant to ORS 279.334.)

Column 6 - HOURLY FRINGE BENEFIT AMOUNT PAID AS WAGES TO THE EMPLOYEE: Enter any additional wages paid directly to the employee in lieu of fringe benefits. (It is not necessary to pay time and a half for overtime work on those wages that are paid in lieu of fringe benefits.)

Column 7 – GROSS AMOUNT EARNED: Enter the gross amount of wages earned by and paid to the worker in each classification for all listed straight time and overtime hours, and including any additional amounts paid directly to the employee.

Column 8 – TOTAL DEDUCTIONS, FICA, FED, STATE, ETC.: Enter the total amount of deductions withheld from the wages of each employee for only those hours reported on this payroll/certified statement for this project. (All deductions must be in accordance with the provisions of ORS 652.610.)

Column 9 – NET WAGES PAID FOR WEEK: Enter the total amount of net wages actually paid to the employee after subtracting the total deductions reported in Column 8 from the gross amount earned shown in Column 7.

Column 10 – HOURLY FRINGE BENEFITS PAID TO BENEFIT PARTY PLAN, FUND OR PROGRAM: Enter the hourly amount of fringe benefits paid to each individually approved party, plan, fund or program for each employee. List these amounts separately on the lines provided. Any contractor who is making payments to approved parties, plans, funds or programs in amounts less than the required hourly fringe benefit is obligated to pay the difference directly to the employee as wages in lieu of fringe benefits, and to show that amount in Column 6 of this form.

Column 11 – NAME OF BENEFIT PARTY, PLAN, FUND OR PROGRAM: Enter the name of the party, plan, fund or program that corresponds to the amount paid as an hourly fringe benefit in Column 10.

CALCULATION CHECK

In order to determine whether the wages and fringe benefits paid are sufficient to meet prevailing wage rate requirements, the following check may be performed:

1. For each trade classification listed in Column 2, compute the sum of:
   a) the Base Hourly Rate of Pay (Column 5),
   b) the Hourly Fringe Benefit Amount Paid as Wages to Employee (Column 6),
   c) and the Hourly Fringe Benefits Paid To Benefit Party, Plan, Fund or Program (Column 10).

2. This sum must equal or exceed the total of the Base Hourly Rate (including zone pay and special wage differentials, if any) and the Fringe Benefit Amount as they are listed for the corresponding trade classifications in the appropriate issue of the Bureau of Labor and Industries publication Prevailing Wage Rates for Public Works Contracts in Oregon.

IF YOU HAVE QUESTIONS REGARDING COMPLETION OF THIS FORM, CONTACT THE PREVAILING WAGE RATE UNIT OF THE BUREAU OF LABOR AND INDUSTRIES AT (503) 731-4723.

NOTE: PAYROLL/CERTIFIED STATEMENTS ARE REQUIRED TO BE SUBMITTED TO THE CONTRACTING AGENCY ONLY.

BUREAU OF LABOR AND INDUSTRIES
WAGE AND HOUR DIVISION

PAYROLL CERTIFIED STATEMENT FORM WH-38
FOR USE IN COMPLYING WITH ORS 279.354

PRIME CONTRACTOR ☐ SUBCONTRACTOR ☐

Business Name (DBA): Phone: ( ) CCB Registration Number:

Project Name: Project Number: Type of Work:

Street Address: Project Location:

Mailing Address: Project County

Date Pay Period Began: Date Pay Period Ended:

THIS SECTION FOR PRIME CONTRACTORS ONLY

Public Contracting Agency Name:
Phone: ( )
Date Contract Specifications First Advertised for Bid:
Contract Amount:

THIS SECTION FOR SUBCONTRACTORS ONLY

Subcontract Amount:
Prime Contractor Business Name (DBA):
Prime Contractor Phone: ( )
Prime Contractor's CCB Registration Number:
Date You Began Work on the Project:

(1)	(2)		(3) DAY AND DATE							(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
NAME AND ADDRESS OF EMPLOYEE	TRADE, CLASSIFICATION (INCLUDE GROUP # IF APPLICABLE)		HOURS WORKED EACH DAY							TOTAL HOURS	BASE HOURLY RATE OF PAY	HOURLY FRINGE BENEFIT AMOUNTS PAID AS WAGES TO EMPLOYEE	GROSS AMOUNT EARNED	TOTAL DEDUCTIONS FICA, FED, STATE, ETC.	NET WAGES PAID FOR WEEK	HOURLY FRINGE BENEFITS PAID TO BENEFIT PARTY, PLAN, FUND, OR PROGRAM	NAME OF BENEFIT PARTY, PLAN, FUND, OR PROGRAM
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THIS FORM CONTINUED ON REVERSE

FORM WH-38 (Rev. 5/02)

(1) NAME AND ADDRESS OF EMPLOYEE	(2) TRADE, CLASSIFICATION (INCLUDE GROUP # IF APPLICABLE)		(3) DAY AND DATE HOURS WORKED EACH DAY	(4) TOTAL HOURS	(5) BASE HOURLY RATE OF PAY	(6) HOURLY FRINGE BENEFIT AMOUNTS PAID AS WAGES TO EMPLOYEE	(7) GROSS AMOUNT EARNED	(8) TOTAL DEDUCTIONS FICA, FED, STATE, ETC.	(9) NET WAGES PAID FOR WEEK	(10) HOURLY FRINGE BENEFITS PAID TO BENEFIT PARTY, PLAN, FUND, OR PROGRAM	(11) NAME OF BENEFIT PARTY, PLAN, FUND, OR PROGRAM
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CERTIFIED STATEMENT

I, _____ DO HEREBY STATE:
(NAME OF SIGNATORY PARTY) (TITLE)

(1) THAT I PAY OR SUPERVISE THE PAYMENT OF THE PERSONS EMPLOYED BY: _____ ON THE _____
(CONTRACTOR, SUBCONTRACTOR OR SURETY) (BUILDING OR WORK)

THAT DURING THE PAYROLL PERIOD COMMENCING ON THE _____ DAY OF _____, _____ AND ENDING THE _____ DAY OF _____, _____
(MONTH) (YEAR) (MONTH) (YEAR)

ALL PERSONS EMPLOYED ON SAID PROJECT HAVE BEEN PAID THE FULL WEEKLY WAGES EARNED, THAT NO REBATES HAVE BEEN OR WILL BE MADE EITHER DIRECTLY OR INDIRECTLY TO OR ON BEHALF OF SAID _____ FROM THE FULL WEEKLY WAGES EARNED BY ANY PERSON, AND THAT
(CONTRACTOR, SUBCONTRACTOR OR SURETY)

NO DEDUCTIONS HAVE BEEN MADE EITHER DIRECTLY OR INDIRECTLY FROM THE FULL WAGES EARNED BY ANY PERSON, OTHER THAN PERMISSIBLE DEDUCTIONS AS SPECIFIED IN ORS 652.610, AND DESCRIBED AS FOLLOWS:

_____

(2) THAT ANY PAYROLLS OTHERWISE UNDER THIS CONTRACT REQUIRED TO BE SUBMITTED FOR THE ABOVE PERIOD ARE CORRECT AND COMPLETE; THAT THE WAGE RATES FOR WORKERS CONTAINED THEREIN ARE NOT LESS THAN THE APPLICABLE WAGE RATES CONTAINED IN ANY WAGE DETERMINATION INCORPORATED IN THE CONTRACT; THAT THE CLASSIFICATION SET FORTH THEREIN FOR EACH WORKER CONFORMS WITH WORK PERFORMED.
(3) THAT ANY APPRENTICES EMPLOYED IN THE ABOVE PERIOD ARE DULY REGISTERED IN A BONA FIDE APPRENTICESHIP PROGRAM REGISTERED WITH A STATE APPRENTICESHIP AGENCY RECOGNIZED BY THE BUREAU OF APPRENTICESHIP AND TRAINING, UNITED STATES DEPARTMENT OF LABOR, OR IF NO SUCH RECOGNIZED AGENCY EXISTS IN A STATE, ARE REGISTERED WITH THE BUREAU OF APPRENTICESHIP AND TRAINING, UNITED STATES DEPARTMENT OF LABOR.

I HAVE READ THIS CERTIFIED STATEMENT, KNOW THE CONTENTS THEREOF AND IT IS TRUE TO MY KNOWLEDGE.

_____ _____
NAME AND TITLE SIGNATURE

NOTE TO CONTRACTORS: YOU MUST ATTACH COPIES OF THIS FORM TO EACH OF YOUR PAYROLL SUBMISSIONS ON THIS PROJECT. SEE THE BOLI PUBLICATION PREVAILING WAGE RATES FOR PUBLIC WORKS CONTRACTS IN OREGON FOR INSTRUCTIONS ON COMPLETING THIS FORM.

FILE THIS FORM WITH THE CONTRACTING AGENCY

CONTRACT FEE SECTION
PREVAILING WAGE RATE UNIT
BUREAU OF LABOR AND INDUSTRIES
800 N.E. OREGON ST., #32
PORTLAND, OR 97232
PHONE: (503) 731-4723
FAX: (503) 731-4606

PUBLIC WORK CONTRACT FEE INFORMATION FORM

For use only by contractors who have contracted directly with a public agency on a public works project regulated by ORS 279.348 to 279.380 in compliance with ORS 279.375)

CONTRACTORS: Please complete and mail this form to BOLI at the above address, along with the appropriate fee (1/10th of 1% of the contract price*) payable to BOLI. **The minimum fee is $100; the maximum fee is $5,000.00.** Without the following completed information, the bureau may be unable to properly credit you for payment received.

BUSINESS NAME (DBA): _____ **CCB#:** _____

MAILING ADDRESS: _____ **PHONE: (___)** _____

PROJECT NAME: _____

PROJECT NUMBER: _____ **PROJECT LOCATION:** _____

AGENCY AWARDING CONTRACT: _____

AGENCY CONTACT PERSON: _____ **PHONE: (___)** _____

CONTRACT AMOUNT: _____ **DATE AWARDED:** _____

DATE WORK BEGAN: _____

***Contract amount X .001**

(Please duplicate this form for future use)

WH-39 (Rev. 1/02)

CONTRACT FEE SECTION
PREVAILING WAGE RATE UNIT
BUREAU OF LABOR AND INDUSTRIES
800 N.E. OREGON ST., #32
PORTLAND, OR 97232
PHONE: (503) 731-4723
FAX: (503) 731-4606

PUBLIC WORK CONTRACT FEE ADJUSTMENT FORM

THIS FORM TO BE USED FOR RECONCILIATION OF FEES UPON COMPLETION OF PUBLIC WORKS PROJECTS
(As required by ORS 279.375 and OAR 839-016-0210)

CONTRACTORS: Complete and mail this form to BOLI at the above address after completion of the public work project and not less than 30 days after the final payment by the contracting agency. Contractors are required to determine the final contract price, including all change orders or other adjustments to the original contract price, and to calculate the adjusted prevailing wage rate fee based on the revised contract price. Documentation must be included to support the final contract price. Documentation of the final contract price may consist of change orders or other contract documents substantiating the amount of the contract. The prevailing wage rate fee of .001 (1/10th of 1%) shall be applied to the final contract price, with credit taken for fees already submitted. The contractor must submit any additional fee payable to BOLI with the adjustment form or requests for refund if applicable. **NO ADDITIONAL FEE IS REQUIRED TO BE PAID, AND REFUNDS WILL NOT BE MADE, FOR RECONCILED AMOUNTS OF LESS THAN $100.00.**

BUSINESS NAME (DBA):_____ **CCB#:**_____

MAILING ADDRESS:_____ **PHONE:(____)**_____
(STREET OR PO BOX #, CITY, STATE, ZIP)

PROJECT NAME:_____

PROJECT NUMBER:_____ **PROJECT LOCATION:**_____

AGENCY AWARDING CONTRACT:_____

DATE AWARDED:_____

FINAL CONTRACT AMOUNT:_____
(Include all change orders and adjustments to the contract price)

FINAL FEE DUE:_____
(Final Contract amount X .001)

ORIGINAL CONTRACT AMOUNT:_____

INITIAL FEE PAID:_____
(Contract amount X .001)

BALANCE DUE*:_____

REFUND DUE*:_____

***Final contract fee less initial fee paid**

Sample Calculation:			
Final Contract Amount:	$ 400,000.00	Final Fee Due:	$ 400.00
Original Contract Amount:	- 300,000.00	Initial Fee Paid:	- 300.00
Total Adjustment:	$ 100,000.00	Additional Amount Due:	$ 100.00

(Please duplicate this form for future use)

PART 2

CONTRACT FORMS

CONTRACT FOR CONSTRUCTION

THIS CONTRACT, made and entered into this 31 day of July, 2003, by and between the CITY OF NEWBERG, OREGON, a municipal corporation, hereinafter called the "OWNER", and

of Clackamas Construction
P.O. Box 279 Boring, OR 97009

hereinafter called the "CONTRACTOR".

WITNESS:

Said Contractor, in consideration of the sum to be paid him by the said Owner and of the covenants and agreements herein contained, hereby agrees at his own proper cost and expense to do all the work and furnish all the materials, tools, labor, and all appliances, machinery and appurtenances for the **Chehalem Drive Sewage Pump Station Project** to the extent of the Bid made by the Contractor on the 19th day of June, 2003, all full compliance with Contract Documents referred to herein.

The Advertisement for Bids, the signed copy of the Bid made by the Contractor, the fully executed Contract, the Performance and Payment Bond, the Specifications, the Drawings, are hereby referred to and by reference made a part of this Contract as fully as if the same were completely set forth herein.

In consideration of the faithful performance of the work herein embraced, as set forth in these Contract Documents, and in accordance with the direction of the Community Development Director and to his satisfaction to the extent provided in the Contract Documents, or as otherwise herein provided and based on the said Bid made by the Contractor, the Owner agrees to pay to the Contractor the amount bid as adjusted in accordance with the Contract Documents, and to make such payments in the manner and at the times provided in the Contract Documents.

The Contractor agrees to complete the work within the time specified herein and to accept as full payment hereunder the amounts computed as determined by the Contract Documents and based on the said Bid.

The Contractor agrees to indemnify and save harmless the Owner from any and all defects appearing or developing in the materials furnished and the workmanship performed under this Contract for a period of two years or such other time as applicable law may allow after the date of acceptance of the work in the Contract by the Owner.

In the event that the Contractor shall fail to complete the work within the time limits or the extended time limit agreed upon, as more particularly set forth in the Contract Documents, shall be paid at the rate of two hundred fifty dollars ($250.00) per consecutive calendar day. Sundays and legal holidays shall be excluded in determining days in default.

The provisions of ORS 279.350 relating to prevailing wage rates are made a part of this Contract as completely as if the same were fully set forth herein.

The Contractor shall pay a fee to the Oregon Bureau of Labor and Industries pursuant to the provisions of ORS 279.352. The fee is equal to one-tenth of one percent (0.1 percent) of the price of the contract, but not less than $100 nor more than $5000, regardless of the contract price. The fee shall be paid on or before the first progress payment or 60 days from the date work first began on the contract, whichever comes first. The fee is payable to the Bureau of Labor and Industries and shall be mailed or otherwise delivered to the Bureau at the following address:

Bureau of Labor and Industries
Wage and Hour Division
Prevailing Wage Unit
800 N.E. Oregon Street, #32
Portland, OR 97232

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed the day and year first herein above written.

CITY OF NEWBERG, OREGON

By _____

Print Name James Bennett

Title City Manager

CONTRACTOR

By _____

Print Name Connie Mueller

Title President

APPROVED AS TO FORM:

_____

City Attorney

BOND NO.: 553863P

PERFORMANCE - PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we Clackamas Construction, Inc. A Oregon Corporation hereinafter called "Principal" and Developers Surety And Indemnity Company
(Corp., Partnership, or Individual)
of P.O. Box 1925, Irvine, State of California, herein after called "Surety", are held firmly bound unto the City of Newberg, Oregon, hereinafter called "Owner" in the penal sum of Three Hundred Thirty Eight Thousand Eight Hundred Thirty-five Dollars ($338,835.00) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract with the Owner, dated this 4th day of August, 2003, a copy of which is hereto attached and made a part hereof for the construction of the Chehalem Drive Sewage Pump Station Project.

NOW THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extension thereof which may be granted by the Owner, with or without notice to the Surety, and if he shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, and shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contracts and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools consumed or used in connection with the construction of such work whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition of the terms of the contract or the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specification.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed this 5th day of August 2003.

Clackamas Construction, Inc.
Principal

(Principal) Secretary

(s)

P.O. Box 279, Boring, OR 97009
(Address - Zip Code)

(SEAL)

Bobbie Krippi
Witness as to Principal

Estacada, 97023
(Address - Zip Code)

ATTEST

Power Of Attorney Attached
(Surety) Secretary

Developers Surety And Indemnity Company
Surety

By
Attorney-in-fact
Roger C. Rothrock, Attorney-in-fact

(SEAL)

Judy Rothrock
Witness as to Surety Judy Rothrock

4850 SW Scholls Ferry Rd. #109, Portland, OR 97225
(Address - Zip Code)

Note: Date of Bond must not be prior to the date of Contract. If Contractor is Partnership, all partners should execute bond.

POWER OF ATTORNEY FOR
DEVELOPERS SURETY AND INDEMNITY COMPANY
INDEMNITY COMPANY OF CALIFORNIA

PO BOX 19725, IRVINE, CA 92623 • (949) 263-3300

KNOW ALL MEN BY THESE PRESENTS, that except as expressly limited, DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA, do each, hereby make, constitute and appoint:

Roger C. Rothrock, Judy Rothrock, jointly or severally

as their true and lawful Attorney(s)-in-Fact, to make, execute, deliver and acknowledge, for and on behalf of said corporations, as sureties, bonds, undertakings and contracts of suretyship giving and granting unto said Attorney(s)-in-Fact full power and authority to do and to perform every act necessary, requisite or proper to be done in connection therewith as each of said corporations could do, but reserving to each of said corporations full power of substitution and revocation, and all of the acts of said Attorney(s)-in-Fact, pursuant to these presents, are hereby ratified and confirmed.

This Power of Attorney is granted and is signed by facsimile under and by authority of the following resolutions adopted by the respective Board of Directors of DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA, effective as of November 1, 2000:

RESOLVED, that the Chairman of the Board, the President and any Vice President of the corporation be, and that each of them hereby is, authorized to execute Powers of Attorney, qualifying the attorney(s) named in the Powers of Attorney to execute, on behalf of the corporations, bonds, undertakings and contracts of suretyship; and that the Secretary or any Assistant Secretary of the corporations be, and each of them hereby is, authorized to attest the execution of any such Power of Attorney;

RESOLVED, FURTHER, that the signatures of such officers may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signatures shall be valid and binding upon the corporation when so affixed and in the future with respect to any bond, undertaking or contract of suretyship to which it is attached.

IN WITNESS WHEREOF, DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA have severally caused these presents to be signed by their respective Executive Vice President and attested by their respective Secretary this 8th day of January, 2002.

By: _____
David H. Rhodes, Executive Vice President

By: _____
Walter A. Crowell, Secretary

DEVELOPERS SURETY AND INDEMNITY COMPANY CORPORATE OCT. 10 1936 IOWA

INDEMNITY COMPANY OF CALIFORNIA INCORPORATED OCT. 5 1967 CALIFORNIA

STATE OF CALIFORNIA)
)SS.
COUNTY OF ORANGE)

On January 8, 2002, before me, Antonio Alvarado, personally appeared David H. Rhodes and Walter A. Crowell, personally known to me (or proved to me on the basis of satisfactory evidence) to be the persons whose names are subscribed to the within instrument and acknowledged to me that they executed the same in their authorized capacities, and that by their signatures on the instrument the entity upon behalf of which the persons acted, executed the instrument.

WITNESS my hand and official seal.

Signature _____

WMD1 ANTONIO ALVARADO COMM. # 1300303 Notary Public - California ORANGE COUNTY My Comm. Expires APRIL 10, 2005 WMD1

CERTIFICATE

The undersigned, as Chief Operating Officer of DEVELOPERS SURETY AND INDEMNITY COMPANY and INDEMNITY COMPANY OF CALIFORNIA, does hereby certify that the foregoing Power of Attorney remains in full force and has not been revoked, and furthermore, that the provisions of the resolutions of the respective Boards of Directors of said corporations set forth in the Power of Attorney, are in force as of the date of this Certificate.

This Certificate is executed in the City of Irvine, California, the 5th day of August, 2003.

By _____
David G. Lane, Chief Operating Officer

ID-1380 (01/02)

THE INSCODICO GROUP

DISCLOSURE RIDER

Terrorism Risk Insurance Act of 2002

The Terrorism Risk Insurance Act of 2002 created a three-year program under which the Federal Government will share in the payment of covered losses caused by certain events of international terrorism. The Act requires that we notify you of certain components of the Act, and the effect, if any, the Act will have on the premium charged for this bond.

Under this program, the Federal Government will cover 90% of the amount of covered losses caused by certified acts of terrorism, as defined by the Act. The coverage is available only when aggregate losses resulting from a certified act of terrorism exceed $5,000,000.00. Insurance carriers must also meet a variable deductible established by the Act. The Act also establishes a cap of $1,000,000,000.00 for which the Federal Government or an insurer can be responsible.

Participation in the program is mandatory for specified lines of property and casualty insurance, including surety insurance. The Act does not, however, create coverage in excess of the amount of the bond, nor does it provide coverage for any losses that are otherwise excluded by the terms of the bond, or by operation of law.

No additional premium has been charged for the terrorism coverage required by the Act.

Developers Surety and Indemnity Company
Indemnity Company of California
17780 Fitch
Irvine, CA 92614
(949) 263 3300
www.inscodico.com

ACORD CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 08/13/2003

PRODUCER (503)239-4116 FAX (503)231-9021
LaPorte & Associates, Inc.
5515 S.E. Milwaukie Avenue
Portland, OR 97202
Patricia Messick

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED Clackamas Construction Inc.
Connie Mueller
P O Box 279
Boring, OR 97009-0279

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A: Ohio Casualty Insurance Co	
INSURER B: West American	
INSURER C:	
INSURER D:	
INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDIN ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A		GENERAL LIABILITY [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC	BKO04352911752	01/24/2003	01/24/2004	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 100,000 $ 10,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
B		AUTOMOBILE LIABILITY [X] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [ ] HIRED AUTOS [ ] NON-OWNED AUTOS	BAW52911752	01/24/2003	01/24/2004	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
		GARAGE LIABILITY [ ] ANY AUTO				AUTO ONLY - EA ACCIDENT OTHER THAN AUTO ONLY: EA ACC AGG	$ $ $
A		EXCESS/UMBRELLA LIABILITY [X] OCCUR [ ] CLAIMS MADE [ ] DEDUCTIBLE [X] RETENTION $ 0	BXO0452911752	01/24/2003	01/24/2004	EACH OCCURRENCE AGGREGATE	$ 3,000,000 $ 3,000,000
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below				[ ] WC STATU-TORY LIMITS [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ $ $
A		OTHER Inland Marine: Installation Floater	BKO(04)52911752	01/24/2003	01/24/2004	$25,000 at Installation Site $5,000 in Transit $500 Deductible	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

RE: Chehalem Drive and Pump Station
The City of Newberg is included as an additional insured per CG8330 attached to policy.

CERTIFICATE HOLDER

City of Newberg
Community Development
Attn: Bob Knorr
P O Box 970
Newberg, OR 97132

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

©ACORD CORPORATION 1988

1. BLANKET ADDITIONAL INSURED (Owners, Contractors or Lessors)

WHO IS AN INSURED (SECTION II) is amended to include as an insured any person or organization whom you are required to name as an additional insured on this policy under a written contract or agreement.

The written contract or agreement must be:
(a) currently in effect or becoming effective during the term of this policy; and
(b) executed prior to the "bodily injury," "property damage" or "personal and advertising injury."
The insurance provided the additional insured is limited as follows:
a. Real property you own, rent, lease or occupy; or
b. "your work" for that additional insured for or by you.

2. The limits of insurance applicable to the additional insured are those specified in the written contract or agreement or the limits available under this policy whichever are less. These limits are inclusive of and not in addition to the limits of insurance available under this policy.

3. The insurance provided the additional insured does not apply toliability arising out of the sole negligence of the additional insured.

4. The insurance provided the additional insured does not apply to:
a. "bodily injury",
b. "property damage",
c. "personal and advertising injury" or
d. defense coverage under the Supplementary Payments section of the policy

arising out of an architect's, engineer's, or surveyor' rendering of or failure to render any professional services including:

(1) The preparing, approving, or failing to prepare or approve maps, map drawing, opinions, reports, surveys, field orders, change orders or drawings and specifications; and
(2) Supervisory, inspection, architectural or engineering activities.

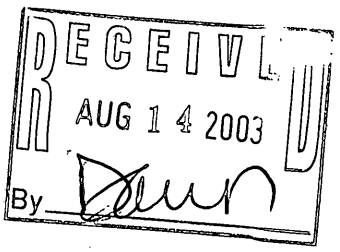
Any coverage provided hereunder shall be excess over any other valid and collectible insurance to the additional insured whether primary, excess, contingent or on any other basis unless a contract specifically requires that this insurance be primary or you request that it apply on a primary basis.

Certificate of Insurance

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE IS NOT AN INSURANCE POLICY AND DOES NOT AMEND, EXTEND, OR ALTER THE COVERAGE AFFORDED BY THE POLICIES LISTED.

This is to Certify that

CLACKAMAS CONSTRUCTION INC
PO BOX 279
BORING OR 97009-0279



Liberty Northwest®
Member of Liberty Mutual Group

P O Box 4555
Portland, OR 97208-4555
503.239.5800

is, at the date of the certificate, insured by the Company under the policy(ies) listed below. The insurance afforded by the listed policy(ies) is subject to all their terms, exclusions and conditions and is not altered by any requirement, term or condition of any contract or other document with respect to which this certificate may be issued.

TYPE OF POLICY	EXPIRATION DATE	POLICY NUMBER	LIMITS OF LIABILITY	
[X] WORKERS' COMPENSATION	10/01/2003	WC4-1NC-004725	COVERAGE AFFORDED UNDER W.C. LAW OF FOLLOWING STATES: OR EMPLOYERS LIABILITY LIMITS Each Accident $ 500,000 Disease - policy limit $ 500,000 Disease - each employee $ 500,000	COVERAGE AFFORDED UNDER W.C. LAW OF FOLLOWING STATES: EMPLOYERS LIABILITY LIMITS Each Accident $ Disease - policy limit $ Disease - each employee $
			MARITIME COVERAGE-FOLLOWING STATES	LIMIT OF LIAB.-MARITIME COVERAGE
GENERAL LIABILITY [ ] Commercial General Liability (Occurrence) [ ] Owner's and Contractor's Protective [ ] _____			General Aggregate Products Comp/OPS Aggregate Personal & Advertising Injury Each Occurrence Fire Damage (Any one fire) Medical Expense (Any one person)	$ $ $ $ $ $
AUTOMOBILE LIABILITY [ ] Any Auto [ ] All owned Autos [ ] Scheduled Autos [ ] Hired Autos [ ] Non-owned Autos [ ] Garage Liability [ ] _____			CSL Bodily Injury (Per Person) Bodily Injury (Per Accident) Property Damage	$ $ $ $
OTHER				

LOCATION(S) OF OPERATIONS & JOB # (IF APPLICABLE)
FAX 503 538 5013 ATTN: BOB KNORR
FAX 503 663 6251 ATTN: BOBBIE

DESCRIPTION OF OPERATIONS
CHEHALEM DRIVE PUMP STATION

CANCELLATION: SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED BELOW, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, OR REPRESENTATIVES.

MAILED TO:
CITY OF NEWBERG
COMMUNITY DEVELOPMENT OFFICE
PO BOX 970
NEWBERG OR 97132-0970

EFS bt 8/12/2003 PORTLAND Marketing
DATE ISSUED OFFICE

CERTIFA

SUBCONTRACTOR'S ELIGIBILITY
FOR A PUBLIC WORKS SUBCONTRACT

_____

project name

_____ _____

signature of person completing form *print name*

_____

title

with legal authority from

_____ _____

name of contracting company *telephone*

_____ _____

business address *fax*

hereinafter referred to as Subcontractor, certifies that the Subcontractor is eligible to provide construction work for the above referenced Project as set forth in ORS 279.361. The Subcontractor further agrees to provide this certification to be filed with the City prior to such Subcontractor commencing any subcontract work under the contract.

Please provide a brief description of subcontract work:

_____

_____

_____ _____

date of commencing subcontract work *estimated completion date*

_____ _____

signature of person completing form *print name*

_____ _____

title *date*

VERIFICATION OF PAYMENT TO SUBCONTRACTORS AND/OR SUPPLIERS

for the month of _____, 2003

The Contractor shall provide a copy of this form to all Subcontractor(s) and Supplier(s). It is the responsibility of all Subcontractor(s) and Supplier(s) to complete this form and give it to the City prior to the 7th day of each month following work or material supplied, until either the end of project is reached or full/final/complete payment is made by the Contractor.

_____

project name

_____ _____

name of contracting company *telephone*

_____ _____

business address *fax*

The City hereby requests the Subcontractor(s) and Supplier(s) to disclose to the City, payment status on work and/or material furnished for the above project for the month indicated above. The purpose is to determine if all claims, indebtedness for material, labor and other services performed in connection with this project have been paid in a timely manner by the Contractor. This information is necessary for the City to evaluate further payment request to the Contractor, in compliance with the contract documents, the plans, and the specifications.

_____ _____

name of subcontracting company *telephone*

_____ _____

business address *fax*

_____

dates of billing *payment status: (when, full, partial, non, overdue, etc.)*

_____

expected date of completion of subcontract work

Comments: _____

_____

_____ _____

signature of person completing form *print name*

_____ _____

title *date*

CERTIFICATE OF COMPLIANCE

_____

project name

_____ _____

name of contracting company *telephone*

_____ _____

business address *fax*

I, (We) hereby certify that all work has been performed and materials supplied in accordance with the contract documents, the plans and the specifications for the above project, and that:

1. Not less than the prevailing rates of wages as ascertained by the Contracting Agency have been paid to laborers, workers and mechanics employed on this project;

2. There have been no unauthorized substitutions or assignment of subcontractors, nor have any subcontracts been entered into without the names of the subcontractors having been submitted to the Engineer prior to the start of such subcontracted work;

3. All claims and indebtedness for material and labor and other services performed in connection with this project have been paid;

4. All moneys due the State Industrial Accident Fund, the State Unemployment Compensation Trust Fund (ORS 279.510), the State Department of Revenue (ORS 316.162 thru 316.212), hospital associations and/or others (ORS 279.320) have been paid;

5. All private property and easement areas have been satisfactorily restored in accordance with the contract.

Comments: _____

_____

_____ _____

signature of person completing form *print name*

_____ _____

title *date*

CERTIFICATE OF COMPLETION

_____
project name

_____ _____
name of contracting company *telephone*

_____ _____
business address *fax*

_____ _____
contract date *contract expiration date*

_____ _____
completion date *delinquent - yes/no*

CITY:

The City hereby accepts the project as complete, in compliance with the contract documents and the plans and specifications.

_____
project inspector *date*

_____
project manager *date*

CONTRACTOR:

I, (We) certify that I (we) have completed the contract, furnished the materials, and performed all the required work for the project, and declare the beginning of the two year maintenance warranty period on the project, in accordance with the contract documents, the plans and specifications.

_____
contractor *date*

_____
title

PART 3

CONDITIONS OF THE CONTRACT

GENERAL CONDITIONS
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GENERAL CONDITIONS

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101 DEFINITIONS AND ABBREVIATIONS

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Unless otherwise defined in the Contract Documents the following definitions and abbreviations shall apply wherever used.

The words directed, required, permitted, ordered, requested, instructed, designated, considered necessary, prescribed, approved, acceptable, satisfactory, or words of like import, refer to actions, expressions, and prerogatives of the Engineer.

Command type sentences are used but are not exclusive of other directives, throughout these Specifications. In all cases the command expressed or implied is directed to the Contractor.

101.01 DEFINITIONS

Acceptance of Work
All work required by the Contract Documents will be considered accepted upon approval of the Certificate of Completion by Owner.

Acts of God
An act of God is to be construed to mean an earthquake, flood, cloudburst, tornado, hurricane or other phenomenon of nature of catastrophic proportions or intensity.

Advertisement
The public announcement inviting bids for work to be performed or materials to be furnished.

Attorney
The City Attorney of the City of Newberg, Oregon.

Bid
The offer of a Bidder, titled Proposal, which is the basis of the Contract, submitted on Owner's official Bid form, to perform stated work at a price or prices quoted.

Bid Bond
The bond required to be submitted with each Bid as described in Subsection 102.06 as a Bid Guaranty, which assures that the bidder will enter into a contract if his bid is accepted, synonymous with bid security.

Bidder
Any individual, firm, co-partnership, corporation, or combination thereof, submitting a Bid in response to the advertisement calling for bids on the work contemplated in the Contract.

Business Day
Definition is the same as for "Working Day".

Certificate of Completion
Standard Owner's form which must be signed by the Contractor.

Certificate of Compliance
Standard Owner's form which must be signed by the Contractor stating compliance with the Contract Documents.

Change Order
A written order issued by the Engineer to the Contractor directing changes in the work, subject to approval of Owner.

Construction Manager
A Project Engineer who manages the project from construction to completion after the award of the Contract.

Contract Cost
The aggregate amount of price promised to be paid by Owner to Contractor upon fulfillment of the Contract.

Contract
The document entitled contract or agreement which is executed by the Contractor and the Owner, authorizing ordinance, the advertisement calling for bids, the bid, instructions to bidder, plans, all specifications, addenda, permits, performance bond, insurance certificates, and change order for any approved revisions made during the performance of the work to any of the above listed documents, collectively referenced as the contract documents.

Contract Item
A specific unit of work for which a price or basis of payment is provided in the Contract.

Contractor
Any individual, firm, co-partnership, corporation or any combination thereof who has or have entered into a Contract with the Owner for a particular project. In the case of work being done under permit issued by the Owner, the permittee shall be construed to be the Contractor.

Day
Calendar day, any and every day shown on the calendar, Sundays and Holidays included.

Easement
The right to use a defined area of property for specific purpose or purposes as set forth in the specifications.

Engineer
The City Engineer of the City of Newberg acting either directly or through authorized representatives.

Foreign Contractor
Contractor who is not domiciled in or registered to do business in the State of Oregon.

Holidays
The following shall be recognized as legal holidays: Veteran's Day, Thanksgiving Day, Christmas Eve, Christmas Day, New Year's Day, Martin Luther King Jr. Birthday, and President's Day.

Improvement
General term encompassing all phases of work to be performed under a Contract for a Local Improvement District and is synonymous with the term Project or work.

Inspector
The authorized representative of the Engineer whose authority, instructions, and decisions shall be limited to the particular duties and responsibilities entrusted to him in making detailed inspections of any or all portions of the work or materials therefor.

Lump Sum
A method of payment providing for one all-inclusive payment for the work described to be done, complete and accepted without further measurement, as such work is covered under the applicable lump sum pay item.

Manager
The City Manager of the City of Newberg acting either directly or through authorized representatives.

Notice
A written communication delivered by hand or by mail to the authorized individual, member of the firm or officer of the corporation for which it is intended. If delivered or sent by mail it shall be addressed to the last known business address of the individual, firm or corporation. In the case of a Contract with two (2) or more persons, firms or corporations, notice to one shall be deemed notice to all.

OSHD Standard Specification
The latest edition of the Specification Document published by the State of Oregon entitled Standard Specifications for Highway Construction, Oregon State Highway Division. This document is available from the Oregon State Highway Division, Salem, Oregon.

Owner
The City of Newberg, acting through its legally constituted City Council.

Performance and Payment Bond
The bond submitted by the Contractor and his surety as specified in the Contract and as more fully described in Subsection 103.06.

Plans
The official plans, profiles, cross sections, elevations, details and other working, supplementary and detail drawings, or reproductions thereof, signed by the Engineer, which show the location, character, dimensions and details of the work to be performed. Plans may either be bound in the same book as the balance of the Contract Documents or bound in separate sets, and are a part of the Contract Documents, regardless of the method of binding.

Prequalification
Process for pre-screening Contractors.

Project
General term encompassing all phases of the work to be performed under the Contract and is synonymous with the term Improvement or Work.

Project Manager
Definition is the same as for "Construction Manager".

Proposal
See Bid.

Provide
When related to an item of work, the word provide shall be understood to mean furnish and install the work complete in place.

Reference Specifications
Bulletins, standards, rules, methods of analysis or test, codes and specifications of other agencies, engineering societies, or industrial associations referred to in the Contract Documents. All such references specified herein refer to the latest edition thereof, including any amendments thereto which are in effect and published at the time of advertising for bids or of issuing the permit for the project.

Responsible and Responsive Bidder
This term denotes a bidder who has the capability in all respects to perform fully the contract, and the integrity and reliability which will assure good faith performance and who has submitted a bid under a competitive sealed bid which conforms in all respects to the invitation for bids so that all bidders may stand on equal footing with respect to method and timeliness of submission and as to the substance of any resulting contract.

Right-of-Way
A general term denoting public land, property, or interest therein, acquired for or devoted to a public street, public access or public use.

Roadway
That portion of a street and its appurtenances between curbs, gutters, or ditches, primarily used for vehicular traffic.

Shop Drawings and Submittals
Supplementary plans or data or other information which the Contract requires the Contractor to submit to the Engineer.

Shown
As used herein, the word shown, or as shown, shall be understood to refer to work shown on the Plans in the Contract.

Special Provisions
Definition is the same as for "Special Specifications".

Special Specifications
Requirements peculiar to the project and changes and modifications of the Standard Specifications.

Specified
As used herein, the word specified, or as specified, means as required by the Contract.

Standard Plans or Drawings
Details of structures, devices, or instructions adopted by Owner as a standard and referred to in the Contract.

Standard Specifications
The terms, directions, provisions and requirements set forth herein.

Station
A distance of 100 feet measured horizontally along the established centerline of a street, sewer, or other work, unless specified otherwise.

Street
Any street, avenue, boulevard, alley, lane, bridge, bicycle path, road, public thoroughfare or public way and any land over which a right-of-way has been obtained or granted for any purpose of public travel.

Subcontractor
An individual, partnership, firm, corporation, or any combination thereof, to whom the Contractor sublets part of the Contract.

Substantial Completion
The work (or a specified part thereof) has progressed to the point where, in the opinion of the Engineer, it is sufficiently complete in accordance with the Contract Documents, so that the work (or specified part) can be utilized for the purposes for which it is intended.

Surety
The corporate body which is bound with and for the Contractor, for the acceptable performance of the Contract, and for his payment of all obligations arising out of the Contract.

Unit Price
A Contract item of work providing for payment based on specific unit of measurement; e.g., linear foot or cubic yard.

Use of Pronoun
As used herein, the singular shall include the plural, and the plural the singular; any masculine pronoun shall include the feminine or neuter gender; and the term "person" includes natural person or persons, firm, co-partnership, corporation or association, or combination thereof.

Utility
Tracks, overhead or underground wires, pipelines, conduits, ducts, or structures, owned, operated or maintained in or across a public right-of-way or easement.

Work
All material, labor, tools, equipment, and all appliances, machinery, transportation, and appurtenances necessary to perform and complete the Contract, and such additional items not specifically indicated or described which can be reasonably inferred as belonging to the item described or indicated and as required by good practice to provide a complete and satisfactory system or structure.

Working Day
Calendar day, any and every day shown on the calendar, excluding Saturdays, Sundays and Legal Holidays.

101.02 ABBREVIATIONS

AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AGC	Associated General Contractors of America
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
BOLI	Bureau of Laborer and Industries
CRSI	Concrete Reinforced Steel Institute
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
ITE	Institute of Traffic Engineers
MUTCD	Manual on Uniform Traffic Control Devices
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NLMA	National Lumber Manufacturer's Association
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statutes
OSHA	Occupational Safety and Health Administration
OSHD	Oregon State Highway Division
PCA	Portland Cement Association
UBC	Uniform Building Code
UL	Underwriters' Laboratories, Inc.
USASI	United States of America Standards Institute
WWPA	Western Wood Products Association

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102 INSTRUCTIONS TO BIDDERS

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102.01 EEO AFFIRMATIVE ACTION

Bidders must comply with the City of Newberg's Equal Opportunity Policy for Contractors. The policy is included in and made a part of these Contract Documents.

102.02 PREQUALIFICATION OF BIDDERS

All bidders must be prequalified. The Contractor's Statement of Qualifications form included with the Bid Documents must be submitted to the Owner at least fourteen (14) calendar days prior to the bid opening date. Contractors approved for bidding will be notified by addendum at least seven (7) calendar days prior to the bid opening date. A notice of disqualification can be given orally. An oral disqualification notice will be followed by written notice and bear the date of the oral notice.

102.03 FORM OF BID

A. Bidders shall enclose the bid, bid bond, certified check or cashier's check in a sealed, labeled, and addressed envelope and file as required in the Notice to Contractors. The outside of the envelope should plainly identify: the Project name and the Bid Opening date.

B. All bids must be clearly and distinctly typed or written with ink or indelible pencil and be on the form furnished by Owner, and in addition to necessary unit price items and total prices in the column of totals to make a complete bid, all applicable blanks giving general information must be filled in and the bid signed by the Contractor or a duly authorized agent. Any statement accompanying and tending to qualify a bid may cause rejection of such bid, unless such statement is required in a bid embracing alternative bids.

C. Unless otherwise specified, bidders shall bid on all bid items included in the bid and the low bidder shall be determined as noted in Subsection 103.01, AWARD OF CONTRACT. Except as provided herein, bids which are incomplete, or fail to reply to all items required in the bid may be rejected.

D. State whether business is being done as an individual, a co-partnership, a corporation, or a combination thereof, and if incorporated, in what state, and if a co-partnership, state names of all partners. The person signing on behalf of a corporation, a co-partnership or combination thereof shall state his position with the firm or corporation, and state whether the corporation is licensed to do business in the State of Oregon.

102.04 WITHDRAWAL, MODIFICATION OR ALTERATION OF BID

A. A bid may only be withdrawn on written or telegraphic request of the bidder and received by the Owner prior to the scheduled closing time for filing bids.

B. Prior to Bid Opening, changes may be made provided the change is initialed by the bidder or his agent. If the intent of the bidder is not clearly identifiable, the interpretation most advantageous to Owner will prevail.

102.05 LATE BIDS

Bids received after the scheduled closing time for filing bids, as set forth in the invitation for bids will be rejected and returned unopened to the bidder unless such closing time is extended by Owner.

102.06 BID GUARANTY AND ORGANIZATION

Unless covered by an annual bid bond, filed with the Owner, in an unencumbered amount sufficient to cover all pending bids, all bids must be accompanied by a Bid guaranty guaranteeing that the bid will be irrevocable for 60 days, unless specified otherwise, in the form of a certified check or cashier's check payable to the order of the Owner, or a bidder's bond in such form as is approved by the City Attorney in an amount of at least ten percent (10%) of the amount of the bid. Such bid guaranty shall be forfeited as liquidated damages if the bidder shall fail or neglect to furnish a performance-payment bond and insurance, if required, and to execute and return the contract within fifteen (15) days after issuance of the Contract.

102.07 INTERPRETATION OF CONTRACT AND ADDENDA

A. If it should appear to a Bidder that the work to be done or matters relative thereto are not sufficiently described or explained in the Contract Documents or that Contract Documents are not definite and clear, or the Bidder requests additional information or an interpretation of the contract, the Bidder may make written inquiry regarding same to the Engineer at least five (5) days before the scheduled closing time for filing bids.

B. If, in the opinion of the Engineer, additional information or interpretation is required, an addendum will be issued to all known specification holders.

C. Any addendum or addenda issued by the Owner which may include changes, corrections, additions, interpretations or information, and issued forty-eight (48) hours or more before the scheduled closing time for filing bids, Saturday, Sunday and legal holidays not included, shall be binding upon the Bidder. Owner shall supply copies of such addenda to all Contractors who have obtained copies of the Contract for the purpose of bidding thereon, but failure of the Contractor to receive or obtain such addenda shall not excuse him from compliance therewith if he is awarded the contract.

ORAL INSTRUCTIONS OR INFORMATION CONCERNING THE CONTRACT OR THE PROJECT GIVEN OUT BY OFFICERS, EMPLOYEES OR AGENTS OF THE OWNER TO PROSPECTIVE BIDDERS SHALL NOT BIND THE OWNER.

102.08 EXAMINATION OF CONTRACT, SITE OF WORK AND SUBSURFACE DATA

A. Bidders shall determine for themselves all the conditions and circumstances affecting the project or the cost of the proposed work, including without limitation utility interferences, by personal examination of the site, careful review of the Contract and by such other means as the Bidder feels may be necessary. It is understood and agreed that information regarding subsurface or other conditions, or obstructions indicated in the Contract Documents, is provided by Owner only for the convenience of Bidders and such information is not expressly or tacitly warranted to accurately represent actual conditions. Bidder's use of such information shall be at Bidder's sole risk, and Bidder is responsible to confirm any information provided from such independent sources as Bidder feels may be necessary.

B. Logs of test holes, test pits, soils reports, ground-water levels and other supplementary subsurface information are offered as information of underlying materials and conditions at the locations actually tested. Owner will not be liable for any loss sustained by the Contractor as a result of any variance between conditions contained in or interpretations of test reports and the actual conditions encountered during progress of the work.

C. The submission of a Bid shall be conclusive evidence that the Bidder has investigated and is satisfied as to the site subsurface conditions to be encountered, as to the character, quality and quantities of work to be performed and materials to be furnished, and as to the requirements of the Contract.

102.09 FAMILIARITY WITH LAWS AND ORDINANCES

The Bidder is presumed to be familiar with all Federal, State, and local laws, ordinances, and regulations which in any manner affect those engaged or employed in the work or the materials or equipment used in the proposed construction, or which in any way affect the conduct of the work. If the Bidder, or Contractor, shall discover any provision in the Contract which is contrary to or inconsistent with any law, ordinance or regulation, he shall immediately report it to the Owner in writing.

102.10 UNIT BIDS

A. The estimate of quantities of work to be done under unit price bids is approximate and is given only as a basis of calculation for comparison of bids and award of the Contract. The Owner does not warrant that the actual amount of work will correspond to the amount as shown or estimated. Payment will be made at unit prices under a contract, only for work actually performed or materials actually furnished according to actual measurement.

B. Bidders must include in their bid prices the entire cost of each item of work set forth in the bid, and when, in the opinion of the Owner, the prices in any bid are obviously unbalanced, such bid may be rejected.

C. The unit contract prices for the various bid items of the contract shall be full compensation for all labor, materials, supplies, equipment, tools and all things of whatsoever nature required for the complete incorporation of the item into the work the same as though the item were to read "In Place."

102.11 REJECTION OF BIDS

A. Owner reserves the right to reject any or all bids in whole or in part or waive irregularities.

B. This invitation to bid does not commit the City to pay any costs incurred by any Bidder in the submission of a proposal, or in making necessary studies or designs for the preparation thereof, or for procuring or contracting for the items to be furnished under the invitation to bid.

102.12 CONFLICT OF INTEREST

A bidder filing a bid thereby certifies that no officer, agent, or employee of the City who has a pecuniary interest in this bid has participated in the contract negotiations on the part of the City, that the proposal is made in good faith without fraud, collusion, or connection of any kind with any other Bidder for the same call for bids, and that the Bidder is competing solely on its own behalf without connection with, or obligation to, any undisclosed person or firm.

102.13 INELIGIBILITY FOR PUBLIC CONTRACTS FOR FAILURE TO PAY PREVAILING RATE OF WAGE

The bidder, in submitting the bid, does thereby certify that the bidder is not ineligible to receive a contract for a public work, as set forth in ORS 279.361 and agrees, if awarded a contract, that every subcontractor will be required to certify compliance thereto, said certification to be filed with the Engineer prior to such subcontractor commencing any work under the contract.

102.14 ORS 654.150 SANITARY FACILITIES AT CONSTRUCTION PROJECTS

If the contract price is estimated (itemized bid) or bid (lump sum) by Contractor at $500,000 or more, Contractor shall be responsible for all costs (which costs shall be included in the bid whether or not a specific bid item is provided therefore) that may be incurred in complying with or in securing exemption or partial exemption from

the requirements of ORS 654.150, (Sanitary facilities at construction projects; standards, exemptions) and the rules adopted pursuant thereto. Whether or not ORS 654.150 is applicable to the project is the sole responsibility of the Contractor.

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103 AWARD AND EXECUTION OF CONTRACT

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103.01 AWARD OF CONTRACT

A. The award will be made by Owner to the Bidder submitting the lowest, responsible and responsive bid. In determining the lowest acceptable bid, Owner may take into account, among other factors, the prices bid, discounts, if any, time of completion or delivery proposed, as between equal bids, the relative merits and performance of any item specifically proposed by the Bidder, any variation in maintenance and guaranty period specially proposed by the Bidder in excess of any minimums specified, the realistic balance of prices in the bids for various parts or units of work and the experience and ability of Bidder to perform the work.

B. While price extensions are required as a matter of convenience, in the event of error in extensions, the unit prices bid shall govern. In the event of discrepancy between the written and numerical amounts, the written prices will govern.

C. Determination of the lowest Bidder and award are subject to review and determination by the Attorney as to legal sufficiency of any bid submitted.

D. Award and tender of contract, if it be awarded, shall be made within forty-five (45) calendar days, unless otherwise specified, after the date of opening of bids.

103.02 EXECUTION OF CONTRACT

The Bidder to whom award is made shall execute and return the Contract in the required number of copies, and shall furnish a performance-payment bond and other required bonds and insurances satisfactory to Owner within fifteen (15) days after issuance of the Contract.

103.03 FAILURE TO EXECUTE CONTRACT

Failure on the part of the Bidder to whom the Contract is awarded to execute the Contract and to deliver the Contract and required performance payment bond and insurance as provided for in Subsection 103.02 shall be just cause for cancellation of the award, withdrawing tender of the Contract and forfeiture of the Bid Guaranty to Owner. The forfeited Bid Guaranty shall become property of the Owner, not as a penalty, but in liquidation of damages sustained. Award may then be made to the next lowest responsible and responsive Bidder, or the work may be re-advertised, or otherwise, as the Owner may decide.

103.04 RETURN OF BID GUARANTY

Upon the execution of the contract and bond by the successful bidder, the bid guaranty shall be returned. The bidder who is awarded a contract and who fails promptly and properly to execute the contract or bond shall forfeit the bid guaranty that accompanied the bid. The bid guaranty of unsuccessful bidders will be returned after the bids have been opened and the contract has been awarded, and shall not be retained after the contract has been duly signed. The Owner reserves the right to retain the bid security of the three (3) lowest bidders until the award contract has been signed and returned.

103.05 TRANSFER OF CONTRACT AND INTERESTS THEREIN

A. Excepting Surety assignment under the performance and payment bond, the Contract is not assignable to any other party or parties without the prior written consent of Owner. In case of such attempted transfer without permission, Owner may refuse to carry out the Contract either with the transfer or the transferee, but all rights of action for any breach of the Contract by said Contractor are reserved to the Owner.

No officer of Owner, nor any person employed in its service is or shall be permitted any share or part of the Contract or is or shall be entitled to any benefit which may arise from the contract.

B. Any assignment of money shall be subject to all proper setoffs and withholdings in favor of Owner and to all deductions provided for in the Contract, and particularly all money withheld, whether assigned or not, shall be subject to being used by Owner for completion of the work in the event Contractor should be in default therein.

103.06 PERFORMANCE AND PAYMENT BOND

At the time of execution of the Contract, the Contractor shall furnish Performance and Payment Bond or Bonds approved by the Owner and Attorney in an amount equal to the amount of the Contract based upon the estimate of quantities or lump sum as set forth in the Proposal, conditioned upon a compliance with and fulfillment of all terms and provisions of the Contract, including maintenance, repair and replacement, and all applicable laws and prompt payment, as due, to all persons supplying labor and/or material for prosecution of the work.

103.07 PROOF OF CARRIAGE OF INSURANCE

Work shall not commence until all insurance required in the Contract has been obtained and a certificate thereof has been approved by the Attorney. Contract shall maintain insurance throughout the life of the Contract which will hold Owner harmless and shall indemnify Owner for any and all losses to third persons or to Owner arising out of the operations, including any contingent liability arising therefrom.

103.08 FOREIGN CONTRACTOR

A foreign Contractor awarded a contract with a price exceeding $10,000, under provisions of ORS Chapter 279, shall promptly report to the Department of Revenue on forms to be provided by the Oregon Department of Revenue the total contract price, terms of payment, length of contract and such other information as may be required before final payment can be received on the public contract. Final payment shall not be made until this provision has been accomplished.

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104 SCOPE OF WORK

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104.01 PLANS AND SPECIFICATIONS

The Contract Documents will govern the work to be done. Anything mentioned in the Specifications and not shown on the Plans and detailed drawings, or shown on the Plans and detailed drawings and not mentioned in the Specifications, shall be of like effect as though shown or mentioned in both. Specifications and Plans referred to in any of the Contract Documents shall be considered as being included in the document in which such reference is made. When a particular Standard Plan or Specification is referred to, such reference shall be to the Standard Plan or Specification which is in force at the time of advertising for bids. The phrases, "Contractor shall", "Contractor will", etc. may not always be specifically stated in all paragraphs but is considered understood where not specifically stated otherwise.

104.02 PRECEDENCE OF CONTRACT DOCUMENTS

In case of conflict, the order of precedence of the following documents in controlling the work shall be:

1. Contract
2. Addenda
3. Bid
4. Permits from outside agencies required by law
5. Special Specifications (Provisions)
6. Plans
7. Standard Plans and Standard Details
8. Standard/Technical Specifications

Change orders, supplemental agreements and approved revisions to Plans and Specifications will take precedence over Contract Documents listed above.

104.03 SHOP DRAWINGS AND OTHER SUBMITTALS

A. Plans furnished and included with Specifications indicate the work proposed and the results that are intended to be accomplished.

B. Unless otherwise specified, furnish six (6) copies of all layout, detail, shop and working drawings requested by the Engineer. Shop drawings shall be of sufficient size and scale to clearly show details. After review and approval by the Engineer, two copies will be returned to the Contractor.

C. 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, and that he has checked and coordinated the information contained within such submittals with the requirements of the work and of the Contract Documents and that he has checked and coordinated the information contained within such submittals with the requirements of the work and of the contract documents and that he is satisfied they conform to the contract documents.

D. All required shop drawings, product data and samples shall be furnished to the Engineer for his review and any required testing before any of the work or related work is performed or products or material ordered prior to the Engineer's review and completion of any testing will be at Contractor's risk.

E. The Engineer will review all shop drawings, product data and samples and conduct such tests as are required by the contract documents within a reasonable time but in no event will Engineer be required to complete such review or conduct such tests in less than fourteen (14) days after submission. the Engineer will return marked-up submittal copies indicating one of the following actions:

1. If review and checking indicate no exceptions, copies will be returned marked "NO EXCEPTIONS TAKEN" and work may begin immediately on incorporating the material or equipment covered by the submittal into the work.

2. If review and checking indicate limited corrections are required, copies will be returned marked "Make Corrections noted," and upon making the corrections noted, work may begin immediately to incorporate the material or equipment covered by the submittal into the work.

3. If review and checking indicate insufficient or incorrect data have been submitted, copies will be returned marked "REVISE AND RESUBMIT." No work may begin on incorporating the material or equipment covered by this submittal into the work until the submittal is revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" OR "MAKE CORRECTIONS NOTED."

4. If review and checking indicate the material or equipment submittal is unacceptable, copies will be returned marked "REJECTED." No work may begin on incorporating the material or equipment covered by this submittal into the work until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" OR "MAKE CORRECTIONS NOTED."

5. If review and checking indicate additional information is required, copies will be returned marked "SUBMIT SPECIFIED ITEM." Work may begin immediately on incorporating the material or equipment covered by the submittal into the work, only if it is not affected by the item to be submitted. If any material or equipment is affected, no work may begin on incorporating that material or equipment into the work until it and the submittal are submitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

F. The review by the Engineer of any shop drawings, product data, samples, construction methods and equipment or other submittals is only for conformance with the general design concept of the project and does not extend to consideration of structural integrity, safety, detailed compliance with contract requirements, or any other obligation of the Contractor. Any action shown is subject to the requirements of the plans and specifications. The Contractor is responsible for confirming and correlating all dimensions; fabricating and construction techniques; coordinating his entire work in strict accordance with the contract documents. The review does not relieve Contractor from his obligation fully to perform all contract requirements, nor shall such review give rise to any right of action or suit in favor of Contractor or third persons, against Engineer or Owner.

104.04 CHANGES IN THE WORK

A. Without invalidating the Agreement and without notice to a surety by the Owner, Owner may, at any time, order additions, deletions or revisions in the Work: these will be authorized by a written amendment, a Change Order, or a work directive change.

B. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

104.05 FORCE ACCOUNT WORK

A. The Contractor shall perform work on a force account basis upon written notice by the Engineer. If the Engineer determines the work increases the amount due under the Contract, payment will be made pursuant to Subsection 109.04 A 3 Method 3 FORCE ACCOUNT WORK.

B. The Contractor must maintain records in such a manner as to provide a clear distinction between direct cost of work performed on force account basis and costs of all other operations performed in connection with the Contract.

C. Daily, furnish to Engineer signed reports itemizing materials used and setting forth the cost of labor and charges for equipment rental, delineating whether said equipment is Contractor or Subcontractor owned. Provide names, identifications, and classifications of workmen, the hourly rate of pay and hours worked, and the size, type, and identification number of equipment and hours of equipment operation.

D. Substantiate material charges by vendor's invoices, submit such invoices with the reports; or, if not available, submit with subsequent reports. In the event said vendor's invoices are not submitted within 30 days after completion of the force account work, Owner reserves the right to establish the cost of such materials.

E. The Engineer will compare his records with the reports furnished by the Contractor, make any necessary adjustments, compile the costs of work paid for on a force account basis and issue a change order covering the work.

104.06 SALVAGE

A. When shown or specified, carefully salvage and stockpile within the construction area all castings, pipe and any discarded facilities, to be disposed of by Owner.

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105 CONTROL OF WORK

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105.01 AUTHORITY OF THE ENGINEER

A. The Engineer will decide all questions which may arise as to quantity, quality, and acceptability of materials furnished and work performed, the rate of progress of the work; interpretation of the Plans and Specifications; the measurement of all quantities; and the acceptable fulfillment of the Contract on the part of the Contractor. The Engineer's estimates, decisions and approval signify favorable opinion and qualified consent; it does not carry with it certification or assurance of completeness, quality or accuracy concerning details. Such approval does not relieve Contractor from responsibility for errors, improper fabrication, improper construction methods, non-conformance to requirements or for deficiencies within his control.

B. It is further understood that all work to be done under the Contract will not be considered completed until it has passed final inspection by the Engineer and is accepted by the Owner. It is further understood that the authority of the Engineer is such that the Contractor shall at all times carry out and fulfill the instructions and directions of the Engineer insofar as they concern the work to be done under the Contract.

C. The Engineer shall have the authority to order unacceptable work to be corrected, removed or replaced, and unauthorized work to be removed and, pending completion of such order, to deduct the estimated cost thereof from any monies due, including retainage, or to become due the Contractor. This authority shall take precedence over any and all requirements of the specifications for payment set forth elsewhere in the specifications.

D. In the Engineer's sole discretion, minor defects in the work may be accepted subject to a reasonable deduction from the Contract price or other credits to the Owner. Such determination by Engineer shall be final.

E. The Engineer is not authorized to waive any written notice required of the Contractor by the Contract.

105.02 AUTHORITY AND DUTIES OF INSPECTORS

A. Engineer may appoint assistants to inspect all materials used and all work done. Such inspection may extend to any or all parts of the work and to the preparation or manufacture of materials to be used. Inspectors will not be authorized to revoke, alter, enlarge, or relax the provisions of the contract. An Inspector is placed on the work to keep the Engineer informed of progress of the work and the manner in which it is being done. In addition, the Inspector shall call to the attention of Contractor any deviation from the Plans, or Specifications.

B. An Inspector will not be authorized to approve or accept any portion of the work or to issue instructions contrary to the Plans and Specifications under this Contract. Furthermore, the Inspector is not authorized to waive any written notices required by the Contract. The Inspector will have authority to reject defective material and to suspend any work that is being improperly done, subject to final decision by the Engineer.

105.03 RESPONSIBILITY OF CONTRACTOR

A. Do all work and furnish all labor, materials, equipment, tools, and machines necessary for the performance and completion of the project in accordance with the Contract. Be obligated to determine and be responsible for the method of construction.

B. Contractor shall be solely liable for any accident, loss or damage happening to work referred to in the Contract prior to completion and acceptance thereof.

105.04 NOTIFICATION OF UTILITIES AND AGENCIES

A. Obtain prior approval from the Engineer for closing or partial closing of any street. Give at least two (2) business days advance notice of such closure to all agencies providing emergency services, including without limitation police, fire and ambulance services. Notification shall include, but not be limited to the time of commencement and completion of work, names of streets or location of alleys to be closed, or partially closed, schedule of operations and routes of detours where applicable.

B. When performing work in streets and easements, whether inside or outside Owner's legal boundaries, notify all of the affected utilities and local agencies about the operations so as to properly coordinate and expedite the work in such a manner as to cause the least amount of conflict and interference between the operations and those of other agencies.

C. The Contractor and its subcontractors must comply with all provisions of ORS 757.541 to 757.571 including notification of all Owners of underground facilities at least forty-eight (48) business day hours but not more than ten (10) business days before beginning work. Notify the following utilities and agencies in writing at least two business days before commencing any work on the project:

One Call Locating Services	1-800-332-2344
Locators, Inc.	503-581-1265
City of Newberg, Public Works Division	503-537-1233
Yamhill County Public Works	503-434-7515
General Telephone Exchange	503-639-9025
Newberg School District	503-538-8361
AT & T Cable Service	503-370-2770
Northwest Natural Gas Co.	1-800-422-4012
Portland General Electric Company	1-800-542-8818

D. Owner shall relocate or cause to be relocated all privately or publicly owned utility conduits, lines, poles, mains, pipes and such other facilities within the jurisdiction and control of Owner where such relocation is necessary in order to conform said utility and other facilities with the plans and ultimate requirements of the project. If desirable for specific reasons, or for convenience of field operations, contact the above listed utilities.

105.05 UTILITIES AND EXISTING IMPROVEMENTS

A. Information shown as to location of existing water courses, drains, sewer lines or utility lines is provided for Contractor's information and convenience and is not, in any way, warranted to be accurate by Owner. Contractor shall verify all such information and shall deal with varying conditions at its own expense.

B. Operation of water valves and hydrants by unauthorized personnel is strictly prohibited. Obtain written permission from and pay any fee required from the City of Newberg prior to using hydrant water.

C. Provide for the flow of sewers, drains, or water courses interrupted during the progress of the work, and restore such drains or water courses as approved by the Engineer, at no additional cost to Owner.

D. Be responsible for all costs for the repair of any and all damage to any utility, whether previously known or disclosed during the work, as may be caused by the work. Maintain in place utilities not shown on the drawings to be relocated or altered by others. If Contractor requires temporary relocation, for his convenience or because of his method of construction or as a result of site conditions, Contractor shall bear all costs for said temporary relocation. Maintain utilities which have been relocated by others in their relocated positions in order to avoid interference with structures which cross the project work.

E. Make excavations and borings ahead of work, as necessary, to determine the exact location of interfering utilities or underground structures. When this is not feasible or practical or the need for such work was not foreseen, the utility owners or the Owner shall have the right to enter upon the right-of-way and upon any structure therein for the purpose of making new installations, changes or repairs. Conduct operations so as to provide the time needed for such work to be accomplished during the progress of the improvement, at no additional cost to the Owner.

F. It is understood that there will be interfering utilities, service laterals, and other underground pipes, drains or structures encountered on underground projects that are not shown or are shown incorrectly on the plans and/or have not been previously discovered in the field. Contractor agrees this is a normal and usual occurrence in the construction of underground improvements. Furthermore, bidders understand and agree that work in some cases must be done in close proximity to said utilities and underground pipes, drains, and structures not shown or shown incorrectly on the plans which may require a change in operations and may cause sloughing of the trench, additional traffic control, additional pavement and backfill costs, and time; the Contractor agrees that a reasonable number of these occurrences are usual and ordinary on underground projects and are reflected in the bid and plan of operation.

G. The Engineer will require a reasonable amount of time to perform design changes necessitated by directly conflicting utilities and/or the utility owners will require a reasonable amount of time to make necessary utility relocations.

H. The Bidders agree to provide for these conflicts and interferences and agree to provide for a reasonable amount of time for design changes and/or utility relocations due to said interference in the bid and understand that no additional compensation for interruption of schedule, extended overhead, delay or any other impact claim or ripple effect or any other costs whatsoever or additional time will be made for these conflicts or interferences.

105.06 SURVEY SERVICE

A. Give notice to Engineer not less than three (3) business days in advance of when survey services will be required in connection with the laying out of any portion of the work.

B. Engineer will furnish and set construction stakes establishing lines and grades as he determines necessary for all work under the Contract.

C. Engineer will furnish appropriate offset lines and grades as he deems necessary for all projects involving trenching operations. Contractor will be responsible for the transfer of the offset lines or grades into the ditch, to batter boards, or any other point within the work. Work done without lines and grades having been established by the Engineer or work done beyond the lines and grades will be considered as unauthorized and will not be paid for and may be ordered removed, replaced, or corrected at no expense to the Owner.

105.07 PROTECTION OF SURVEY MARKERS

A. Permanent Survey Markers

Notify the Engineer not less than three (3) business days prior to starting work in order that the Engineer may take necessary measures to ensure the preservation of survey monuments, stakes, lot stakes and bench marks. Do not disturb permanent survey monuments, stakes, lot stakes or bench marks without

the consent of Engineer, and notify Engineer and bear the expense of hiring a licensed surveyor to replace any that may be disturbed.

When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument is located, preserve the monument and adjust the monument cover to the new grade at no expense to Owner.

B. Construction and Survey Markers

Preserve construction survey stakes and marks for the duration of their usefulness during construction. If any construction survey stakes are lost or disturbed through negligence of Contractor, and in the judgment of the Engineer need to be replaced, such replacement shall be by the Engineer at the expense of Contractor. The cost of replacement shall be charged against, and shall be deducted from payments for Contract work.

105.08 PROTECTION OF PROPERTY

A. Protect all public and private property, insofar as it may be endangered by operations and take every reasonable precaution to avoid damage to such property.

B. Restore and bear the cost of any public or private improvement, facility, structure, or land and landscaping within the right-of-way or easement which is damaged or injured directly or indirectly by or on account of an act, omission, or neglect in the execution of the work. Restore to a condition substantially equivalent to that existing before such damage or injury occurred, by repairing, rebuilding, or otherwise effecting restoration thereof, or if this is not feasible, make a suitable settlement with the Owner of the damaged property.

C. Give reasonable notice to occupants of buildings on property adjacent to the work to permit the occupants to remove vehicles, trailers and other possessions as well as salvage or relocate plants, trees, fences, sprinkler systems, or other improvements in the right-of-way which are designated for removal or which might be destroyed or damaged by work operations.

D. Protect all designated trees, lawns and planted areas within the right-of-way or easements. Restore all on-surface disturbed areas, by methods as set forth in the technical specifications. If conditions are such that the method specified cannot be done, provide erosion control surface covering of such quality and quantity as will prevent erosion from occurring, without adverse impacts to the environment, if required by conditions existing at the site, at no additional cost to the Owner.

E. Review with Engineer the location, limits and methods to be used prior to clearing work. Clearing and grubbing shall be performed in strict compliance with all local, State and Federal laws and requirements pertaining to clearing and burning, and particularly in conformity with the provisions of ORS Chapter 477, and all subsequent amendments, which require, among other things, filing with the State Forester a general description of the right-of-way to be cleared before the start of clearing operations. Obtain the required permit from the State Forester and perform clearing work in conformance thereto.

105.09 USE OF WORK DURING CONSTRUCTION

A. Owner shall have the right to take possession of and use any completed or partially completed portions of the Work. Such use shall not be considered as final acceptance of the Work or portions thereof.

B. Such action by Owner will not relieve the Contractor of responsibility for injury or damage to said completed portions of the work resulting from use by public traffic, action of the elements, Contractor's operations, defective work, or negligence, or from any other cause, except for injury or damage resulting from Owner's negligence. Contractor will not be required to again clean up such portions of the Work prior to final

acceptance, excepting for such clean up as results from Contractor's operations or defective work. Use of any completed or partially completed portions of the work does not relieve Contractor from the warranty responsibility nor shall the warranty period commence to run until final completion and acceptance of the work.

105.10 FURNISHING TEMPORARY SERVICES AND FACILITIES

Install, furnish and maintain temporary light, power, water and any temporary services or facilities complete with connecting piping, wiring, lamps, and similar equipment during construction of the work, including testing and start up. Remove temporary facilities upon completion of work. Obtain all permits and bear all costs in connection with temporary services and facilities. Conform to applicable statues, rules, codes, and other requirements in the use of these facilities.

105.11 VERBAL AGREEMENTS OR REPRESENTATIONS

No verbal agreement or conversation by or with any officer, agent or employee of the Owner, either before or after execution of the Contract, shall affect or modify any of the terms or obligations contained in any of the documents comprising the Contract. Any such verbal agreement or conversation is in no way binding upon Owner.

105.12 WATER AND AIR POLLUTION CONTROL

A. During the term of the Contract, Contractor's operations shall conform to applicable laws and regulations of the Oregon Department of Environmental Quality, and other agencies of the State and Federal government, City of Newberg guidelines, as well as other local Ordinances and Resolutions designed to prevent, control, and abate water and air pollution.

B. During all phases of the work, or when directed, protect work sites, storage and disposal areas from washout and erosion, and take precautions to control or abate dust nuisance and air pollution by cleaning up, sweeping, sprinkling, covering, enclosing or sheltering work areas, and stockpiles, and by promptly removing from paved streets earth or other material which may become airborne or may be washed into waterways or drainage systems.

105.13 NOISE

A. Conform and comply with applicable noise regulations of the City of Newberg.

105.14 ACCESS TO THE WORK

A. Provide access to the work for representatives of the Owner, the State of Oregon, the Federal Government, and other entities having jurisdiction in the area.

B. Allow access to Engineer or his representatives to all parts of the work and to plants of manufacturers at all times. Furnish them with every reasonable facility for ascertaining if the work meets requirements and intent of the Contract.

105.15 DEFECTIVE OR UNAUTHORIZED WORK

A. All work which does not conform to the requirements of the Contract shall be considered as unacceptable.

B. Upon discovery immediately remove unacceptable and defective work and replace by work and materials which conform to the Contract. This provision shall have full effect regardless of the fact that the unacceptable work may have been done or the defective materials used with the full knowledge of the Inspector.

105.16 RAILROAD CROSSINGS OR RIGHT-OF-WAY

Submit a schedule of proposed operations to the Engineer whenever the project or work thereunder involves the crossing of any railroad line or the encroachment on any railroad right-of-way. This schedule shall be approved by the appropriate railroad officials and the Engineer before the work is started within such area. Pay for services of flag persons and/or watch persons furnished by the railroad company and provide and drive piling, set cribbing, build bridges or tunnels, install enclosing pipe and do all other work required by the railroad company or necessary for safety or maintenance of railroad traffic, including working on weekends, holidays and providing extra shifts. Furnish any bond or insurance required of the Owner by the railroad company as a result of such intended operations and indemnify Owner for any and all expenses incurred by Owner, and assume any and all liability or claims thereof imposed on Owner as a result of operations in railroad right-of-way area. Bear all costs resulting from interferences, obstructions or liabilities set forth in this Specification, whether or not herein specifically mentioned.

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106 CONTROL OF MATERIALS

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106.01 PREFERENCE FOR USE OF OREGON PRODUCTS

Preference may be given to services, articles or materials produced or manufactured in Oregon, if price, fitness, availability and quality are otherwise equal. These provisions do not apply to Contracts on projects financed wholly or in part by Federal funds.

106.02 QUALITY OF WORK

Materials, parts, products and equipment which are to be incorporated into the work shall be new and shall conform to the Contract Documents.

106.03 SAMPLING AND TESTING

A. Tests of the work may be made by Owner at any time during construction of the work or during the production, fabrication, or preparation and use of materials, parts, products and equipment.

B. Owner reserves the right to require samples and to test products for compliance with pertinent requirements irrespective of prior certification of the products by the manufacturer.

C. When such tests of the work are necessary, as determined by the Engineer, such tests will be made by and at the expense of Owner unless otherwise specified. Provide such facilities and cooperate as required for collecting and forwarding samples and do not incorporate into the work until tests have been made and found acceptable. In all cases furnish the required samples without charge and in ample time to permit testing prior to use. Provide safety measures and devices to protect those who take the samples.

D. In the absence of any reference Specification it shall be understood that materials shall meet the Specifications and requirements of the American Society for Testing and Materials (ASTM), or the American Association of State Highway and Transportation Officials (AASHTO), as directed by the Engineer. When there is no pertinent coverage under ASTM or AASHTO, the material concerned shall meet Specifications and requirements of applicable Commercial Standards of the Commodity Standards Division of the U.S. Department of Commerce. Lacking such coverage, materials shall meet requirements established by reputable industry for a high-quality product of the kind involved.

E. All testing shall be performed by the testing laboratory or by the Engineer or as directed by the Engineer.

F. In the event Engineer requests tests, and the work fails, the Contractor shall bear all costs for all subsequent testing necessary to meet specified requirements.

106.04 CERTIFICATION

The Engineer in his sole discretion may in lieu of any other required sampling and testing accept from Contractor two copies of the manufacturer's certification with respect to the product involved, under conditions set forth as follows:

1. Certification shall state that the named product conforms to Owner's requirements and that representative samples thereof have been sampled and tested as specified.

2. Certification shall either be accompanied with a certified copy of test results, or certify that such test results are on file with the manufacturer and will be furnished to Engineer upon request.

3. Certification shall give the name and address of the manufacturer and the testing agency and the date of tests; and shall set forth the means of identification which will permit field determination of the product delivered to the project as being the product covered by the certification.

4. Contractor shall not be responsible for any costs of certification or for any costs of the sampling and testing of products in connection therewith.

106.05 INSPECTION BY OTHERS

Inspection of work by persons other than representatives of the Owner will not constitute inspection by Owner.

106.06 STORAGE AND PROTECTION OF ITEMS OF WORK

Store items to be incorporated into the work to assure the preservation of their quality and fitness for the work. Stored items, even though approved before storage, may be reinspected and are subject to rejection prior to being incorporated into the work. Stored items shall be located so as to facilitate their prompt inspection.

106.07 TRADE NAMES, EQUALS OR SUBSTITUTIONS

A. In order to establish a basis of quality, certain processes, types of machinery or equipment or kinds of materials may be specified either by description of process or by designating a manufacturer by name and referring to his brand or product designation or by specifying a kind of material. It is not the intent of these specifications to exclude other processes, equipment or materials of equal value, utility or merit.

B. Whenever a process is designated or a manufacturer's name, brand or item designation is given or whenever a process or material covered by patent is designated or described, it shall be understood that the words "or equal" follow such name, designation, or description, whether in fact they do so or not. This "or equal" clause is not a warrantee, either expressed or implied by Owner that an equal exists.

C. The Contractor may offer to furnish materials or equipment of equal or better quality and performance other than that specified as a substitute after the contract is executed. If the offer necessitates changes to or coordination with any other portion of the work, the data submitted shall include drawings and details showing all such changes. Contractor agrees to perform these changes as part of the substitution of material or equipment. Acceptance by the Engineer shall not relieve the Contractor from full responsibility for the efficiency, sufficiency, quality and performance of the substituted material or equipment in the same manner and degree as the material and equipment specified by name. Any cost differential associated with a substitution shall be reflected in the Contract price and the contract shall be appropriately modified by Change Order.

D. If the Bid includes a list of equipment, materials or articles for which Contractor must name the manufacturer at time of submission of the bid, no substitutions therefore will be permitted.

E. All materials or equipment of equal or better quality offered by the Contractor for substituting shall be approved by the Engineer prior to incorporation into the project.

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107 LEGAL RELATIONS AND RESPONSIBILITIES

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107.01 LAWS AND REGULATIONS

A. Comply with all Federal and State laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of work. Observe and comply with all such laws, ordinances, regulations, orders and decrees. Protect and indemnify Owner and his representatives against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree, whether by Contractor, his subcontractors, suppliers of materials or services, or others engaged by the Contractor, or their employees.

B. In addition to those set forth herein, the Statutes of the State of Oregon for public works contracts, Chapter 279, are incorporated by reference into the Contract.

107.02 SUBCONTRACTORS

A. After contract award and notice of Contractor/ subcontractor agreements have been submitted, work shall not be transferred or subcontracted without prior consent of Owner.

B. Use of subcontractors, material suppliers or equipment suppliers shall in no way release Contractor from any obligations of contract with Owner.

C. Contractor will provide in all subcontract agreements that the Subcontractor, material supplier and equipment supplier will be bound by the terms and conditions of this Contract to the extent that they relate to the Subcontractor's work, material or equipment. All Subcontractor's agreements will also provide that they are assignable to the Owner at Owner's option, in the event this agreement is terminated for default of Contractor.

107.03 NO WAIVER OF LEGAL RIGHTS

Owner shall not be precluded or estopped by any measurement, estimate or certificate made either before or after completion and acceptance of work or payment therefore, from showing the true amount and character of work performed and materials furnished by the Contractor, or from showing that any such measurement, estimate or certificate is untrue or incorrectly made, or that work or materials do not conform in fact to the Contract. Owner shall not be precluded or estopped, notwithstanding any such measurement, estimate or certificate, or payment in accordance therewith, from recovering from the Contractor and his Sureties such damages as it may sustain by reason of his failure to comply with terms of the Contract, or from enforcing compliance with the Contract. Neither acceptance by Owner, or by any representative or agent of the Owner, of the whole or any part of the work, nor any extension of time, nor any possession taken by Owner, nor any payment for all or any part of the project, shall operate as a waiver of any portion of the Contract or of any power herein reserved, or any right to damages herein provided. A waiver of any breach of the Contract shall not be held to be a waiver of any other breach.

107.04 OTHER CONTRACTS

A. The Owner reserves the right to award other contracts or issue permits for work that may require coordination with the work to be performed under this contract.

B. When separate contracts or permits are awarded or issued for different portions of the Project, "the Contractor" in the contract documents in each case shall be the Contractor who signs each separate contract.

C. Mutual Responsibility of Contractors - The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly connect and coordinate his Work with theirs.

D. If any part of the Contractor's Work depends for proper execution or results upon the work of any other separate Contractor, the Contractor shall inspect and promptly report to the Engineer any apparent discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to inspect and report shall constitute an acceptance of the other Contractor's work as fit proper to receive the Work, except as to defects which may develop in the other separate Contractor's work after the execution of the Contractor's Work.

E. Should the Contractor cause damage to the work or property of any separate Contractor which results in a claim against the Owner, and if the claim is not satisfied by Contractor and the separate Contractor sues the Owner or initiates an arbitration proceeding on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor who shall defend if requested such proceedings at the Contractor'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 attorney's fees and court or arbitration costs which the Owner has incurred.

F. The Contractor shall be responsible for any cutting, fitting and patching that may be required to complete the Work except as otherwise specifically provided in the Contract. The Contractor shall not endanger any work of any other Contractors by cutting, excavating or otherwise altering any work and shall not cut or alter the work of any other Contractor. Any costs caused by defective or ill-timed work shall be borne by the party responsible therefore.

G. If a dispute arises between the separate Contractors as to their responsibility for cleaning up, the Owner may clean up and charge the cost thereof to the several Contractors as the Engineer shall determine to be just.

107.05 LIABILITY AND INDEMNIFICATION

The Contractor shall assume all responsibility for the work and shall bear all losses and damages directly or indirectly resulting to the Contractor, to the Owner, to the Engineer, and to their officers, agents, and employees on account of (a) the character or performance of the work, (b) unforeseen difficulties, (c) accidents, or (d) any other cause whatsoever.

The Contractor shall defend, indemnify, and hold harmless the Owner, the Design Engineer, and their officers, agents and employees from all claims, loss, damage, and injury of every kind directly or indirectly arising out of this Contract. The Contractor shall assume this responsibility even if (a) fault is the basis of the claim, and (b) any act, omission or conduct of the Owner connected with the Contract is a condition or contributory cause of the claim, loss, damage or injury.

The Contractor shall not be liable for, nor be required to defend, or indemnify the Owner or the Design Engineer relative to any claim, loss, damage, or injury resulting solely from acts or omissions by the Owner, the Design Engineer, or their officers, agents or employees. The Contractor shall not be liable for, not be required to defend, or indemnify the Owner or the Design Engineer relating to any claim loss, damage, or injury arising from the use of any maps, drawings, reports, surveys, designs, or specifications furnished by the Owner, Design

Engineer, or their officers, agents, or employees. Any specific duty or liability imposed or assumed by the Contractor, as may be otherwise set forth in the Contract documents, shall not be construed as a limitation or restriction of the general liability or duty imposed upon the Contractor by this section.

The Contractor shall assume all responsibility for the work.

107.06 INSURANCE

A. General

1. The Contractor shall provide and maintain during the life of this Contract the insurance coverage designated hereafter. All costs for such insurance shall be born by the Contractor and shall be included in the contract price.

2. Prior to execution by the Owner and before commencing work under this Contract, Contractor shall furnish the Engineer with certificates of insurance specified herein showing the name of the insurance carrier, coverage, type, amount (or limits), policy numbers, effective and expiration dates, description of operations covered, and containing substantially the following cancellation provision:

"The insurance covered by this certificate will not be canceled or materially reduced, except after 30 days written notice has been received by the Owner."

3. In case of the breach of any provision of this Article, the Owner, at its option, may take out and maintain, at the expense of the Contractor, such insurance as the Owner may deem proper. The Owner may deduct the cost of such insurance from any monies which may be due or become due the Contractor under this Contract.

B. Review and Approval of Insurance

The Contractor shall not commence work under this Contract nor allow any subcontractor to commence work on a subcontract until the Contractor has obtained all the insurance required hereunder and such insurance has been approved by the Attorney. All policies or insurance and certificates of insurance shall be satisfactory to the Owner. Approval of the insurance shall not relieve or decrease the liability of the Contractor hereunder.

C. Workers' Compensation, the Federal Longshoremens' and Harborworkers' Act and the Federal Jones Act

1. The Contractor shall provide and shall require all subcontractors to provide workers' compensation coverage for all persons employed under this Contract including the Contractors' partners and any individual regardless of relation to the Contractor's partners and any individual regardless of relation to the Contractor or to the partners who provide work under this Contract. The Contractor shall be required to assure that subject workers will receive the compensation for compensable injuries provided in ORS Chapter 656 either by:

a. a carrier-insured employer; or

b. a self-insured employer as provided by ORS 656.407.

In addition to the statutory benefits outlined above, the Contractor and all subcontractors shall provide employers' liability insurance with limits of not less than:

$100,000 each accident for bodily injury by accident
$100,000 each employee for bodily injury for disease
$500,000 policy limit for bodily injury by disease

2. Evidence of such coverage, including the guaranty or warrant period, shall be filed with the City and maintained for the duration of the Contract.

3. The Contractor shall defend, indemnify, and hold harmless, the City and the City's officers, agents, and employees against any liability that may be imposed upon them by reason of the Contractor's or subcontractor's failure to provide workers' compensation and employers liability coverage.

4. Where work under this Contract is subject to the Federal Longshoremens' and Harborworkers' Act or the Federal Jones Act, the Contractor shall provide coverage for such exposure.

D. General Liability and Automobile Liability

1. The Contractor shall provide a general liability policy that provides coverage for bodily injury including personal injury and property damage liability insurance and automobile liability insurance. Such insurance must protect the Contractor, the Owner, and their officers and employees from all things or damage which may arise out of this Contract or in connection therewith, including all operations of Subcontractors. Such insurance shall provide coverage for not less than the amounts for which public bodies are responsible as set forth in Oregon Revised Statutes Chapter 30, Tort Actions against Public Bodies, but in no event less than the following limits of liability:

$1,000,000 each occurrence
$1,000,000 general aggregate
$1,000,000 product and completed operations aggregate
$1,000,000 personal and advertising injury
$1,000,000 combined single limit automobile liability for owned, non-owned, and hired automobiles.

The policy shall contain an endorsement that the aggregate applies separately to this Contract.

The insurance shall be written on a comprehensive form which includes broad form property damage on an occurrence basis. Unless excluded by Special Specification, the general liability policy shall include, without deductible, coverage for premises operations, explosion and collapse hazard, underground hazard, products, completed operations, contractual insurance, and independent Contractors. Such insurance shall be maintained until the expiration of the guaranty period required by the Contract. Failure to maintain liability insurance as provided above shall, at Owner's option, be cause for immediate termination of the Contract.

2. The Contractor shall provide a letter from the insurance company which states that such insurance shall be without prejudice to coverage otherwise existing.

3. The City of Newberg, its officers, agents, and employees, shall be named additional insureds in the Contractor's General Liability Insurance policy by attaching ISO Endorsement number CG 20 09 11 85 ADDITIONAL INSURED - Owners, Lessees, or Contractors (Form A) or its equivalent.

The policy shall also provide for a Cross Liability Endorsement or Separation of Insured's Endorsement.

The policy shall be endorsed to provide an AMENDMENT - AGGREGATE LIMITS OF INSURANCE (per project) specifying that a separate aggregate limit of liability applies to this Contract.

If there are insufficient insurance proceeds and assets of the Contractor to fully indemnify the City of Newberg, its officers, employees, agents, and the Engineer, then the City, its officers, employees, and agents would be indemnified first with any remaining insurance proceeds and assets to be used to indemnify the developer's or consulting Engineer.

4. If set forth in the Special Specifications, additional insureds may be the Owner's consultant, Engineer, other governmental bodies with jurisdiction in the area involved in the project, and their officers and employees and such agents as may be specified.

E. Claims on Project

1. The Contractor, when notified of a claim by an affected party shall:

a. Refer claim to the Contractor's insurance carrier or claims administrator.

b. Contractor's insurer will copy Owner on acknowledgment of claim.

c. Contractor's insurer will copy Owner on notice to claimant of disposition of claim.

F. Builders Risk Insurance

During construction, Contractor shall obtain and maintain for the benefit of the parties to the Contract as their interest may appear, all-risk Builder's Risk insurance to the extent of 100 percent of the value of the project. Coverage shall also include: (1) formwork in place; (2) form lumber on site; (3) temporary structures; (4) equipment; and (5) supplies related to the work while at the site. Such insurance shall be endorsed to require thirty days' written notice to the City prior to cancellation or change of the policy. One copy of the policy and two certificates of such insurance shall be delivered to the City before commencing work and shall be subject to review and approval by the City. The City may temporarily waive delivery of the copy of the policy. In the event Contractor fails to maintain such insurance, the City may arrange therefore; and any premium incurred shall be to the account of Contractor.

107.07 ROYALTIES AND PATENTS

Pay all royalties and license fees required to perform the Work. Defend and indemnify Owner, from all loss or damage that may result from the Contractor's wrongful or unauthorized use of any patented article or process.

107.08 PERMITS

Secure all Municipal, County, State, Federal or other permits or licenses, necessary or incident to performance of the work under this Contract. Comply with all permit requirements pertaining to the project. The Owner will reimburse the Contractor for all permit fees.

107.09 COMPLIANCE WITH OREGON REVISED STATUTES CHAPTER 279 (Public Contracts)

A. Comply, and require all Subcontractors to comply with the cities public contracting requirements, the requirements of the applicable State statutes, and be subject to the applicable liabilities provided in Oregon Revised Statutes Chapter 279 (Public Contracts), such as, but not limited to, the statutes that are numbered and referenced, and incorporated herein by an abbreviated subject matter, and listed below and the statutes required to be set forth as conditions in public contracts, which follows:

LIST:

1. ORS 279.021 Award of contract; Bond; Waiver of bond in case of emergency

2. ORS 279.334 Maximum hours of labor on public contracts; holidays; exceptions.

3. ORS 279.338 Length of day's labor on public works.

4. ORS 279.350 Workers on public works to be paid not less than prevailing rate of wage.

5. ORS 279.354 Certification of rate of wage by Contractor or Subcontractor.

6. ORS 279.355 Inspection to determine whether prevailing rate of wage being paid; proceedings to require payment of prevailing rate of overtime.

7. ORS 279.356 Liability for violations.

8. ORS 279.400 Withholding of retainage.

B. The statutes required as conditions in public contracts are as follows:

1. 279.021 – Preferences; Foreign Contractor

a. The public contracting agency shall prefer goods or services that have been manufactured or produced in their State if price, fitness, availability, and quality are otherwise equal.

b. Where a public contract is awarded to a foreign Contractor and the contract price exceeds $10,000, the Contractor shall promptly report to the Oregon Department of Revenue on forms to be provided by the Department of Revenue the total contract price, terms of payment, length of contract and such other information as the Department of Revenue may require before final payment can be received on the public contract. The public contracting agency shall satisfy itself that the requirement of this subsection has been complied with before it issues a final payment on a public contract.

For purposes of this subsection, a foreign Contractor is one who is not domiciled in or registered to do business in the State of Oregon.

2. 279.029 – Conditions of award of contract regarding resident bidder.

a. In determining the lowest responsible bidder, a public contracting agency shall, for the purpose of awarding the contract, add a percent increase on the bid of a nonresident bidder equal to the percent, if any, of the preference given to that bidder in the state in which the bidder resides.

b. Resident bidder means a bidder that has paid unemployment taxes or income taxes in this state during the 12 calendar months immediately receding submission of the bid, has a business address in this state and has stated in the bid whether the bidder is a "resident bidder" pursuant to this subsection.

3. 279.312 – Conditions of public contracts concerning payment of laborers and material men, contributions to Industrial Accident Fund, liens and withholding taxes. The Contractor shall:

a. Make payment promptly, as due, to all persons supplying to such Contractor labor material for the prosecution of the work provided for in such contract.

b. Pay all contributions or amounts due the Industrial Accident Fund from such Contractor or subcontractor incurred in the performance of the contract.

c. Not permit any lien or claim to be filed or prosecuted against the state, county, school district, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished.

d. Pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.

4. 279.314 – Condition concerning payment of claims by public officers.

a. If the Contractor fails, neglects or refuses to make prompt payment of any claim for labor or services furnished to the Contractor or a subcontractor by any person in connection with the public contract as such claim becomes due, the proper officer or officers representing the state, county, school district, municipality, municipal corporation or subdivision thereof, as the case may be, may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due the Contractor by reason of such contract.

b. The payment of a claim in the manner authorized in this section shall not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims.

5. 279.316 – Condition concerning hours of labor. No person shall be employed for more than eight hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency, or where the public policy absolutely requires it, and in such cases the laborer shall be paid at least time and a half pay for all overtime in excess of eight hours a day and for work performed on Saturday and on any legal holiday specified in ORS 279.334.

6. 279.318 – Provisions relating to environmental and natural resources laws and rules; change orders. A public contract for a public improvement shall make specific reference to federal, state and local agencies that have enacted ordinances or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that affect the performance of the contract. If the successful bidder is delayed or must undertake additional work by reason of existing regulations or ordinances of agencies not cited in the public contract or due to the enactment of new or the amendment of existing statutes, ordinances or regulations relating to the prevention of environmental pollution and the preservation of natural resources occurring after the submission of the successful bid, the awarding agency shall grant a time extension and issue a change order setting forth the additional work that must be undertaken. The change order shall not invalidate the contract and there shall be, in addition to a reasonable extension of the contract time, a reasonable adjustment in the contract price to compensate the successful bidder for all costs and expenses incurred, including overhead and profits, as a result of such delay or additional work.

7. 279.320 – Condition concerning payment for medical care and attention to employees. The Contractor shall promptly, as due, make payment to any person, co-partnership, association or corporation furnishing medical, surgical and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such Contractor, of all sums which the Contractor agrees to pay for such services and all moneys and sums which the Contractor collected or deducted from the wages of employees pursuant to any law, contract or agreement for the purpose of providing or paying for such service.

8. 279.352 – Provision in Contract for minimum rate of wage. The existing prevailing rate of wage that may be paid to workers in each trade or occupation under this Contract is contained in the Special Specifications. Such workers shall be paid not less than such specified minimum hourly rate of wage.

107.10 LABOR

Upon notification in writing from the Engineer, remove immediately from the job for its duration any laborer, workman, mechanic, foreman, superintendent, or other person employed who is found to be incompetent, intemperate, troublesome, disorderly or otherwise objectionable, or who fails or refuses to perform his work properly or acceptably.

Comply with provisions of Owner's Equal Opportunity Policy and to Chapter 659, Oregon Revised Statutes relative to unlawful employment practices and discrimination by employers against any employee or applicant for employment because of race, religion, color, sex, or national origin. Particular reference is made to ORS 659.030, which states that it is unlawful employment practice for any employer, because of the race, religion,

color, sex, or national origin of any individual, to refuse to hire or employ or to bar or discharge from employment such individual or to discriminate against such individual in compensation or in terms, conditions or privileges of employment.

107.11 OVERTIME

A. In addition to the requirement set forth in Specification 107.09 (ORS 279.316), Contractor shall notify the Engineer of any overtime operations as soon as possible. The Contractor must provide documentation to the Engineer's satisfaction justifying the overtime work.

B. In the event that the Contractor wishes to proceed with an overtime operation, the Contractor must first notify and obtain approval from the Engineer to do so, prior to commencing such work.

C. For overtime work requested by the Contractor, the Contractor shall pay the applicable wage rate for the Engineer's Inspector, engineering and operations personnel, and other staff required at the project during the overtime hours.

D. This section does not apply to labor performed in the manufacture or fabrication of any material ordered by the Contractor or manufactured or fabricated in any plant or place other than the place where the main Contract is to be performed.

107.12 SAFETY

A. Employee Safety:

The Contractor shall at all times be responsible for the safety of his employees and his subcontractor's employees. The Contractor shall maintain the job site and perform the work in a manner which meets the Owner's responsibility under statutory and common law for the provision of a safe place to work and which complies with the Owner's written safety regulations, if any.

Conduct the project with proper regard for the safety and convenience of the public. When the project involves use of public ways, provide necessary flag persons and install and maintain means of reasonable access to all fire hydrants, service stations, warehouses, stores, houses, garages and other property. Private residential driveways shall be closed only with approval of the Engineer or specific permission of the property owner. Do not interfere with normal operation of public transit vehicles unless otherwise authorized. Do not obstruct or interfere with travel over any public street or sidewalk without approval. At all times provide open trenches and excavations with secured and adequate barricades or fences of an approved type which can be seen from a reasonable distance. Close up or plate all open excavations at the end of each business day in all street areas unless approved otherwise by the Engineer and in all other areas when it is reasonably required for public safety or as directed by the Engineer. At night, mark all open work and obstructions by lights. Install and maintain all necessary signs, lights, flares, barricades, railings, runways, stairs, bridges and facilities. Observe all safety instructions received from the Engineer or governmental authorities, but following of such instructions shall not relieve Contractor from its responsibility or liability for accidents to workmen or damage or injury to person or property.

B. Public Safety and Convenience:

The Contractor shall at all times conduct his work so as to insure the least possible obstruction to traffic and convenience to the general public and residents in the vicinity of the work and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission of the Engineer and proper governmental authority. Fire hydrants on or adjacent to the work shall be kept accessible to fire fighting equipment at all times. Temporary provisions shall be made by the Contractor to insure the use of sidewalks, private and public driveways and proper functioning of all gutters, sewer inlets, drainage ditches and culverts, irrigation ditches and natural water courses. The Contractor shall minimize inconvenience to others due to mud and dust.

C. Safety Program:

The Contractor shall adopt a written safety program complying with the requirements of employee and public safety set forth hereinabove. The Safety Program shall also comply with O.A.R. Chapter 437, Division 3, Rules 1926.20 through 1926.32 regarding general safety and health provisions.

107.13 RIGHTS-OF-WAY, EASEMENTS, AND PREMISES

A. Confine construction activities within property lines, right-of-way, limits of easements and limits of construction permits as shown or specified in the Contract Documents unless arrangements are made with owner(s) of adjacent private property. If additional space or property is needed to accommodate Contractor's method for construction of the Work or for the convenience of the Contractor, Contractor shall bear all related costs and responsibilities. Prior to the use of any private property outside the specified boundaries, file with the Engineer written permission from the property owner(s).

B. Do not unreasonably encumber the specified work areas with materials and equipment. Obtain and bear the costs of permits for special occupancy and use of the specified work areas from the proper agencies. Comply with all requirements regarding signs, advertisements, fires and smoking.

107.14 TWO (2) YEAR MAINTENANCE AND WARRANTY

A. In addition to and not in lieu of any other warranties required under the Contract make all necessary repairs and replacements to remedy, in a manner satisfactory to the Engineer and at no cost to Owner, any and all defects, breaks, or failures of the Work occurring within two (2) years following the date of completion due to faulty or inadequate materials or workmanship. Repair damage or disturbances to other improvements under, within, or adjacent to the Work, whether or not caused by settling, washing, or slipping, when such damage or disturbance is caused, in whole or in part, from activities of the Contractor in performing his duties and obligations under this Contract when such defects or damage occur within the warranty period. The two-year maintenance period required shall, with relation to such required repair, be extended two years from the date of completion of such repair.

B. If Contractor, after written notice, fails within ten (10) days to proceed to comply with the terms of this section, Owner may have the defects corrected, and Contractor and Contractor's Surety shall be liable for all expense incurred. In case of an emergency where, in the opinion of the Engineer, delay would cause serious loss or damage, repairs may be made without notice being given to Contractor and Contractor or Surety shall pay the cost of repairs. Failure of the Engineer to act in case of an emergency shall not relieve Contractor or Surety from liability and payment of all such costs.

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108 PROSECUTION AND PROGRESS OF WORK

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108.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

Within thirty (30) days of Contract award or one (1) week in advance of starting work, whichever is earlier, SUBMIT FOR WRITTEN APPROVAL a proposed construction schedule to the Engineer. Contractor may not commence work until construction schedule is approved by the Engineer.

If it is desirable to carry on operations in more than one location simultaneously, submit a schedule for each location at least one (1) week in advance of beginning such operations. In the event that the Contractor's proposed construction schedule does not meet the necessary construction program schedule as determined

by Owner, immediately resubmit a schedule that conforms as approved. Contractor shall not commence work until schedule is approved by the Engineer.

The schedule shall show the proposed order of work and indicate the time required for completion of the major items of work. This working schedule shall take into account the passage and handling of traffic with the least practicable interference therewith and the orderly, timely and efficient prosecution of work. It will also be used as an indication of the sequence of the major construction operations and as a check on the progress of work.

108.02 PRECONSTRUCTION CONFERENCE

Attend a preconstruction conference, if requested, at a time, prior to start of work, designated by the Engineer. Comply with information and instructions provided at the preconstruction conference as recorded in the minutes of the meeting.

108.03 NOTICE TO PROCEED

A. Unless stated otherwise in the Special Specifications, written Notice to Proceed will be given by the Engineer within thirty (30) days after the Performance and Payment Bond and all required insurances have been filed with and approved by the Owner and the Contract has been executed. Do not commence work under the Contract until such written notice has been given.

B. Notice to proceed may be delayed up to an additional thirty (30) days (for a total of sixty (60) days) from date of Contract by Engineer if, in the Engineer's opinion, necessary easements or permits have not been obtained, or required utility relocation, construction, or reconstruction has not been completed or has not progressed to a degree that will allow initial contract work to commence.

C. Commence work within five (5) business days after the date of the Notice to Proceed, or such other date as may be fixed by the Notice to Proceed, which date shall establish the date for commencement of the Contract time. Notify Engineer forty-eight (48) hours in advance of the time and place work will be started.

108.04 CONTRACT TIME

A. Time shall be considered the essence of the Contract.

B. Upon commencement of work, Contractor shall provide adequate labor, materials, and equipment, and work shall be performed vigorously and continuously in accordance with a schedule which will ensure completion within the specified time limit. Failure to diligently pursue the work may jeopardize additional contract time.

108.05 SUSPENSION OF WORK

A. If the work is suspended for convenience: Temporarily suspend work on the Project wholly or in part for convenience of Owner as directed by the Engineer. In the event of such suspension, Engineer shall, except in emergency, and except as hereinafter provided, give Contractor three (3) days notice. Work shall be resumed within five (5) days after notice has been given by Engineer to Contractor to do so. Engineer shall allow Contractor an extension of time for completion corresponding to the total period of temporary suspension, and shall reimburse Contractor for necessary rental of unused equipment, services of watch persons, and other unavoidable expenses accruing by reason of the suspension, as stipulated in Section 108.05 (E), Delays and Extensions of Time.

B. If work is suspended by the Engineer: Immediately suspend work on the project, wholly or in part, as directed by the Engineer, for reasonable periods of time as the Engineer may deem necessary, when conditions are unsuitable for satisfactory performance of the work. The Owner shall allow the Contractor an

extension of time for completion corresponding to the total period of suspension, but the Contractor shall not be entitled to reimbursement for any costs or damages arising under this clause.

C. If work is suspended for cause: Immediately suspend work on the Project wholly or in part as directed by the Engineer for such periods as the Engineer may deem necessary due to: (1) failure to correct unsafe conditions for working personnel, the general public, or Owner's employees, (2) failure to immediately correct defective and unacceptable work in accordance with Subsection 105.15, (3) failure to carry out provisions of the Contract Documents, and (4) failure to carry out orders or directives.

D. Voluntary suspension by Contractor: There shall be no voluntary suspension or slowing of operations without the prior written approval of the Engineer and such approval shall not relieve Contractor from the responsibility to complete the Contract work within the prescribed Contract time. Should operations be discontinued, Contractor shall notify, in writing, the Engineer at least twenty-four (24) hours in advance of resuming operations.

E. Responsibilities of Contractor:

1. At the commencement of and during any suspension of Work, protect all work performed to prevent any damage or deterioration of the Work. Provide temporary protection devices to warn, safeguard, protect, guide and inform traffic during suspension, the same as though the work had been continuous and without interferences.

2. Bear all costs for providing suitable provisions for traffic control and for maintenance and protection of the work during suspension unless the suspension was for convenience.

F. In all cases of suspension, except voluntary suspension by Contractor, work will be resumed only upon written order of the Engineer or Owner.

108.06 DELAYS AND EXTENSIONS OF TIME

A. If the Contractor is significantly delayed due to court orders enjoining the prosecution of this Project, unavoidable strikes, Acts of God, unusual and extraordinary action of the elements that are of such severity to stop all progress of the work, or act or neglect of Owner not authorized by the Contract, the Contractor shall, within forty-eight (48) hours of the start of the occurrence, give notice to the Engineer of the cause of the potential delay and estimate the possible time extension involved. Within ten (10) days after the cause of the delay has been remedied the Contractor shall give notice to the Engineer of any actual time extension requested as a result of the aforementioned occurrence in accordance with Section 109.05 Claims and Notice.

B. No extension of time will be considered for weather conditions normal to the area and time of year in which the work is being performed. Delays in delivery of equipment or material purchased by the Contractor or his Subcontractors (including Owner-selected equipment) shall not be considered as a just cause for delay, when timely ordering would have made the equipment available. The Contractor shall be fully responsible for the timely ordering, scheduling, expediting, delivery, and installation of all equipment and materials. Extensions of time will be considered for delayed delivery of Owner specified equipment "without equal".

C. Within a reasonable period after the Contractor submits to the Engineer a written request for an extension of time the Engineer will make the decision on each request, for City Manager approval.

D. An adjustment of Contract time as herein provided shall be the Contractor's sole remedy for any delay in completion of the project arising from causes beyond the control of the Contractor, except for unreasonable delay caused by acts or omissions of the Owner or persons acting therefor. In no event shall the Contractor be entitled to collect or recover any damages, loss or expense incurred by reason of such delay, except for an unreasonable delay caused by acts or omissions of the Owner or persons acting therefor.

However, if Contractor is delayed due solely to a breach by Owner, Contractor will be entitled to recover damages limited to reimbursement for necessary rental of unused equipment, services of watch persons, documented direct overhead costs, documented direct unavoidable expenses accruing by reason of the suspension, plus fifteen percent (15%) of the foregoing damages to cover normal Contractor profit. Contractor shall not be entitled to indirect costs or any other damages arising out of the delay, including but not limited to, interruption of schedules, or any other impact claim or ripple effect. If a delay is caused by Owner and Contractor (joint delay), Contractor shall be entitled to a time extension only, by reason of such joint delay.

108.07 LIQUIDATED DAMAGES

A. Time shall be considered the essence of the Contract. If Contractor fails to complete the project or to deliver the supplies or perform the services within the time specified in the Contract or any extension thereof by Owner, the actual damage to Owner for the delay will be substantial but will be difficult or impractical to determine.

B. It is therefore agreed that Contractor will pay to Owner, not as a penalty but as liquidated damages, the per diem amount, as set forth in the following given Schedule of Liquidated Damages or modification thereof as given in the Special Provisions for each and every calendar day elapsed in excess of the Contract time or the final adjusted Contract time applicable to the work required under the Contract.

SCHEDULE OF LIQUIDATED DAMAGES

Original Amount of Contract		Per Diem Amount of Liquidated Damages	
For More Than	To and Including	Calendar Day*	Business Day
$ 0	$ 25,000	$ 40	$ 55
25,000	50,000	65	85
50,000	100,000	110	150
100,000	500,000	150	210
500,000	1,000,000	225	315
1,000,000	2,000,000	300	420
2,000,000	5,000,000	450	630

* Calendar day amounts are applicable when the contract time is expressed on the calendar day, calendar workday or fixed date basis.

C. Permitting Contractor to continue and finish the work or any part thereof after the Contract time or adjusted Contract time, as pertinent, has expired shall in no way operate as a waiver on the part of Owner or any of its rights under the Contract.

D. Payment of liquidated damages shall not release Contractor from obligations in respect to the fulfillment of the entire Contract, nor shall the payment of such liquidated damages constitute a waiver of Owner's right to collect any additional damages which may be sustained by failure of Contractor to carry out the terms of the Contract, it being the intent of the parties that said liquidated damages be full and complete payment only for failure of Contractor to complete the work on time.

108.08 CONTRACTOR'S REPRESENTATIVE

Designate, in writing before starting work, an authorized representative who shall have complete authority to represent and to act for Contractor, in all directions given by the Engineer. Contractor, or its authorized representative shall supervise the work, and shall be present on site continually during its progress.

If Contractor or its authorized representative is not present, directions may be given by Engineer or his authorized representative to the workmen and such order shall be received and followed. Any direction will be confirmed in writing upon request from the Contractor.

Keep a complete copy of the Plans and Specifications on or near the site at all time.

108.09 CONFLICTS, ERRORS, OMISSIONS, AND ADDITIONAL DRAWINGS

Check and compare all Plans and Specifications prior to construction and notify Engineer of any discrepancies or omissions in order to permit correction by Engineer. Coordination of Plans and Specifications is intended. Furnish labor and materials as required for the work. Should any work or materials be reasonably required or intended for carrying the project to completion which are omitted on the Plans and Specifications, furnish same as fully as if particularly delineated or described. The intent of the Plans and Specifications is to show and describe a complete project within the limits stated. Dimensions shown on Plans shall be followed, rather than scale measurements. Whenever it appears that the Plans are not sufficiently detailed or explicit, the Engineer may furnish additional detail drawings or written instructions and Contractor shall perform the work in accordance with the additional details or instructions.

108.10 OWNER'S RIGHT TO DO WORK

Failure or refusal to comply with any of the terms or conditions of the Contract will permit Owner to supply or correct any deficiency or defect or take other appropriate action without prejudice to any other remedy. Such action by Owner shall be taken only after seven (7) days notice by Engineer to Contractor and his Surety, unless in the judgment of the Engineer an emergency or danger to the work or to the public exists, in which event action of Owner as set forth above may be taken without any notice whatsoever. The cost of such action by Owner shall be deducted from the payment then or thereafter due Contractor. Pay Owner any costs in excess of such payment due.

108.11 TERMINATION FOR DEFAULT

A. If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of insolvency, or if he should refuse to or fail to supply enough properly skilled workmen or proper materials for the efficient prosecution of the Project, disregard laws, ordinances or the instructions of the Engineer, or otherwise be in violation of any provision of the Contract, the Owner may, without prejudice to any other right or remedy and after giving the Contractor and its Surety seven (7) days written notice, terminate the services of the Contractor and take possession of the premises and of all materials, tools and appliances thereon as well as all other materials whether on the premises or not, on which the Contractor has received partial payment and finish the work by whatever method it may deem expedient.

B. In the event action as above indicated is taken by the Owner, the Contractor, or its Surety, shall provide the Engineer with immediate and peaceful possession of all of the materials, tools and appliances located on the premises as well as all other materials whether on the premises or not, on which the Contractor has received any progress payment. Upon termination, in the event that the Surety does not complete the Contract, at the election of the Owner, Contractor shall assign any and all subcontractors and material contracts to Owner or Owner's designee. Further, the Contractor shall not be entitled to receive any further payment until the work is completed. On completion of the work, determination shall be made by the Engineer

of the total amount the Contractor would have been entitled to receive for the work, under the terms of the Contract, had Contractor completed the work. If the difference between said total amount and the sum of all amounts previously paid to the Contractor, which difference will hereinafter be called the "unpaid balance," exceeds the expense incurred by the Owner in completing the work, including expense for additional managerial and administrative services, such excess will be paid to the Contractor, with the consent of the Surety. If, instead, the expense incurred by the Owner exceeds the unpaid balance, the amount of the excess shall be paid to the Owner by the Contractor or his Surety. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be as determined and certified by the Engineer.

C. In addition to and apart from the above-mentioned right of the Owner to terminate the employment of the Contractor, the Contract may be canceled at the election of the Owner for any willful failure or refusal on the part of the Contractor to faithfully perform the Contract according to all of its terms and conditions; provided, however, that in the event the Owner should cancel the Contract, neither the Contractor nor its Surety shall be relieved from damages or losses suffered by the Owner on account of the Contractor's breach of Contract.

D. The Owner may, at its discretion, avail itself of any or all of the above rights or remedies and that its invoking of any one of the above rights or remedies will not prejudice or preclude the Owner from subsequently invoking any other right or remedy set forth above or elsewhere in the Contract.

E. None of the foregoing provisions shall be construed to require Owner to complete the work, not to waive or in any way limit or modify the provisions of the Contract relating to the fixed and liquidated damages suffered by Owner on account of failure to complete the Project within the time prescribed.

108.12 TERMINATION IN THE PUBLIC INTEREST

A. It is hereby agreed that the Owner has the right to terminate the Contract in whole or in part when it is considered to be in the public interest.

B. In the event the Contract is terminated as being in the public interest the Contractor shall be entitled to a reasonable amount of compensation for preparatory work and for all costs and expenses arising out of the termination excluding lost profits.

The amount to be paid to the Contractor:

1. Shall be determined on the basis of the contract price in the case of any fully completed separate item or portion of the work for which there is a separate or unit contract price; and

2. In respect to any other work, the Contractor will be paid a percent of the Contract price equal to the percentage of the work completed.

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109 MEASUREMENT AND PAYMENT

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109.01 MEASUREMENT OF QUANTITIES

A. Payments shall be based on measurements of completed work in accordance with the United States Standard Measures, and as set forth in the applicable divisions of these specifications.

B. Volume of materials measured in the vehicles by which they are transported will require computing of the volume of the vehicles to the nearest 0.1 cubic yard for its approved capacity, and

identification of the vehicle and its capacity. Pay quantities will be determined by vehicle measurement at point of delivery with no allowance for settlement of material during transit.

Loads shall be level and uniform. Payment will not be made for material in excess of the approved capacity of the vehicle and deductions will be made for loads below approved capacity.

C. Volume of concrete and masonry in structures will be measured according to neat lines as shown on the Plans or as altered on order of the Engineer.

D. Volume of earthwork, particularly excavation and embankment, will be computed by the average end area method or by other methods of equivalent accuracy.

E. Weight – When payment for materials other than bituminous cements is on a weight basis and unless otherwise set forth in the specification under which material is to be furnished, pay quantities will be determined by weighing material on weigh scales provided by the Contractor as set forth hereinafter. Such weighing is to be of material in the hauling vehicle as loaded for delivery. Determination of tare weights and weight of loaded vehicles will be to the nearest ten (10) pounds. Tare weights will be determined by weighing empty vehicles at intervals of such frequency as the Engineer deems necessary to ensure accuracy of pay load weights.

F. Scales – When the Contract calls for materials which are to be measured by weighing on scales, provide suitable scales and transport materials to scales at no expense to the Owner. Before use of scales is commenced, and as frequently as the Engineer may deem necessary to ensure accuracy, have the scales examined by an official of the State's Sealer of Weights and Measures, and bear all resulting costs. Maintain the scales in accurate condition at all times.

G. Furnish and so locate scales that the amount of hauling involved in the delivering of materials is no greater than if no weighing were required; if not, bear expense of whatever extra hauling is required. If hauling of materials is to be paid for as a separate pay item, the distance shall be via the most direct practicable route and no allowance will be made for any extra hauling required to reach the scales.

H. If material is weighed on public scales, a representative of the Owner may be present at all times to witness the weighing and to check and compile records of scale weights.

109.02 SCOPE OF PAYMENT

A. Quantities listed in the Bid do not govern final payment. Payments to the Contractor will be made only for actual quantities of Contract items performed in accordance with terms of the Contract and for items of work actually performed under Change Orders.

B. The Contractor shall accept the compensation, as herein provided, in full payment for furnishing all materials, labor, tools and equipment necessary to the completed work and for performing all work contemplated and embraced under the Contract; also for loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the Owner.

109.03 COMPENSATION FOR ALTERATION OF CONTRACT

A. Unless changes and alterations in the Plans, or quantities, or details of construction materially change the character of the work to be performed or the unit costs thereof, the Contractor shall accept as payment in full, so far as Contract items are concerned, payment at the same unit prices as are provided under the Contract for the accepted quantities of work done. If the Contract is done on a lump sum basis, the adjustment for increases or decreases may be based, at the sole discretion of the Engineer, on a theoretical

unit price. This price will be determined by dividing the Contractor's applicable breakdown category price (as listed in the Special Specifications or as set forth in the Bid) by the estimated quantities of all units of work within the applicable breakdown category.

B. If either (1) the total project (total bid) cost of the work, using original bid quantities and unit prices, or (2) the total quantity of any major contract item, using original bid quantities changes more than 25 percent, then that part of the increase or decrease exceeding 25 percent shall be adjusted as the parties agree. A major bid item is any contract item, except lump sum items, having an original contract value greater than 10 percent of the total amount of the contract. If the parties cannot agree, the Engineer will determine the equitable adjustment of time, payment, or both. The basis of the equitable adjustment of time will be in accordance with Subsection 108.06. The basis of the equitable cost adjustment for decreases will take into account a redistribution of fixed costs. The basis of the equitable cost adjustment for increases will be by using one of the following methods:

1. Unit contract prices.
2. Other means of establishing costs.
3. Force account.

C. The Contractor shall obtain written consent of the surety or sureties if: (1) changed work increases the total cost by more than 25 percent of the original total contract, or (2) the Engineer requests such consent. The City will not adjust for increases or decreases if the City has entered the amount for the item in the proposal only to provide a common basis for bidders. The Contractor shall bear all costs that result from increased or decreased in such common-bid-basis amounts.

109.04 PAYMENT FOR CHANGE ORDERS

A. Payment or credit for any alterations covered by a Change Order shall be determined by one or a combination of the methods set forth in 1, 2, 3, or 4 below:

1. METHOD 1. UNIT PRICES. If applicable, those unit prices stipulated in the Proposal, or unit prices negotiated and mutually acceptable to the Contractor and Owner.

2. METHOD 2. LUMP SUM. A total sum for the work negotiated and mutually acceptable to the Contractor and Owner.

3. METHOD 3. FORCE ACCOUNT WORK

a. The Contractor shall perform work on a force account basis upon written notice from the Engineer. Payment will be made as set forth herein.

b. The Contractor must maintain records in such a manner as to provide a clear distinction between direct cost of work performed on force account basis and costs of all other operations performed in connection with the Contract.

c. Daily, furnish to Engineer signed reports itemizing materials used and setting forth the cost of labor and charges for equipment rental, delineating whether said equipment is Contractor or Subcontractor owned. Provide names, identifications, and classifications of workmen, the hourly rate of pay and hours worked, and the size, type and identification number of equipment and hours of equipment operation.

d. Substantiate material charges by vendor's invoices, submit such invoices with the reports; or, if not available, submit with subsequent reports. In the event said vendor's invoices are not submitted within forty-five (45) days after completion of the force account work Owner reserves the right to establish the cost of such materials.

e. When work is ordered to be paid for on a force account basis, such work will be paid for on the basis of cost, plus a negotiated percentage allowance, not to exceed the maximum set forth herein.

f. Items of cost for which payment will be made and to which payment will be restricted, together with the maximum percentage allowance applicable to the respective items, are as follows:

Items of Cost for Which Payments Will Be Made	Maximum Percentage Additional Allowance To Actual Costs
Labor, while engaged directly on force account work	20
Materials and supplies used on force account work	15
Rental on equipment having a value in excess of $300	*

* No additional percentage except as follows:

g. Payment for labor used in the work will be computed at the rates actually paid by Contractor, but not to exceed prevailing straight time rates established by the Oregon Department of Labor, plus allowable allowance set forth above. Time allowed shall be the number of hours worked directly on force account operations. The employers cost for accident and unemployment compensation premiums, labor insurance cost, public liability and property damage cost and fringe benefits will be included in the direct labor cost item before applying the additional allowance. Written approval is required from the City for any overtime work on force account operations prior to any such work. Any overtime worked on force account operations will be compensated at the straight time rates unless previous approval was obtained from the Engineer.

h. Payment for materials and supplies used on force account work must be supported by paid invoices. Contractor and Subcontractors shall take advantage of all practicable discounts on bills for materials and supplies, and such discounts shall be reflected on all bills and invoices submitted to the Owner for payment. Freight will be considered to be part of the cost of materials and supplies and will be paid for as materials and supplies. Materials and supplies will be paid for as agreed in writing prior to their production or use. If there is no price agreement, the Engineer shall establish a reasonable price for such materials and supplies.

i. For the use of the Contractor's equipment, the Contractor will be paid at the monthly rental rates and the hourly operating costs set forth in the current edition of the "Rental Rate Blue Book for Construction Equipment" and the "Rental Rate Blue Book for Older Construction Equipment" which are published by the Equipment Guidebook Company, 2800 W. Bayshore Road, Palo Alto, California 94303. Reference copies of the above publications are on file at the Oregon State Highway Division Region Engineer, and the area offices of the Associated General Contractors of America. While using the Blue Book to determine allowable rental rates for equipment the hourly rate will be calculated by using the monthly rate as set forth in the book divided by one hundred seventy-six (176) hours. The rental rates will be the total compensation for all costs including fuel, supplies, repairs and renewals. No further allowance will be made for these items. For the use of equipment not listed in said documents, the rental rates shall be as agreed to in writing between the Contractor and the Engineer prior to use of said unlisted equipment. If there is no prior agreement, the Engineer shall establish a reasonable price for such equipment.

j. Time allowed for Contractor's equipment shall be only the number of hours that the equipment actually operated directly on force account work.

k. Compensation on equipment not owned by the Contractor will not exceed the rates actually paid by the Contractor and must be supported with an invoice that represents an arms length transaction. The Contractor and the Engineer will agree on the equipment to be used and the appropriate

rental rates before using said equipment on force account work. If prior approval is not obtained, the Engineer will establish the rates by either comparing the available equipment and using the applicable rate for the least expensive equipment that will accomplish the work or utilizing the applicable Blue Book rates as established above. Rental cost for equipment not owned by the Contractor will be established so as to minimize the cost to the City. The Hourly rate will be used unless the accumulated cost using the hourly rate exceeds the accumulated cost using the daily rate. The daily rate will be used unless the accumulated cost using the daily rate exceeds the accumulated cost using the weekly rate. This system will be expanded to utilize monthly or yearly rates as appropriate. These rental rates will be considered total compensation for all costs, including move-in, move-out, fuel, supplies, repairs, and renewals. No further allowance will be made for these items without specific approval of the Engineer before the work is commenced. Payment for rental on equipment not owned by the Contractor shall be at the rental costs so determined, plus a negotiated percentage not to exceed the allowance for materials and supplies.

l. Individual pieces of equipment, having a value of $350 or less, will be considered to be tools or small equipment, and no rental will be allowed on such, unless not normally on work site and must be rented from others. Then (k) will apply.

m. No standby charges will be considered as a compensable part of any force account work. When a piece of equipment and operators thereof are hired, rented, or furnished as a unit, (Owner/Operator), the additional percentage to be allowed shall be five (5) percent and Contractor shall not be entitled to twenty (20) percent on the time of operators of such equipment. Neither shall Contractor be entitled to payment for contributions made under terms of the Worker's Compensation Act, Unemployment Compensation Act, or Social Security Act or any other benefits to cover the time of these operators.

n. The percentage allowances made to Contractor in accordance with terms outlined herein will be full reimbursement and compensation for all superintendence, use of tools and small equipment, overhead expense, bond costs, record keeping expense, insurance premiums, profits, indirect costs, and all other items of cost not specifically designated herein as items for which payment is to be made, whether or not the services, costs and other items involved are furnished or incurred by Contractor or Subcontractor.

o. When work is performed on a force account basis by a Subcontractor, the Contractor will be allowed a supplemental markup of five percent (5%) on amount charged by Subcontractor, provided however, Owner will pay no more than a reasonable amount for work performed by a Subcontractor.

4. METHOD 4. PAYMENT DETERMINED BY ENGINEER

A. In case no other basis can be agreed upon, and the Engineer has not directed the work to be paid for on a force account basis, then an allowance may be made, either for or against the Contractor, in such amount as the Engineer may determine to be fair and equitable.

B. The Owner's request for quotations on alterations to the work shall not be considered authorization to proceed with the work prior to the issuance of a formal Change Order, nor shall such request justify any delay in existing work. Lump sum quotations for alterations to the work shall include substantiating documentation with an itemized breakdown of Contractor and Subcontractor costs, including labor, material, rentals and approved services, overhead, and profit calculated as specified under Method "3" above.

C. In Methods "1" and "2" above, Contractor's quotations for Change Orders shall be in writing and firm for a period of thirty (30) days. Any compensation paid in conjunction with the terms of a Change Order shall comprise total compensation due the Contractor for the work or alteration defined in the Change Order. By signing the Change Order, the Contractor acknowledges that the stipulated compensation includes payment for the work or alteration plus all payment for the interruption of schedules, extended overhead, delay or any other impact claim or ripple effect, and by such signing specifically waives any reservation or claim for additional compensation or time in respect to the subject of the Change Order.

109.05 CLAIMS AND NOTICE

A. No claim shall be made by the Contractor for any loss of anticipated profits because of any alterations or changes made pursuant to the provisions of Subsections 104.04 and 109.04, nor by reason of any variation between the approximate quantities and the quantities of work as done. No allowance except as provided in Subsection 104.04 will be made for any increased expense, loss of expected reimbursement or loss of anticipated profits suffered or claimed by the Contractor resulting directly from such alterations or changes or resulting indirectly from unbalanced allocation among the Contract items of overhead expense on the part of the Contractor as a Bidder and subsequent loss of expected reimbursements therefor or from any other cause.

B. In any case where the Contractor claims that it is entitled to or will be entitled to additional compensation and/or additional Contract time or if the Contractor considers any interpretation or order by the Engineer to be a breach of Contract, Contractor shall immediately notify the Engineer, in writing, of its intention to make claim before beginning the work or conforming to the interpretation on which the claim is based. Contractor's written notification shall be a written statement describing (1) the act of omission or commission by the Owner or its agent that allegedly caused damage to the Contractor, (2) the nature of the claimed damage, (3) the clauses of the Contract or general legal principles upon which the claim is based, (4) the factual occurrences upon which the Contractor bases the claim. Submission of notice of claim as specified shall be mandatory, and failure to comply shall be a conclusive waiver to such claim for damages by the Contractor. Oral notice or statement will not be sufficient nor will notice or statement after the event since it tends to hinder, if not prevent, the Owner's investigation of the pertinent facts. After said written notification (if the claim is not resolved or withdrawn in writing) and only upon written direction by the Engineer proceed without delay to perform the work pursuant to the decision of the Engineer. While the work on an unresolved claim is being performed Contractor shall keep track of costs and maintain records in the manner set forth in Section 109.04 A 3 FORCE ACCOUNT WORK, at no cost to Owner. Such notice by the Contractor and the fact that Contractor and Engineer are keeping track of costs and maintaining records as required by Section 109.04 A 3 FORCE ACCOUNT WORK shall not in any way be construed as proving the validity of the claim nor the costs thereof.

C. A fully documented claims package shall be submitted in writing to the Engineer within forty-five (45) days after completion of the work upon which the claim is based.

D. Each claim submitted shall include substantiating documentation with an itemized breakdown of Contractor and Subcontractor's costs on a daily basis which shall include, but not be limited to labor, material, equipment, supplies, services, overhead, and profit. All documentation that Contractor believes is relevant to the claim shall be provided in said claim package including without limitation, payroll records, purchase orders, quotations, invoices, estimates, profit and loss statements, daily logs, ledgers, and journals. Failure to submit the claim package in full compliance with this requirement, and/or maintain cost records as herein required, will constitute a waiver of the claim.

E. The requirements of this Subsection 109.05 shall apply to claims for additional or extra compensation or time arising from any situation which may occur except for claims of error in the final estimate as provided in Subsection 109.08.

F. Provided the claim or claims have been submitted in accordance with the requirements of this Subsection 109.05, the Engineer will, as soon as possible, consider and investigate the claim or claims of the Contractor for additional compensation. The Engineer will promptly advise the Contractor of the decision to accept or reject the claim or claims, in full or in part.

G. The Contractor shall commence any suit or action to collect or enforce any claim filed in accordance with this Subsection 109.05 within a period of one year following the mailing of the Engineer's full or partial denial. If said suit is not commenced in said one year period, the Contractor expressly waives any and all claims for additional compensation and any and all causes of suit for the enforcement thereof that he might have had.

109.06 OWNER'S RIGHT TO ACCESS TO CONTRACTOR'S RECORDS

A. In the event that Contractor makes a claim under Subsection 109.05 or performs work under 109.04 A 3 the Owner or its designated representative shall have access and a right (at any time) to inspect, audit and copy Contractor's books, records, documents, diaries, and logs and other evidence (hereinafter referred to as records) pertinent to performance and payment of this Contract and amendments, change orders and any claims made in relation to the Contract. If an audit is conducted, it shall be in accordance with generally accepted auditing standards.

B. The Contractor will make its records available within the boundaries of the City of Newberg, Oregon, or pay all additional costs for travel and per diem or other additional expenses incurred by Owner in examining, auditing, inspecting and copying Contractor's records, by reason of said records not being available within said boundaries.

C. Contractor agrees to the disclosure of all records and to their admission as evidence in any proceeding, between the parties, involving a claim or force account work as set forth in Subsections 109.05 and 109.04(3).

D. In the event that Contractor's records establish a discrepancy, favorable to Owner, in the representations Contractor has made to Owner involving claims or force account work, Contractor shall bear all costs incurred by Owner in conducting the audit and inspection provided herein.

E. All costs referenced in subparagraphs B. and D. may be withheld and/or deducted from any sum due or that becomes due Contractor.

109.07 PROGRESS PAYMENTS AND RETAINAGE

A. Payment for all work under the Contract will be made at the price or prices bid, and those prices shall include full compensation for all incidental work.

B. If the Contract is for a public work and the Contract price is $10,000 or more, supply and file, and require every Subcontractor to supply and file, with the Owner and the with the Wage and Hour Division, Bureau of Labor and Industries (BOLI), 1400 SW Fifth Avenue, Portland, Oregon 97201 a statement in writing that conforms to the requirements of ORS 279.354. The schedule for submitting payroll information shall be as noted in the latest applicable edition of the Prevailing Wage Rates for Public Works Contracts in Oregon published by BOLI.

C. Make progress estimate of work performed in any calendar month and submit to the Engineer for approval, on or before the 7th day of the following month. These estimates shall include value of labor performed and materials incorporated in the work since commencing work under the Contract. Such estimates need not be made by strict measurements and may be approximate only, and shall be based upon the whole amount of money that will become due according to terms of the Contract when Project has been completed.

D. If the Contract price is determined, in whole or in part, on a Lump Sum basis, prepare an itemized cost breakdown relating thereto and have the Engineer approve same before commencing work; progress estimates based on said itemized cost breakdown may be the basis for progress payments. Upon direction by the Engineer provide for revision of the costs breakdown to reflect the true costs of the work as it progresses.

E. If the Contract price is determined wholly on a unit basis, Engineer may use unit prices bid in making progress estimates on the work. In case said unit prices do not, in the opinion of the Engineer, truly represent actual relative costs of different parts of work, a percentage of the Unit Price may be used in making progress estimate adjustments.

F. If the Engineer receives written notice of any unsettled claims for damage or other costs due to Contractor's operations including, without limitation, claims from any City Department or other governmental agency, an amount equal to the claim may be withheld from the progress, final payments or retainage until such claim has been resolved to the satisfaction of Engineer.

G. Progress payments will be made by Owner on a monthly basis within thirty (30) days from sign off by the Contractor of the progress payment or fifteen (15) days after the payment is approved by Engineer of work performed. Payment will be issued by Owner for the amount of the approved estimate, less five percent (5%) retainage. Such amount of retainage shall be withheld and retained by Owner until it is included in and paid to Contractor as part of the final payment of the Contract amount. Securities in lieu of retainage will be accepted, or if Contractor elects, retainage as accumulated will be deposited by Owner in an interest-bearing account pursuant to ORS Chapter 279 for progress payments. Upon substantial completion of the work under the Contract which shall be understood to be not less than ninety-five percent (95%) of the work, the Engineer may, at its discretion, reduce the retained amount equivalent to not less than two hundred percent (200%) of the contract value or estimated value or estimated cost, whichever is greater, of the work remaining to be done.

H. The Engineer may decline to approve an application for payment and may withhold such approval if, in the Engineer's opinion the work has not progressed to the point indicated by the Contractor's submittal. The Engineer may also decline to approve an application for payment or may reduce said payment or, because of subsequently discovered evidence or subsequent inspections, he may nullify the whole or any part of any payment previously made 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 failure of the Contractor to make payments properly to Subcontractors for labor, materials or equipment, unless Surety consents to such payment, (3) reasonable doubt that the work can be completed for the unpaid balance of the Contract sum, (4) damage to another Contractor's work, (5) reasonable indication that the work will not be completed within the Contract time, (6) unsatisfactory prosecution of the work by the Contractor, (7) claims against the Contractor by the Owner, (8) failure to submit a construction schedule or failure to keep said construction schedule updated as set forth in Subsection 108.01, or (9) exceeding work limits as set forth in Subsection 204.03.

I. When the above grounds are removed, payment shall be made for amounts withheld because of them. Withholding of progress payments or partial payments under the criteria set forth above shall not entitle the Contractor to interest on such withheld payments or partial payments.

J. If Contractor fails to complete the Project within the time limit fixed in the Contract or any extension, no further estimate may be accepted or progress or other payments allowed until the Project is completed, unless approved otherwise by Owner.

K. Progress estimates are for the sole purpose of determining progress payments and are not to be relied on for any other purpose. The making of a progress payment shall not be construed as an acceptance of any of the work or materials under the Contract.

L. When the progress estimate indicates that the progress payment would be less than one thousand dollars ($1,000), no progress payment will be made for that estimate period, unless approved by the Engineer.

109.08 FINAL ESTIMATE AND FINAL PAYMENT

A. Pursuant to ORS Chapter 279, notify the Engineer in writing when work is considered complete and Engineer shall, within fifteen (15) days after receiving notice, make a final inspection and either accept the work or notify Contractor of work yet to be performed on the Contract. If accepted, Engineer shall so notify Contractor, and will make a final estimate and prepare a Certificate of Completion recommending acceptance of the Work as of a certain date.

B. If the Contractor believes the quantities and amounts specified in the final estimate and Certificate of Completion prepared by the Engineer to be incorrect, Contractor shall submit to the Engineer within fifteen (15) days of mailing of the Engineer's final estimate and Certificate of Completion to the Contractor's last known address as shown in the records of the Owner, an itemized statement of any and all claims for additional compensation under the Contract which are based on differences in measurements or errors of computation. Any such claim not so submitted and supported by an itemized statement within said fifteen (15) day period is expressly waived and the Owner shall not be obligated to pay the same. Nothing contained herein shall limit the requirements of Subsection 109.05.

C. A project cannot be accepted until all provisions of the Contract Documents have been met including submission of the certificate of completion and compliance. Upon receipt of the executed Certificate of Completion from the Contractor, the final payment will be made within thirty (30) days in accordance with ORS 279.

D. Provided Contractor submits a claim in the manner and time as required in B) above, the Engineer, as soon as practicable, will consider and investigate the claim or claims of the Contractor for compensation earned under the Contract and not included in the Engineer's final estimate and Certificate of Completion. The Engineer will then promptly advise the Contractor of acceptance or rejection of the claim in full or part. If the Engineer allows the Contractor's claims in full or in part, Engineer will prepare a revised final estimate and Certificate of Completion, including all such items allowed and will submit the same to the Contractor.

E. The Contractor shall execute and return the revised Certificate of Completion within five (5) days of receipt of the final progress payment.

F. If the Engineer rejects the claim or claims, he will issue written notice of rejection mailed to the Contractor's last known address as shown in the records of the Owner.

G. The Contractor shall commence any suit or action to collect or enforce the claim or claims for any additional compensation arising from, or errors of computation in the final estimate within a period of one (1) year following the original mailing of the Engineer's final estimate and Certificate of Completion to the Contractor's last known address as shown in the records of Owner. The Engineer's issuance of a revised final estimate pursuant to this subsection does not alter the original final estimate date. If said suit, action or proceeding is not commenced in said one (1) year period, the final estimate and Certificate of Completion or revised final estimate and Certificate of Completion, if revisions are made, shall be conclusive with respect to the amount earned by the Contractor, and the Contractor expressly waives any and all claims for compensation and any and all causes of suit or action for the enforcement thereof that he might have had.

H. Upon return of the fully executed Certificate of Completion from the Contractor, the Engineer will submit the Certificate of Completion and final estimate to the Owner for approval. Upon approval and acceptance by the Owner, Contractor will be paid a total payment equal to the amount due under the Contract including retainage.

I. Monies earned by the Contractor are not due and payable until the procedures set forth in these Specifications for inspection, approval and acceptance of the Work, for determination of the work done and the amount due therefor, for the preparation of the final estimate and Certificate of Completion processing the same for payment, for consideration of the Contractor's claim, or claims, if any, and for the preparing of a revised final estimate and Certificate of Completion and processing same for payment have been carried out.

J. Foreign Contractor will provide Owner with evidence that provisions of ORS Chapter 279 have been satisfied; this is a prerequisite to final payment. See Subsection 103.08.

K. Execute and deliver to Owner, in form approved by the Attorney, a receipt for all amounts paid or payable to Contractor under the Contract, and a release and waiver of all claims against Owner arising out of or relating to the Contract and furnish satisfactory evidence that all amounts due for labor, materials and other obligations under the Contract have been fully and finally settled or are fully covered by the Performance and Payment Bond and/or insurance protecting Owner, its officers, agents and employees as well as Contractor. This is a condition of final payment and Contractor will not be entitled to final payment on release of retainage nor interest thereon until execution and delivery of said Receipt, Release & Waiver.

L. If Owner declares a default of the Contract, and Surety completes said Contract, all payments after declaration of default and retainages held by Owner shall be paid to Surety and not to Contractor in accordance with terms of the Contract.

M. Unless otherwise specifically noted and documented as required in Subsection 109.05 or this Subsection 109.08, acceptance by Contractor of final payment shall release Owner and Engineer from any and all claims by Contractor whether known or unknown, arising out of and relating to the work. No payment, however, final or otherwise, shall operate to release Contractor or its Sureties from warranties or other obligations required in the performance of the Contract.

END OF DIVISION

PART 4

SPECIFICATIONS

SECTION 01001
GENERAL REQUIREMENTS

PART 1 PROJECT DESCRIPTION

1.1 GENERAL

A. A brief description of the work is stated in the Invitation to Bid. To determine the full scope of the project or any particular part of the project, coordinate the applicable information in the several parts of these Contract Documents.

PART 2 SEQUENCE OF OPERATIONS

2.1 SCHEDULING

A. Plan the work and carry it out with minimum interference to the operation of the existing facilities. Prior to starting the work, confer with the ENGINEER and OWNER's representative to develop a work schedule which will permit the facilities to function normally as practical. It may be necessary to do certain parts of the construction work outside normal working hours in order to avoid undesirable conditions. The CONTRACTOR shall do this work at such times, and at no additional cost to the OWNER. Do not make connections between existing work and new work until necessary inspection and tests have been completed on the new work and it is found to conform in all respects to the requirements of the Contract Documents.

B. Work on existing structures and facilities shall be performed on a schedule and in a manner that will permit the existing facility to operate continuously.

2.2 SHUTDOWN OF EXISTING OPERATIONS OR UTILITIES

A. Continuous operation of the OWNER's existing sewer system is of critical importance.

B. Connections to existing services or utilities, or other work that requires the temporary shutdown of any existing operations or utilities shall be planned in detail with appropriate scheduling of the work and coordinated with the OWNER or ENGINEER. The approved schedule for shutdown or restart shall be indicated on the CONTRACTOR's Progress Schedule, and advance notice shall be given in order that the OWNER or ENGINEER may witness the shutdown, tie-in, and startup.

C. All materials and equipment (including emergency equipment) necessary to expedite the tie-in shall be on hand prior to the shutdown of existing services or utilities.

2.3 OPERATION OF EXISTING SYSTEM PROHIBITED

A. At no time undertake to close off any lines or open valves or take any other action which would affect the operation of the existing system, except as specifically required by the Drawings and Specifications and after approval is granted by the OWNER. Request approval 7 working days in advance of the time that interruption of the existing system is required.

PART 3 SITE CONDITIONS

3.1 SITE INVESTIGATION AND REPRESENTATION

A. The CONTRACTOR acknowledges satisfaction as to the nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, access to the site, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract.

B. The CONTRACTOR further acknowledges satisfaction as to character, quality, and quantity of surface and subsurface materials to be encountered from inspection of the site and from reviewing any available records of exploratory work furnished by the OWNER or included in these Documents. Failure by the CONTRACTOR to become acquainted with the physical conditions of the site and all the available information will not relieve the CONTRACTOR from responsibility for properly estimating the difficulty or cost of successfully performing the work.

C. The CONTRACTOR warrants that as a result of examination and investigation of all the aforesaid data, the CONTRACTOR can perform the work in a good and workmanlike manner and to the satisfaction of the OWNER. The OWNER assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefor is assumed by the OWNER.

PART 4 INFORMATION ON SITE CONDITIONS

4.1 GENERAL

A. Any information obtained by the ENGINEER regarding site conditions, subsurface information, groundwater elevations, existing construction of site

facilities as applicable, and similar data will be available for inspection at the office of the OWNER upon request. Such information is offered as supplementary information only. Neither the ENGINEER nor the OWNER assumes any responsibility for the completeness or interpretation of such supplementary information.

4.2 SUBSURFACE INVESTIGATION

A. A soil boring was performed at the project site. The geotechnical report is available at the office of the OWNER.

B. The CONTRACTOR further acknowledges satisfaction as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site and from evaluating information derived from exploratory work that may have been done by the OWNER or included in these Contract Documents. Any failure by the CONTRACTOR to become acquainted with all the available information will not relieve CONTRACTOR from responsibility for properly estimating the difficulty or cost of successfully performing the work.

4.3 INFORMATION ON SITE CONDITIONS

A. All information obtained by the OWNER regarding site conditions, topography, subsurface information, groundwater elevations, and similar data will be available for inspection at the office of the OWNER upon request. Such information is offered as supplementary information only. Neither the ENGINEER, nor the OWNER assumes any responsibility for the completeness or for the CONTRACTOR's interpretation of such supplementary information.

4.4 BORING LOG

A. A log of the test boring showing a record of the data obtained on subsurface conditions is included at the end of this section for reference only. Said log is only the opinion of the ENGINEER as to the character of the materials and is not to be considered as a part of the Contract Documents.

4.5 BIDDER'S SUBSURFACE INVESTIGATION

A. Prospective bidders are invited, at their own expense, to make such additional subsurface investigation, by boring or test-hole excavation, as may be desirable, provided, however, that such work be scheduled by appointment with the OWNER and the property owner.

4.6 DIFFERING SUBSURFACE CONDITIONS

A. In the event subsurface or latent physical conditions are found materially different from those indicated in these Documents, and differing materially from those ordinarily encountered and generally recognized as inherent in the character of work covered in these Contract Documents, the CONTRACTOR shall promptly, and before such conditions are disturbed, notify the OWNER in writing of such changed conditions. Upon encountering an unknown obstruction, however, the CONTRACTOR, at no change in Contract price, shall remove any element which can be removed by powered hand spade or by 1 cubic yard capacity power shovel without drilling or blasting.

B. In the event hazardous materials or buried tanks are encountered, the CONTRACTOR shall immediately stop work in the affected area and immediately notify the OWNER. The CONTRACTOR shall not proceed with work in the affected area until directed to do so in writing by the OWNER.

C. The ENGINEER will investigate such conditions promptly and following this investigation, the CONTRACTOR shall proceed with the work, unless otherwise instructed by the ENGINEER. If the ENGINEER finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for performing the work, the ENGINEER will recommend to the OWNER the amount of adjustment in cost and time considered to be reasonable. The OWNER will make the final decision on all Change Orders to the Contract regarding any adjustment in cost or time for completion.

4.7 UTILITIES

A. Known utilities and structures adjacent to or expected to be encountered in the work are shown on the Drawings. The locations shown are taken from existing records; however, it is expected that there may be some discrepancies and omissions in the locations and quantities of utilities and structures shown. Those shown are for the convenience of the CONTRACTOR only, and no responsibility is assumed by either the OWNER or the ENGINEER for their accuracy or completeness.

B. The following is a list of the major utilities serving the work area indicating the name and telephone number of the responsible authority of the various utilities which should be notified if conflicts or emergencies arise during the progress of the work:

Name of Utility	Responsible Authority	Telephone No.
All	One-Call Utility Location	1-800-332-2344
Electrical	PGE	503-463-4336
Gas	NW Natural	1-800-422-4012
Telephone	Verizon	503-643-1001
Water	City of Newberg	503-537-1205
Owner	City of Newberg	503-554-1631
Engineer	Southwood Engineering	541-929-2533

4.8 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

A. Where the CONTRACTOR's operations could cause damage or inconvenience to railway, telegraph, telephone, television, power, oil, gas, water, sewer, or irrigation systems, the operations shall be suspended until all arrangements necessary for the protection of these utilities and services have been made by the CONTRACTOR.

B. Notify all utility offices which are affected by the construction operation at least 48 hours in advance. Under no circumstances expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, locate, expose, and provide temporary support for all existing underground utilities.

C. The CONTRACTOR shall be solely and directly responsible to the OWNER and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage which may result from the construction operations under this Contract.

D. Neither the OWNER nor its officers or agents shall be responsible to the CONTRACTOR for damages as a result of the CONTRACTOR's failure to protect utilities encountered in the work.

E. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental breakage due to construction operations, promptly notify the proper authority. Cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is granted.

F. In the event the CONTRACTOR encounters water service lines that interfere with trenching, CONTRACTOR may, by obtaining prior approval of the property owner, Water Department, or Fire Department as applicable, and the OWNER, cut the service, dig through, and replace the entire service with similar and equal materials at the CONTRACTOR's expense. The entire service between existing joints must be replaced. No couplers or unions will be allowed.

G. The CONTRACTOR shall replace, at CONTRACTOR's expense, all existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract Documents or ordered by the OWNER.

4.9 INTERFERING STRUCTURES

A. Take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground. An attempt has been made to show major structures on the Drawings. The completeness and accuracy of information shown cannot be guaranteed, and it is presented simply as a guide to avoid known possible difficulties.

B. Protect underground and aboveground existing structures from damage, whether or not they lie within the limits of the easements obtained by the OWNER. Where such existing fences, gates, barns, sheds, buildings, or any other structure must be removed in order to properly carry out the construction, or are damaged during construction, restore to their original condition to the satisfaction of the property owner involved at the CONTRACTOR's own expense. Notify the OWNER of any damaged underground structure, and make repairs or replacements before backfilling.

C. Without additional compensation, the CONTRACTOR may remove and replace in a condition as good as or better than original, such small miscellaneous structures as fences, mailboxes, and signposts that interfere with the CONTRACTOR's operations.

4.10 FIELD RELOCATION

A. During the progress of construction, it is expected that minor relocations of the work will be necessary. Such relocations shall be made only by direction of the OWNER. If existing structures are encountered which prevent the construction, and which are not properly shown on the Drawings, notify the OWNER before continuing with the construction in order that the OWNER may make such field revisions as necessary to avoid conflict with the existing structures. If the CONTRACTOR shall fail to so notify the OWNER when an

existing structure is encountered, and shall proceed with the construction despite this interference, it shall be at CONTRACTOR's own risk.

PART 5 TEMPORARY CONSTRUCTION UTILITIES AND FACILITIES

5.1 TEMPORARY WATER

A. Water is not available at the project site. All water used during construction shall be provided and paid for by the CONTRACTOR.

5.2 TEMPORARY ELECTRIC POWER

A. Temporary electric power is available at the site. All temporary electrical power used during construction shall be paid for by the CONTRACTOR. CONTRACTOR shall make arrangements with electrical utility for temporary power service connection.

5.3 SANITARY FACILITIES

A. The CONTRACTOR shall provide and maintain sanitary facilities for CONTRACTOR's employees and subcontractors' employees that will comply with the regulations of the local and state departments of health and as directed by the ENGINEER.

5.4 STORAGE OF MATERIALS

A. Materials shall be so stored as to ensure the preservation of their quality and fitness for the work. When considered necessary, they shall be placed on wooden platforms or other hard, clean surfaces, and not on the ground. Stored materials shall be located so as to facilitate prompt inspection. Private property shall not be used for storage purposes without the written permission of the OWNER or lessee.

B. Delicate instruments and materials subject to vandalism shall be placed under locked cover and, if necessary, provided with temperature control as recommended by the manufacturer.

PART 6 SAFETY AND CONVENIENCE

6.1 CONSTRUCTION SAFETY PROGRAM

A. The CONTRACTOR shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The CONTRACTOR shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.

B. The duty of the ENGINEER to conduct construction review of the CONTRACTOR's performance is not intended to include a review or approval of the adequacy of the CONTRACTOR's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site.

6.2 SAFETY EQUIPMENT

A. The CONTRACTOR, as part of safety program, shall maintain at CONTRACTOR's office or other well-known place at the jobsite, safety equipment applicable to the work as prescribed by the governing safety authorities, all articles necessary for giving first-aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of any person who may be injured on the jobsite.

B. The CONTRACTOR shall do all work necessary to protect the general public from hazards. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work.

C. The performance of all work and all completed construction, particularly with respect to ladders, platforms, structure openings, scaffolding, shoring, lagging, machinery guards and the like, shall be in accordance with the applicable governing safety authorities.

D. During construction, the CONTRACTOR shall construct and at all times maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades or steel plates, as applicable, at all openings, obstructions, or other hazards. All such barriers shall have adequate warning lights as necessary, or required, for safety.

6.3 ACCIDENT REPORTS

A. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the ENGINEER. In addition, the CONTRACTOR must promptly report in writing to the ENGINEER all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses.

B. If a claim is made by anyone against the CONTRACTOR or any subcontractor on account of any accident, the CONTRACTOR shall promptly report the facts in writing to the ENGINEER, giving full details of the claim.

6.4 SAFE ACCESS BY FEDERAL, STATE, AND LOCAL GOVERNMENT OFFICIALS

A. Authorized representatives of the Oregon State Department of Environmental Quality, Oregon State Board of Health, and other government officials shall at all times have safe access to the work, and the CONTRACTOR shall provide proper facilities for such access and inspection.

6.5 TRAFFIC MAINTENANCE AND SAFETY

A. Comply with all rules and regulations of the state, county, and city authorities regarding closing or restricting the use of public streets or highways. No public or private road shall be closed, except by express permission of the OWNER or other agency, such as the State or County, having jurisdiction over the roadway. Conduct the work so as to assure the least possible obstruction to traffic and normal commercial pursuits. Protect all obstructions within traveled roadways by installing approved signs, barricades, and lights where necessary for the safety of the public. The convenience of the general public and residents near the construction areas, and the protection of persons and property are of prime importance and shall be provided for in an adequate and satisfactory manner.

B. Where traffic will pass over trenches after they are backfilled and before they are paved, the top of the trench shall be maintained in a condition that will allow normal vehicular traffic to pass over. Temporary access driveways must be provided where required. Cleanup operations shall follow immediately behind backfilling and the worksite shall be kept in an orderly condition at all times.

C. When flaggers and guards are required by regulation or when deemed necessary for safety, they shall be furnished with approved orange wearing apparel and other regulation traffic-control devices.

6.6 TRAFFIC CONTROL

A. Traffic control on all rights-of-ways shall meet the requirements of the current edition (including all amendments) of the Manual on Uniform Traffic Control Devices for Streets and Highways published by the U.S. Department of Transportation Federal Highway and Administration as adopted by the State of Oregon, all State of Oregon Supplements, and City of Newberg Standards.

6.7 PROTECTION OF PROPERTY

A. Protect stored materials, cultivated trees and crops, and other items located adjacent to the proposed work. Notify property owners affected by the construction at least 48 hours in advance of the time construction begins.

During construction operations, construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to their residence or place of business for a period exceeding 8 hours, unless the CONTRACTOR has made special arrangements with the affected persons.

6.8 USE OF EXPLOSIVES

A. The use of explosives will not be allowed.

6.9 FIRE PREVENTION AND PROTECTION

A. The CONTRACTOR shall perform all work in a fire-safe manner. CONTRACTOR shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The CONTRACTOR shall comply with applicable federal, state, and local fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

6.10 ACCESS FOR POLICE, FIRE, AND POSTAL SERVICE

A. Notify the fire department and police department before closing any street or portion thereof. No closing shall be made without the OWNER's approval. Notify said departments when the streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without special written permission from the fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access.

B. The CONTRACTOR shall leave a night emergency telephone number or numbers with the police department, so that contact may be made easily at all times in case of barricade and flare trouble or other emergencies.

C. Maintain postal service facilities in accordance with the requirements of the U.S. Postal Service. Move mailboxes to temporary locations designated by the U.S. Postal Service, and at the completion of the work in each area, replace them in their original location and in a condition satisfactory to the U.S. Postal Service.

PART 7 PRESERVATION, RESTORATION, AND CLEANUP

7.1 SITE RESTORATION AND CLEANUP

A. At all times during the work, keep the premises clean and orderly, and upon completion of the work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.

B. Stockpile excavated materials in a manner that will cause the least damage to adjacent lawns, grassed areas, gardens, shrubbery, or fences, regardless of whether these are on private property, or on state, county, or city rights-of-way. Remove all excavated materials from grassed and planted areas, and leave these surfaces in a condition equivalent to their original condition.

C. Upon completion of backfilling operations, hand-rake and drag all former grassed and planted areas, leaving all disturbed areas free from rocks, gravel, clay, or any other foreign material and ready, in all respects, for seeding. The finished surface shall conform to the original surface, and shall be free-draining and free from holes, ruts, rough spots, or other surface features detrimental to a seeded area.

7.2 FINISHING OF SITE, BORROW, AND STORAGE AREAS

A. Upon completion of the project, all areas used by the CONTRACTOR shall be properly cleared of all temporary structures, rubbish, and waste materials and properly graded to drain and blend in with the abutting property. Areas used for the deposit of waste materials shall be finished to properly drain and blend with the surrounding terrain.

7.3 REMOVAL OF ROCK FROM FINISHED SURFACES

A. Remove and dispose of all loose rock and boulders larger than 2-inch diameter occurring on the finished surfaces as a result of the construction operations.

7.4 STREET CLEANUP DURING CONSTRUCTION

A. Thoroughly clean all spilled dirt, gravel, or other foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation. Use self-contained vacuum type sweepers. No flushing will be allowed.

7.5 DUST PREVENTION

A. Give all unpaved streets, roads, detours, or haul roads used in the construction area an approved dust-preventive treatment or periodically water to prevent

dust. Applicable environmental regulations for dust prevention shall be strictly enforced.

PART 8 SUBMITTALS

8.1 GENERAL

A. Requirements in this section are in addition to any specific requirements for submittals specified in other sections of these Contract Documents.

B. Submittals shall be addressed to: Bob Knorr, City of Newberg, P.O. Box 970, Newberg, Oregon 97132.

C. Submitted data shall be fully sufficient in detail for determination of compliance with the Contract Documents.

D. Review, acceptance, or approval of substitutions, schedules, shop drawings, lists of materials, and procedures submitted or requested by the CONTRACTOR shall not add to the Contract amount, and all additional costs which may result therefrom shall be solely the obligation of the CONTRACTOR.

E. The OWNER is not precluded, by virtue of review, acceptance, or approval, from obtaining a credit for construction savings resulting from allowed concessions in the work or materials therefor.

F. It shall not be the responsibility of the OWNER to provide engineering or other services to protect the CONTRACTOR from additional costs accruing from such approvals.

G. No equipment or material for which listings, drawings, or descriptive material is required shall be installed until the ENGINEER has on hand copies of such approved lists and the appropriately stamped final shop drawings.

H. The review of drawings by the OWNER and ENGINEER will be limited to general design requirements only, and shall in no way relieve the CONTRACTOR from responsibility for errors or omissions contained therein.

I. Submittals will be acted upon by the OWNER and ENGINEER as promptly as possible, and returned to the CONTRACTOR not later than the time allowed for review in SHOP DRAWING SUBMITTAL PROCEDURE. Delays caused by the need for resubmittals shall not constitute reason for an extension of Contract time.

8.2 SHOP DRAWING SUBMITTAL PROCEDURE

A. The CONTRACTOR shall submit four copies to the OWNER for review, shop drawings, and catalog cuts for fabricated items and manufactured items furnished under this Contract. Shop drawings shall be submitted in sufficient time to allow the OWNER and ENGINEER not less than 10 regular working days for examining the shop drawings.

B. These shop drawings shall be accurate, distinct, and complete, and shall contain all required information, including satisfactory identification of items, units, and assemblies in relation to the Contract Drawings and Specifications.

C. Shop drawings shall be submitted only by the CONTRACTOR, who shall indicate by a signed stamp on the shop drawings, or other approved means, that the CONTRACTOR has checked and approved the shop drawings, and that the work shown is in accordance with Contract requirements and has been checked for dimensions and relationship with work of all other trades involved. The practice of submitting incomplete or unchecked shop drawings for the ENGINEER to correct or finish will not be acceptable, and shop drawings which, in the opinion of the ENGINEER, clearly indicate that they have not been checked by the CONTRACTOR will be considered as not complying with the intent of the Contract Documents and will be returned to the CONTRACTOR for resubmission in the proper form.

D. When the shop drawings have been reviewed by the OWNER and ENGINEER, two sets of submittals will be returned to the CONTRACTOR appropriately stamped. If major changes or corrections are necessary, the shop drawing may be rejected and one set will be returned to the CONTRACTOR with such changes or corrections indicated, and the CONTRACTOR shall correct and resubmit the shop drawings in the same manner and quantity as specified for the original submittal, unless otherwise directed by the ENGINEER. If changes are made by the CONTRACTOR (in addition to those requested by the ENGINEER) on the resubmitted shop drawings, such changes shall be clearly explained in a transmittal letter accompanying the resubmitted shop drawings.

E. The review of such shop drawings and catalog cuts by the OWNER and ENGINEER shall not relieve the CONTRACTOR from responsibility for correctness of dimensions, fabrication details, and space requirements, or for deviations from the Contract Drawings or Specifications, unless the CONTRACTOR has called attention to such deviations in writing by a letter accompanying the shop drawings and the OWNER and ENGINEER approves the change or deviation in writing at the time of submission; nor shall review by the OWNER and ENGINEER relieve the CONTRACTOR from the responsibility for errors in the shop drawings.

F. The CONTRACTOR agrees that shop drawing submittals processed by the OWNER and ENGINEER do not become Contract Documents and are not Change Orders; that the purpose of the shop drawing review is to establish a reporting procedure and is intended for the CONTRACTOR's convenience in organizing the work and to permit the OWNER and ENGINEER to monitor the CONTRACTOR's progress and understanding of the design.

8.3 OPERATION AND MAINTENANCE (O&M) MANUALS

A. The CONTRACTOR shall furnish six copies of a complete manual for installation, operation, maintenance, and lubrication requirements for each component of mechanical and electrical equipment or system. All equipment manufacturers and/or suppliers shall be made aware of these requirements and all associated costs shall be included in the costs for furnishing the equipment or system. The six copies shall include one with all original documentation and two electronic versions on CD.

B. Submit O&M Manuals printed on 8.5-inch by 11-inch heavy first quality paper with standard three-hole punching and bound in stiff-hinged binders constructed as a three-ring style (heavy-duty EZ-D binders preferred). Binders shall have titles on front and spine. Tab each section of manuals for easy reference with plastic-coated dividers. Provide index for each manual. Provide plastic sheet lifters prior to first page and following last page.

C. Reduce drawings or diagrams bound in manuals to an 8.5-inch by 11-inch or 11-inch by 17-inch size. However, where reduction is not practical to ensure readability, fold larger drawings separately and place in vinyl envelopes which are bound into the binder. Identify vinyl envelopes with drawing numbers.

D. Provide CADDFILE versions of all vendor- or CONTRACTOR-generated drawings in AutoCad 2000 readable format.

E. Prepare Operation and Maintenance Manuals to include, but are not necessarily limited to, the following detailed information, as applicable:

1. Equipment function, normal operating characteristics, limiting operations.
2. Assembly, disassembly, installation, alignment, adjustment, and checking instructions.
3. Operating instructions for startup, routine and normal operation, regulation and control, shutdown, and emergency conditions.
4. Lubrication and maintenance instructions.
5. Guide to "troubleshooting."
6. Parts list and predicted life of parts subject to wear.

7. Outline, cross-section, and assembly drawings; engineering data; and electrical diagrams, including elementary diagrams, wiring diagrams, connection diagrams, and word description of wiring diagrams and interconnection diagrams.
8. Test data and performance curves.
9. A list of recommended spare parts with a price list and a list of spare parts provided under these Specifications.
10. Copies of installation instructions, parts lists or other documents packed with equipment when delivered.
11. Instrumentation or tag numbers relating the equipment back to the Contract Documents.

F. For equipment items involving components or subunits, an Equipment Record Sheet for each operating component or subunit is required.

G. One complete set of preliminary O&M Manuals shall be submitted to the OWNER for review at 50 percent completion level of the Project. The final manuals shall be furnished at least 30 calendar days prior to the scheduled completion of the Project.

PART 9 CONSTRUCTION DOCUMENTATION

9.1 DAILY LOGS

A. Prepare a daily log summarizing the work performed each day, the equipment used, workers on the project, visitors to the site, and any other information pertinent to the construction activity. Submit the daily logs to the OWNER on a weekly basis.

9.2 CONSTRUCTION PHOTOGRAPHS

A. Prior to beginning work, take a minimum of 24 photographs of the work site.

B. During construction, take a minimum of 12 photographs of the construction site per month.

C. Photographs shall be a minimum of 3.5 inches by 5.0 inches.

D. Archive photographs in an album and submit to the OWNER at completion of the Contract.

PART 10 CONTRACT CLOSEOUT

10.1 FINAL SUBMITTALS

A. No Contract will be finalized until all guarantees, bonds, certifications, licenses, and affidavits required for work or equipment as specified are satisfactorily filed with the OWNER.

10.2 RELEASE OF LIENS OR CLAIMS

A. No Contract will be finalized until satisfactory evidence of release of liens has been submitted to OWNER as required by the General Conditions.

10.3 FINAL CLEANING

A. At completion of work and immediately prior to final inspection, clean entire project according to the following provisions:

1. Clean, sweep, and wash pipe and structures provided under the Contract. Leave the structures and site in a complete and finished condition to the satisfaction of the ENGINEER and OWNER.
2. Should the CONTRACTOR not remove rubbish or debris or not clean the facilities and site as specified above, the OWNER reserves the right to have final cleaning done at the sole expense of the CONTRACTOR.

B. The CONTRACTOR shall:

1. Conduct final inspection of exposed interior and exterior surfaces in preparation for substantial completion or occupancy.
2. Repair, patch, and touch up damaged surfaces to match adjacent surfaces.
3. Broom clean or wash paved surfaces; rake clean other surfaces.
4. Remove materials, equipment, and appurtenances not required as part of, or appurtenant to, the completed work.
5. Leave water courses and ditches open and in condition satisfactory to ENGINEER.

10.4 FINAL INSPECTION

A. After final cleaning and upon written notice from CONTRACTOR that work is completed, ENGINEER and OWNER will make preliminary inspection with the CONTRACTOR present. Upon completion of preliminary inspection, OWNER will notify CONTRACTOR in writing of particulars in which the completed work is defective or incomplete.

B. Upon receiving written notice from OWNER, CONTRACTOR shall immediately undertake work required to remedy defects and complete the work to the satisfaction of ENGINEER and OWNER.

C. After the items as listed in OWNER's written notice are corrected or completed, inform OWNER in writing that required work has been completed. Upon receipt of this notice, OWNER will make final inspection of the project.

D. Should the OWNER find all work satisfactory at the time of final inspection, CONTRACTOR will be allowed to make application for final payment in accordance with provisions of the General Conditions. Should OWNER still find deficiencies in the work, OWNER will notify CONTRACTOR in writing of deficiencies and will not approve CONTRACTOR's request for final payment until such time as CONTRACTOR has satisfactorily completed the required work.

PART 11 PAYMENT

11.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

CH2MHILL

PROJECT NUMBER: 108148.A0.ZZ

BORING NUMBER: B-1
Sheet: 1 of 2

SOIL BORING LOG

PROJECT: Newberg Pump Station **LOCATION:** Pump Station

ELEVATION: 193.0' **DRILLING CONTRACTOR:** Geotech Explorations

DRILLING METHOD AND EQUIPMENT: Mud Rotary - Mobile B-59 4.75"

WATER LEVELS: 0.75' **START:** 1/9/03 **FINISH:** 1/9/03 **LOGGER:** P. Davis

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS: 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					Ground Surface	
0						
	2.5 4.0	1-SS	1.2'	1-2-3 (5)	Silt (ML), Gray-brown, moist-wet, firm, fine organics.	PP = 1.5 tsf
5	5.0 6.5	2-SS	1.5	4-4-5 (9)	Silt (ML), As above, except stiff.	PP = 3.0 tsf
	7.5 9.0	3-SS	1.5	3-3-4 (7)	Silt (ML), As above, except firm.	PP = 2.5 tsf
10	10.0 11.5	4-SS	1.5	5-6-8 (14)	Sandy Silt (ML), Olive, wet, stiff, sand is fine grained.	PP = 2.0 tsf
15	15.0 16.5	5-SS	1.3	4-8-5 (13)	Silty Sand (SM), Gray, medium dense, wet.	
20	20.0 21.5	6-SS	1.5	5-4-7 (11)	Fat Clay (CH), Some sand, Gray-olive-brown, wet, stiff, sand is fine-grained.	PP = 1.75 - 2.25 tsf P200 = 81%
25						PP = 1.5 tsf

CH2MHILL

PROJECT NUMBER: 108148.A0.ZZ	BORING NUMBER: B-1 Sheet: 2 of 2

SOIL BORING LOG

PROJECT: Newberg Pump Station **LOCATION:** Pump Station

ELEVATION: 193.0' **DRILLING CONTRACTOR:** Geotech Explorations

DRILLING METHOD AND EQUIPMENT: Mud Rotary - Mobile B-59 4.75"

WATER LEVELS: 0.75' **START:** 1/9/03 **FINISH:** 1/9/03 **LOGGER:** P. Davis

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	25.0 26.5	7-SS	1.5	3-6-5 (11)	Fat Clay (CH), As above.	PP = 1.5 tsf
30	30.0 31.5	8-SS	1.5	5-5-5 (10)	Fat Clay (CH), As above.	PP = 1.5 - 2.0 tsf Atterberg - LL = 58%, PI = 29% W = 38%
35	35.0 36.5	9-SS	1.5	9-10-12 (22)	Fat Clay with Sand (CH), Gray, wet, very stiff, sand is fine-grained.	PP = 3.0 tsf
40	40.0 41.5	10-SS	1.5	6-8-10 (18)	Lean Clay with Sand (CL), Rust color, moist, very stiff, sand is coarse, weathered siltstone - sandstone, green-white-orange, estimated 15%.	PP = 2.25 tsf Piezometer 1-inch diameter PVC, piezometer installed at 40.0', 10.0' machine, slot screen from 40.0' to 30.0', sand up to 28.0' bgs, flush monument.
45						
50						

SECTION 01092
ABBREVIATIONS

PART 1 GENERAL

1.1 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES

A. Reference to standards and specifications of technical societies and reporting and resolving discrepancies associated therewith shall be as provided in paragraph 3.3 of the General Conditions, and as may otherwise be required herein and in the individual Specification sections.

B. Work specified by reference to the published standard or specification of a government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall meet the requirements or surpass the minimum standards of quality for materials and workmanship established by the designated standard or specification.

C. Where so specified, products or workmanship shall also meet or exceed the additional prescriptive or performance requirements included within the Contract Documents to establish a higher or more stringent standard of quality than that required by the referenced standard.

D. Where two or more standards are specified to establish quality, the product and workmanship shall meet or exceed the requirements of the most stringent.

E. Where both a standard and a brand name are specified for a product in the Contract Documents, the proprietary product named shall meet or exceed the requirements of the specified reference standard.

F. Copies of standards and specifications of technical societies:

1. Copies of applicable referenced standards have not been bound in these Contract Documents. Copies can be obtained from the OWNER.
2. Where copies of standards are needed by the CONTRACTOR, obtain a copy or copies directly from the publication source and maintain in an orderly manner at the site as Work site records, available to the CONTRACTOR's personnel, Subcontractors, OWNER, and ENGINEER.

1.2 ABBREVIATIONS

A. Abbreviations for trade organizations and government agencies: Following is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations used.

1.	AA	Aluminum Association
2.	AABC	Associated Air Balance Council
3.	AAMA	American Architectural Manufacturers Association
4.	AASHTO	American Association of State Highway and Transportation Officials
5.	ACI	American Concrete Institute
6.	AFBMA	Anti-Friction Bearing Manufacturers' Association
7.	AGA	American Gas Association
8.	AGMA	American Gear Manufacturers' Association
9.	AI	Asphalt Institute
10.	AISC	American Institute of Steel Construction
11.	AISI	American Iron and Steel Institute
12.	AITC	American Institute of Timber Construction
13.	ALS	American Lumber Standards
14.	AMA	Acoustical Materials Association
15.	AMCA	Air Movement and Control Association
16.	ANSI	American National Standards Institute
17.	APA	American Plywood Association
18.	API	American Petroleum Institute
19.	APWA	American Public Works Association
20.	AREA	American Railway Engineering Association
21.	ARI	Air Conditioning and Refrigeration Institute
22.	ASA	American Standards Association
23.	ASAE	American Society of Agricultural Engineers
24.	ASCE	American Society of Civil Engineers
25.	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
26.	ASNT	American Society for Nondestructive Testing
27.	ASME	American Society of Mechanical Engineers
28.	ASTM	American Society for Testing and Materials
29.	AWI	Architectural Wood Work Institute
30.	AWPA	American Wood Preservers' Association
31.	AWPB	American Wood Preservers Bureau
32.	AWPI	American Wood Preservers' Institute
33.	AWS	American Welding Society
34.	AWWA	American Water Works Association
35.	BHMA	Builders Hardware Manufacturers' Association

36.	CBMA	Certified Ballast Manufacturers' Association
37.	CDA	Copper Development Association
38.	CGA	Compressed Gas Association
39.	CIPRI	Cast Iron Pipe Research Institute
40.	CISPI	Cast Iron Soil Pipe Institute
41.	CMAA	Crane Manufacturers' Association of America
42.	CRSI	Concrete Reinforcing Steel Institute
43.	CS	Commercial Standard
44.	CSA	Canadian Standards Association
45.	CSI	Construction Specifications Institute
46.	CTSS	Caltrans Standard Specification
47.	EJCDC	Engineers Joint Contract Documents' Committee
48.	ETL	Engineering Test Laboratories
49.	FCC	Federal Communications Commission
50.	FEMA	Federal Emergency Management Agency
51.	FGMA	Flat Glass Marketing Association
52.	FM	Factory Mutual
53.	Fed. Spec.	Federal Specifications
54.	FS	Federal Specification
55.	GA	Gypsum Association
56.	HI	Hydraulic Institute
57.	HMI	Hoist Manufacturers' Institute
58.	ICBO	International Conference of Building Officials
59.	ICEA	Insulated Cable Engineers' Association
60.	IEEE	Institute of Electrical and Electronics Engineers, Inc.
61.	IES	Illuminating Engineering Society
62.	IFI	Industrial Fasteners Institute
63.	ISA	Instrument Society of America
64.	ISO	Insurance Service Office
65.	JIC	Joint Industry Conferences of Hydraulic Manufacturers
66.	MIA	Marble Institute of America
67.	Mil. Sp. or MIL	Military Specification
68.	MS	Military Specifications
69.	MMA	Monorail Manufacturers' Association
70.	NAAMM	National Association of Architectural Metal Manufacturers
71.	NACE	National Association of Corrosion Engineers
72.	NBHA	National Builders' Hardware Association
73.	NEC	National Electrical Code
74.	NECA	National Electrical Contractor's Association

75.	NEMA	National Electrical Manufacturers' Association
76.	NESC	National Electric Safety Code
77.	NFPA	National Fire Protection Association
78.	NHLA	National Hardwood Lumber Association
79.	NHPMA	Northern Hardwood and Pine Manufacturer's Association
80.	NLMA	National Lumber Manufacturers' Association
81.	NRCA	National Roofing Contractors Association
82.	NSF	National Sanitation Foundation Testing Laboratory
83.	NSPE	National Society of Professional Engineers
84.	NTMA	National Terrazzo and Mosaic Association
85.	NWWDA	National Wood Window and Door Association
86.	OECI	Overhead Electrical Crane Institute
87.	OSHA	Occupational Safety and Health Act (both Federal and State)
88.	PCI	Prestressed Concrete Institute
89.	PEI	Porcelain Enamel Institute
90.	PPI	Plastic Pipe Institute
91.	PS	Product Standards Section-U.S. Department of Commerce
92.	RMA	Rubber Manufacturers' Association
93.	SAE	Society of Automotive Engineers
94.	SCPRF	Structural Clay Products Research Foundation
95.	SDI	Steel Deck Institute
96.	SDI	Steel Door Institute
97.	SIGMA	Sealed Insulating Glass Manufacturing Association
98.	SJI	Steel Joist Institute
99.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
100.	SPI	Society of the Plastics Industry
101.	SSPC	Steel Structures Painting Council
102.	SWI	Steel Window Institute
103.	TEMA	Tubular Exchanger Manufacturers' Association
104.	TCA	Tile Council of America
105.	UBC	Uniform Building Code
106.	UFC	Uniform Fire Code
107.	UL	Underwriters Laboratories Inc.
108.	UMC	Uniform Mechanical Code
109.	US	U.S. Bureau of Standards
110.	USBR	U.S. Bureau of Reclamation
111.	WCLIB	West Coast Lumber Inspection Bureau
112.	WWPA	Western Wood Products Association

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 02240
DEWATERING

PART 1 GENERAL

1.1 SUBMITTALS

A. Shop Drawings: Water Control Plan.

1.2 WATER CONTROL PLAN

A. As a minimum, include:

1. Descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment; methods; standby equipment and power supply, pollution control facilities, discharge locations to be utilized, and provisions for immediate temporary water supply as required by this section.
2. Drawings showing locations, dimensions, and relationships of elements of each system.
3. Design calculations demonstrating adequacy of proposed dewatering systems and components.

B. If system is modified during installation or operation revise or amend and resubmit Water Control Plan.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

A. Remove and control water during periods when necessary to properly accomplish Work.

3.2 DEWATERING SYSTEMS

A. Provide, operate, and maintain dewatering systems of sufficient size and capacity to permit excavation and subsequent construction in dry and to lower and maintain groundwater level a minimum of 2 feet below the lowest point of excavation. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade.

B. Dewatering systems shall include wells or well points, and other equipment and appurtenances installed outside limits of excavations and sufficiently

below lowest point of excavation, or to maintain specified groundwater elevation.

C. Design and Operate Dewatering Systems:

1. To prevent loss of ground as water is removed.
2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.
3. To relieve artesian pressures and resultant uplift of excavation bottom.

D. Provide sufficient redundancy in each system to keep excavation free of water in event of component failure.

E. Provide 100 percent emergency power backup with automatic startup and switchover in event of electrical power failure.

F. Provide supplemental ditches and sumps only as necessary to collect water from local seeps. Do not use ditches and sumps as primary means of dewatering.

3.3 DISPOSAL OF WATER

A. Obtain discharge permit for water disposal from authorities having jurisdiction.

B. Treat water collected by dewatering operations, as required by regulatory agencies, prior to discharge.

C. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.

D. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 02316
EXCAVATION

PART 1 GENERAL

1.1 SUBMITTALS

A. Shop Drawings:

1. Excavation Plan, Detailing:
   a. Methods and sequencing of excavation.
   b. Proposed locations of stockpiled excavated material.
   c. Proposed onsite and offsite spoil disposal sites.
   d. Numbers, types, and sizes of equipment proposed to perform excavations.

1.2 SEQUENCING AND SCHEDULING

A. Dewatering: Conform to applicable requirements of Section 02240, DEWATERING, prior to initiating excavation.

B. Excavation Support: Install and maintain support systems as necessary to support sides of excavations and prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.

B. Do not overexcavate without written authorization of ENGINEER.

C. Remove obstructions as shown.

3.2 UNCLASSIFIED EXCAVATION

A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

3.3 TRENCH WIDTH

A. Minimum Width of Trenches:

1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
   a. Less than 4-inch Outside Diameter or Width: 18 inches.
   b. Greater than 4-inch Outside Diameter or Width: 18 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.
2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.
3. Increase trench widths by thicknesses of sheeting.

B. Maximum Trench Width: Unlimited, unless otherwise shown or specified, or unless excess width will cause damage to existing facilities, adjacent property, or completed Work.

3.4 DISPOSAL OF SPOIL

A. Dispose of excavated materials offsite.

B. Dispose of concrete resulting from removal of underground facilities offsite.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 02468
CAISSONS

PART 1 GENERAL

1.1 QUALITY ASSURANCE

A. Qualifications: As specified in Section 03300, CAST-IN-PLACE CONCRETE.

PART 2 PRODUCTS

2.1 BENTONITE

A. Commercially processed powdered and expanding type.

B. Manufacturers and Products:

1. American Colloid Co.; Volclay.
2. National Lead Co.; National Bentonite.

2.2 WATER FOR BENTONITE SLURRY

A. Potable.

PART 3 EXECUTION

3.1 INSTALLATION

A. Excavate within open caisson and remove excavated material without damaging caisson walls.

B. Sink caisson to final depth by excavating material from within caisson under atmospheric pressure.

C. Control rate and location of removed excavated materials to prevent undue stress or damage to open caisson as it settles.

D. Align caisson walls to within 1 percent from plumb.

E. Either sink entire shell as a caisson, or excavate for initial caisson section prior to sinking lower sections as a caisson. If excavation method is used for initial caisson section, accomplish dewatering to permit placement of concrete as specified in Section 03300, CAST-IN-PLACE CONCRETE.

3.2 REMOVAL OF WATER

A. Remove water as specified in Section 02240, DEWATERING.

B. After placing concrete plug in caisson, do not remove water from inside caisson until plug has obtained sufficient strength to resist uplift pressure.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 02512
GRAVITY SEWER PIPE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section covers all work necessary for furnishing and installing gravity sewer pipe of the sizes and classes indicated.

1.2 DEFINITIONS

A. CCTV: Closed Circuit Television.

B. SDR: Standard Dimension Ratio.

PART 2 PRODUCTS

2.1 POLYVINYL CHLORIDE PIPE (PVC)

A. 15-Inch Diameter and Smaller:

1. In accordance with ASTM D3034.
2. Joints: Integral bell and spigot, in accordance with ASTM D3212.
3. Minimum SDR: 35.
4. Cell Classification: 12454-B or 12454-C, as defined by ASTM D1784.
5. Fittings: SDR 35 minimum wall thickness.
6. Gaskets: Factory fabricated rubber compression type with solid cross section in accordance with ASTM F477. Lubricant for joining pipe as approved by pipe manufacturer.

2.2 PIPE TO MANHOLE CONNECTOR

A. Manufacturers and Products:

1. Uniseal, Evansville, Indiana; Pipeconx, Universal Pipe Connector.
2. NPC Inc., Milford, NH; Kor-N-Seal.

2.3 FLEXIBLE COMPRESSION COLLAR

A. Mechanical joint coupling with No. 305 stainless steel bands.

B. Manufacturers:

1. Calder, Inc. , Bellflower, CA.
2. Fernco Inc., Davison, MI.

2.4 QUICK SETTING GROUT

A. High strength, nonstaining grout, free of gypsum.

B. Reach initial set within 90 minutes at 70 degrees F and minimum compressive strength of 2,500 psi within 24 hours.

C. Shrinkage shall be less than 0.01 percent when tested in accordance with ASTM C596.

2.5 IMPORTED GRANULAR MATERIAL FOR PIPE BASE AND FOR PIPE ZONE

A. For pipe 18 inches in diameter and smaller use crushed rock with a maximum size of 3/4-inch, uniformly graded from coarse to fine.

PART 3 EXECUTION

3.1 EXAMINATION

A. Notify ENGINEER immediately of manufacturing imperfections or damage caused by improper handling.

B. Verify size, pipe condition, and pipe class prior to installation of pipe.

3.2 PREPARATION

A. Inspect pipe and fittings prior to lowering into trench to ensure no cracked, broken, or otherwise defective materials are being used.

B. Remove foreign matter and dirt from inside of pipe and fittings and keep clean during and after laying. Wash ends of section clean with wet brush prior to joining sections of pipe.

3.3 INSTALLATION

A. General:

1. Install pipe sections in accordance with manufacturer's recommendations.
2. Provide and use proper implements, tools, and facilities for safe and proper prosecution of Work.
3. Lower pipe, fittings, and appurtenances into trench, piece by piece, by means of crane, slings, or other suitable tools and equipment, in such a manner as to prevent damage to pipe materials, protective coatings and linings. Do not drop or dump pipe into trenches.

B. Line and Grade:

1. Establish line and grade for pipe by use of lasers.
2. Measure for grade at pipe invert, not at top of pipe.
3. Do not deviate from line or grade, as shown on Drawings, more than 1/2 inch, provided that such variation does not result in a level or reverse sloping invert.

C. Laying and Jointing:

1. Use gasket lubricant as recommended by gasket manufacturer.
2. Lay pipe upgrade with bell ends pointing in direction of laying.
3. When field cutting or machining pipe is necessary, use only tools and methods recommended by pipe manufacturer and approved by ENGINEER.
4. After section of pipe has been placed in its approximate position for jointing, clean end of pipe to be joined, inside of joint, and rubber ring immediately before joining pipe.
5. Assemble joint in accordance with recommendations of manufacturer.
6. Apply sufficient pressure in making joint to assure that joint is "home" as defined in standard installation instructions provided by pipe manufacturer. Inside joint space shall not exceed 50 percent of pipe manufacturer's recommended maximum allowance.
7. Place pipe to specified line and grade to form smooth flow line.
8. Ensure that bottom of pipe is in contact with bottom of trench for full length of each section.
9. Check for alignment and grade after joint has been made.
10. Place sufficient pipe bedding material to secure pipe from movement before next joint is installed.
11. When pipe is laid within movable trench shield, take precautions to prevent pipe joints from pulling apart when moving shield ahead.
12. When laying operations are not in progress, and at close of day's work close and block open end of last laid section of pipe to prevent entry of foreign material or creep of gasketed joints.
13. Take precautions to prevent "uplift" or floating of line prior to completion of backfill operation.
14. Connections between one pipe material and another shall be by means of flexible compression collar, installed in accordance with the manufacture's recommendations, or concrete closure collar.

D. Connection to Structure or Manhole:

1. Plug or close off pipe stubbed with watertight plug.
2. Connect PVC pipe to manhole with pipe to manhole connector in accordance with manufacturer's recommendations.

3.4 CLEANING

A. Clean each section of completed sewer pipeline prior to testing.

B. Place screen or dam in downstream manhole of section being cleaned to catch debris.

C. Remove material from each manhole section before cleaning the next section downstream.

D. Method: High velocity hydro-cleaning equipment.

E. Cleaning water may be discharged into existing sewer system after screening and removal of debris.

3.5 HYDROSTATIC AND PNEUMATIC TESTS

A. General:

1. Notify ENGINEER in writing 5 days in advance of testing. Perform testing in presence of ENGINEER.
2. Pipe 18 inches in diameter and smaller shall be tested for leakage using Hydrostatic Exfiltration or Pneumatic Test Methods at CONTRACTOR's option.
3. Pipe shall successfully pass leakage test prior to acceptance
4. Test sections of constructed sewer between stations only after service connections, manholes, and backfilling are completed. Testing may be done prior to placement of asphaltic concrete or roadway structural section.
5. Isolate new pipelines that are connected to existing pipelines. Install pipe plugs as required to allow section of new pipe to be pressure tested.
6. Plug wyes, tees, stubs, and service connections with gasketed caps or plugs securely fastened or blocked to withstand internal test pressure. Such plugs or caps shall be removable, and their removal shall provide socket suitable for making flexible jointed lateral connection or extension.
7. Furnish testing equipment and perform tests as approved by ENGINEER. Testing equipment shall provide observable and accurate measurement of leakage under specified conditions.

B. Hydrostatic Exfiltration Test:

1. Fill pipe test section 24 hours prior to time of testing, if desired, to permit normal absorption into VCP and RCP pipe walls.
2. Procedure:
   a. Maximum filling velocity shall not exceed 0.25 foot per second, calculated based on full area of pipe.

b. Expel air from piping system during filling.
c. Apply and maintain specified test pressure with hydraulic force pump. Valve off piping system when test pressure is reached.
d. Maintain hydrostatic test pressure continuously for 2 hours minimum, adding additional make-up water only as necessary to restore test pressure.
e. Determine actual leakage by measuring quantity of water necessary to maintain specified test pressure for duration of test.

3. Measurement Accuracy: Plus or minus 1/8 gallon of water leakage under specified conditions
4. PVC pipe and joints shall sustain maximum water loss limit of 0.8 gallon per inch diameter per 1,000 feet of pipe, including service connections within test section per 2 hours. Allowable leakage shall be modified as stated below if hydrostatic head is other than 6 feet.
5. Hydrostatic Head:
   a. At least 6 feet above maximum estimated groundwater level in section being tested, but no less than 6 feet above inside top of highest section of pipe in test section, including service connections.
   b. In every case, determine height of water table at time of test by exploratory holes or such other methods approved by ENGINEER. ENGINEER will make final decision regarding test height for water in pipe section being tested.
   c. If hydrostatic head is other than 6 feet, allowable leakage as computed by criteria above shall be adjusted by the square root of actual head divided by square root of 6.
6. Length of Pipe Tested: Limit length such that pressure on invert of lower end of section does not exceed 16 feet of water column. In no case shall length be greater than 700 feet or distance between manholes when greater than 700 feet.
7. Dispose of test water in a manner that will not damage or interfere with adjacent property and in a manner acceptable with ENGINEER and regulatory agencies.

C. Pneumatic Testing for 18-inch and Smaller Diameter Pipe:

1. Equipment:
   a. Calibrate gauges with standardized test gauge provided by CONTRACTOR at start of each testing day. ENGINEER will witness calibration.
   b. Install compressor, air piping manifolds, gauges, and valves at ground surface.
   c. Provide pressure release device, such as rupture disc or pressure relief valve, to relieve pressure at 6 psi or less.
   d. Restrain plugs used to close sewer lines to prevent blowoff.

2. Procedure:
   a. No person shall enter manhole or structure, or occupy area above opening of manhole or structure where pipe is under pressure.
   b. Determine height of groundwater table at time of test.
   c. Slowly introduce air into pipe section until internal air pressure reaches 4 psi greater than average backpressure of groundwater submerging pipe.
   d. Allow 2 minutes minimum for air temperature to stabilize.
   e. Allowable leakage for sewers constructed of air-permeable materials, such a concrete or clay:
      1) When pressure is decreased to 3.5 psig, air pressure test shall begin.
      2) Test shall consist of measuring time in seconds for pressure in pipe to drop from 3.5 psig to 2.5 psig.
      3) Pipe leakage shall be considered acceptable if time in seconds for pressure drop is equal to or greater than required time as calculated below:

         $K = 0.0111d^2L$
         $C = 0.000392dL$

         If C_t is less than or equal to 1.0, then time = K_t
         If C_t is between 1.0 and 1.75, then time = K_t/C_t
         If C_t is greater than or equal to 1.75, then time = $K_t/1.75$

         Where: d = pipe diameter in inches
         L = pipe length in feet
         K = value for each length of pipe of a specific diameter
         C = value for each length of pipe of a specific diameter
         K_t = Sum of all K values
         C_t = Sum of all C values

   f. This method is based on allowable air loss rate of 0.003 cubic foot per minute (cfm) per square foot of internal pipe surface, with total air loss rate not less than 2.0 cfm nor greater than 3.5 cfm.
   g. Allowable leakage for sewers constructed of nonair-permeable materials such as ductile iron, and polyvinyl chloride (PVC).
      1) When nonair-permeable pipe is subjected to low pressure air test, time in seconds for pressure drop shall be equal to or greater than three times required time calculated using procedure above.
      2) Defective Piping Sections: Replace and retest as specified.

D. Test Report Documentation:

1. Test date.
2. Pipe section tested.
3. Test Method.
4. Test Pressure.
5. Length of test.
6. Pressure or water loss.
7. Remarks, including:
   a. Leaks (type, location).
   b. Repair/ replacement performed to remedy excessive leakage.
8. Signed by CONTRACTOR and ENGINEER to represent that test has been satisfactorily completed.

E. Subsequent Failure: Visible infiltration of groundwater following successful test shall be considered evidence that original test was in error or that subsequent failure of pipeline has occurred.

F. PVC Pipe Deflection Test:

1. General:
   a. Test installed pipeline for deflection by pulling a mandrel through sewer without aid of mechanical pulling device.
   b. Perform test after trench backfill and compaction have been completed.
2. Mandrel:
   a. Full circle, solid or rigid odd number of legs (minimum 9 legs) steel cylinder with pulling rings at each end.
   b. Diameter: Sized to allow only as much initial deflection for ultimate deflection of 5 percent.
   c. Obtain ENGINEER approval, through CONTRACTOR calculations, for use of mandrel smaller than 96-2/3 percent of inside diameter of pipe.
3. Correcting Deficiencies or Obstructions:
   a. Excavate to springline of pipeline and replace and recompact pipe zone material.
   b. Internal pipe rerounding or vibration will not be allowed.
   c. If pipe does not pass mandrel test after replacement of pipe zone material and trench backfill, re-excavate and replace pipeline.

3.6 INSPECTION

A. Television Pipeline Inspection:

1. General:
   a. Internally inspect sewer pipelines by closed circuit television (CCTV) after completion of pipeline cleaning and testing.

b. Conduct inspection in presence of ENGINEER.

2. Procedure:
   a. Provide complete and continuous taped record and written log of inspection.
   b. Format: VHS, T-120 videotape, color. Do not use long-play as quality is not acceptable
   c. Television Camera Equipment:
      1) Rotating lens or pan and tilt.
      2) Resolution: Minimum 350 lines per inch.
      3) Focal Distance: Adjustable through a range of 6 inches to infinity.
      4) Remote-Reading Footage Counter: Accurate to less than 1 percent error.
      5) Lighting: Sufficient to provide clear, in-focus picture of entire inside periphery of pipe, and minimizes reflection.
   d. Pull camera at uniform rate, stopping to properly document defects. Maximum pull of camera shall not exceed 30 feet per minute.

3. Quality Standard:
   a. Provide clear, sharp image when played back on conventional television receiver.
   b. Neatly label videotape showing contents, project title, tape number, pipe structure identification numbers, and date that tape was made, inspection company.
   c. Tapes to include:
      1) Opening Screen:
         a) Date of inspection.
         b) Pipe structure identification number.
         c) Upstream and downstream node identification numbers.
         d) Street address.
         e) Pipe size.
         f) Normal (upstream to downstream) or reverse (downstream to upstream) pull.
      2) Continuous View: Current distance along reach (tape counter footage).
   d. Log sheets to show time and date of inspection, location, upstream and downstream manholes, direction of pull, pipeline length, pipe size, pipe material, location of lateral connections, video tape number and detail of defects encountered.
   e. Show sufficient detail to determine cracks in pipe, offset joints, leaking joints, sags, and other flaws in pipeline installation. Record location of deficiencies by distance from center of reference manhole.

f. Upon completion, playback tape in presence of ENGINEER. Any tape not meeting quality standard will be rejected and taping process repeated.

g. Correct deficiencies found as a result of video replay, and repeat CCTV inspection.

B. Deficiencies Requiring Correction:

1. Variations in alignment greater than specified herein.
2. Joint separations greater than allowed by pipe manufacturer.
3. Visible infiltration.
4. Presence of debris or foreign objects.
5. Obvious damage or defects in pipeline.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 02555
ASPHALT CONCRETE PAVEMENT

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Standard of Testing Materials (ASTM):
   a. D1559-89, Standard Test Method for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
   b. D2041-91, Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
   c. E699-79, Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee (1984).

1.2 DEFINITIONS

A. Combined Aggregate: All mineral constituents of an asphalt concrete mix, including mineral filler and separately sized aggregates.

B. Standard Specifications: Standard Specifications used herein shall mean the 1996 Edition of the Oregon Department of Transportation (ODOT) Standard Specifications for Highway Construction including the 1996 Supplemental.

1.3 SUBMITTALS

A. Shop Drawings: Job-mix formula for pavements.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Temperature:

1. Do not apply asphalt materials or place asphalt mixes when ground temperature is lower than 50 degrees F, air temperature is lower than 40 degrees F, or application surface is wet.
2. Measure ground and air temperature in shaded areas away from heat sources or wet surfaces.

PART 2 PRODUCTS

2.1 BASE COURSE ROCK

A. As specified for 1-1/2-inch base aggregate in Section 02630 of the Standard Specifications.

2.2 AGGREGATE

A. As specified in Section 02680 of Standard Specification for hot plant mix bituminous pavement.

2.3 TACK COAT

A. Emulsified asphalt, Type CS5-1 conforming to Section 02710 of Standard Specifications.

2.4 ASPHALT CONCRETE MIXTURE

A. Asphalt Concrete: As specified in Section 00743.12 of the Standard Specifications.

2.5 ASPHALT CEMENT

A. Asphalt cement to be used in the asphalt concrete mixture shall be Grade PBA-2 or PBA-5 as specified in Section 02710 of the Standard Specifications.

2.6 SOURCE QUALITY CONTROL

A. The CONTRACTOR shall submit the job mix formula at least 10 days prior to start of paving.

B. Job mix formula shall meet the requirements of Section 00743.13(1)a.

PART 3 EXECUTION

3.1 GENERAL

A. Application Equipment: In accordance with Section 00743 of Standard Specifications.

B. Traffic Control: Minimize inconvenience to traffic, but keep vehicles off freshly treated or paved surfaces to avoid pickup and tracking of asphalt. Maintain at least one-way traffic at all times.

C. Traffic Control: CONTRACTOR shall be solely responsible for traffic control and for meeting all federal, state, and local requirements for such.

3.2 CONTROL OF LINE AND GRADE

A. Provide and maintain intermediate control, independent of the underlying base to meet finish surface grades and minimum thickness.

3.3 CONSTRUCTION OF BASE COURSE

A. General: Complete each lift in advance of laying succeeding lift to provide required results and adequate inspection.

B. Base Course:

1. Maximum Completed Lift Thickness: 6 inches.
2. Completed Course Total Thickness: 12 inches.
3. Lightly blade and roll surface until thoroughly compacted.
4. Provide water as necessary to achieve compaction and to prevent loss of fines during processing.
5. Blade or broom surface to maintain true line, grade, and cross section.

C. Compaction: Compact each layer of base course until density of 95 percent of maximum density has been achieved as determined by AASHTO T99-86.

3.4 TACK COAT

A. Do not apply more tack coat than necessary for the day's paving operation.

B. Application: Apply tack coat uniformly to clean dry surfaces. Avoid overlapping of applications. Touch up missed or lightly coated surfaces and remove excess tack coat.

C. Application Rate: Minimum 0.05-gallon to maximum 0.15-gallon of asphalt (residual if diluted emulsified asphalt) per square yard of surface area.

3.5 ASPHALT CONCRETE PAVEMENT PLACEMENT

A. Lay asphalt concrete over prepared base in two equal lifts to a total compacted thickness of 4 inches.

B. Collect and dispose of segregated aggregate from raking process. Do not scatter material over finished surface.

C. Apply tack coat to pavement surface prior to placing succeeding pavement lift.

3.6 PAVEMENT OVERLAY

A. Place and compact asphalt concrete in one or more layers.

B. Place the first layer to include widening of pavement and leveling of irregularities in the surface of adjacent existing pavement.

C. Place layers so final wearing layer is of uniform thickness and meets grades and cross-sections shown.

3.7 JOINTS

A. Offset edge of each layer a minimum of 6 inches so joints shall not be directly over those in underlying layer.

B. Offset longitudinal joints in roadway pavements, so longitudinal joints in wearing layer coincides with pavement centerlines and lane divider lines.

C. Form transverse joints by cutting back on previous day's run to expose full vertical depth of layer.

3.8 COMPACTION

A. Roll until roller marks are eliminated and density of 92 percent of measured maximum density determined in accordance with ASTM D2041-91 is obtained.

3.9 TOLERANCES

A. Conduct measurements for conformity with crown and grade immediately after initial compression. Correct variations immediately by removal or addition of materials and by continuous rolling.

B. Tolerance Measurements:

1. Completed Surface of Top or Wearing Layer: Uniform texture, smooth, and uniform to crown and grade.
2. Completed surface shall not vary more than 1/8-inch from lower edge of 10-foot straightedge placed on surface parallel to centerline.
3. Transverse slope of completed surface shall not vary more than 1/4-inch in 10 feet from the rate of transverse slope shown.
4. Finished grade shall not vary more than 0.02 feet.

C. Correct deviations in excess of specified tolerances by addition of asphalt concrete mixture to low places or removal of material from high places.

D. Wearing surface may be removed and replaced to achieve a satisfactory finish surface, if surface of completed pavement deviates by more than twice the specified tolerances.

3.10 FIELD QUALITY CONTROL

A. General: OWNER will conduct density testing as deemed necessary.

B. Field Density Tests:

1. Measured with properly operating and calibrated nuclear density gauge.
2. Maximum Density: Determined in accordance with ASTM D2041-91, using a Sample of mix taken prior to compaction from the same location as the density test Sample.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 02821
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section includes the work necessary to construct the chain link fence, complete.

1.2 DEFINITIONS

A. Terms as defined in ASTM F552.

1.3 SUBMITTALS

A. Shop Drawings: Detailed information and specifications for materials, finishes, and dimensions.

B. Information Submittals:

1. Manufacturer's recommended installation instructions.
2. Evidence of Supplier and installer qualifications.

1.4 SCHEDULING AND SEQUENCING

A. Complete necessary site preparation and grading before installing chain link fence and gate.

PART 2 PRODUCTS

2.1 GENERAL

A. Match style, finish, and color of each fence component with that of other fence components.

2.2 CHAIN LINK FENCE FABRIC WITH VINYL SLATS

A. PVC-coated galvanized fabric conforming to ASTM F668, Class 1 or 2a.

1. Color: Green.
2. Manufacturers and Products:
   a. Colorbond Corp., Raritan, NJ; Colorbond II.
   b. Cyclone Fence, United States Steel, Chicago, IL; Cyclone Color Fence System.

B. Height: 72 inches, unless otherwise shown.

C. Wire Gauge: No. 9.

D. Pattern: 3-1/2-inch by 5-1/2-inch diamond-mesh.

E. Green vinyl slats 2-3/8 inches wide.

F. Diamond Count: Manufacturer's standard and consistent for fabric furnished of same height.

G. Loops of Knuckled Selvages: Closed or nearly closed with space not exceeding diameter of wire.

2.3 POSTS

A. General:

1. Strength and Stiffness Requirements: ASTM F1043, Light Industrial Fence, except as modified in this section.
2. Steel Pipe: ASTM F1083.
3. Lengths: Manufacturer's standard with allowance for a minimum 3-foot embedment below finished grade.
4. Protective Coatings:
   a. Zinc Coating: ASTM F1043, Type A external and internal coating.
5. Color Coating: ASTM F1043, minimum 10 mils thickness over zinc coating to match color of chain link fabric.

B. Line Posts:

1. Steel Pipe:
   a. Outside Diameter: 2.375 inches.
   b. Weight: 2.96 pounds per foot.

C. End, Corner, Angle, and Pull Posts:

1. Steel Pipe:
   a. Outside Diameter: 2.875 inches.
   b. Weight: 4.69 pounds per foot.

2.4 TOP RAILS AND BRACE RAILS

A. Galvanized steel pipe, color-coated.

B. Protective Coatings: As specified for posts.

C. Color Coating: Minimum 10-mil thickness over protective coating.

D. Strength and Stiffness Requirements: ASTM F1043, Top Rail, Light Industrial Fence.

E. Steel Pipe:

1. ASTM F1083.
2. Outside Diameter: 1.66 inches.
3. Weight: 2.27 pounds per foot.

2.5 FENCE FITTINGS

A. General: In conformance with ASTM F626, except as modified by this article.

B. Post and Line Caps: Designed to accommodate passage of top rail through cap, where top rail required.

C. Tension and Brace Bands: Vinyl-clad.

D. Tension Bars:

1. One-piece vinyl-clad.
2. Equal in length to full height of fabric.

E. Truss Rod Assembly: 3/8 inch diameter.

2.6 GATE

A. General:

1. Gate Operation: Opened and closed easily by one person.
2. Welded Steel Joints: Paint with zinc-based paint.
3. Chain Link Fabric: Attached securely to gate frame at intervals not exceeding 15 inches.

B. Rolling Gate:

1. Track Rollers: Malleable iron or heavy pressed steel with provision for grease lubrication.
2. Ground Rollers: Malleable iron or heavy pressed steel with provision for grease lubrication.
3. Support Posts: Spaced on maximum 7-foot centers.
4. Gate shall have two tracks.
5. Frames: ASTM F1184, Type I.
6. Gate Accessories: ASTM F1184.

2.7 CONCRETE

A. Provide as specified in Section 03300, CAST-IN-PLACE CONCRETE.

PART 3 EXECUTION

3.1 GENERAL

A. Install chain link fences and gates in accordance with ASTM F567, except as modified in this section, and in accordance with fence manufacturer's recommendations, as approved by ENGINEER. Erect fencing in straight lines between angle points.

B. Provide all necessary hardware for a complete fence and gate installation.

3.2 PREPARATION

A. Establish locations of fence lines, gates, and terminal posts.

3.3 POST SETTING

A. Driven posts are not acceptable.

B. Post Hole Depth:

1. Minimum 3 feet below finished grade.
2. 2 inches deeper than post embedment depth below finish grade.

3.4 BRACING

A. Brace gate and corner posts diagonally to adjacent line posts to ensure stability.

3.5 TOP RAILS

A. Install top rail sleeves with springs at 105 feet maximum spacing to permit expansion in rail.

3.6 CHAIN LINK FABRIC

A. Do not install fabric until concrete has cured minimum 7 days.

3.7 GATE

A. Hang gate and adjust hardware so gate operates satisfactorily from OPEN or CLOSED position.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 03100
CONCRETE FORMWORK

PART 1 GENERAL

1.1 SUBMITTALS

A. Shop Drawings:

1. Form Ties-Tapered Through-Bolts: Proposed method of sealing form tie hole; coordinate with details shown.

1.2 QUALITY ASSURANCE

A. Qualifications: Formwork, falsework, and shoring designs prepared by an engineer licensed in the state of Project.

PART 2 PRODUCTS

2.1 FORM MATERIALS

A. Wall Forms and Underside of Slabs:

1. Materials: Plywood, hard plastic finished plywood, overlaid waterproof particle board, or steel in "new and undamaged" condition, of sufficient strength and surface smoothness to produce specified finish. Use in combination with form liners where required.
2. Circular Structures:
   a. Forms conform to circular shape of structure.
   b. Straight panels may be substituted for circular forms provided panels do not exceed 2 feet in width and angular deflection is no greater than 3-1/2 degrees per joint.

B. All Other Forms: Materials as specified for wall forms.

C. Form Sealer:

1. Material: Surface sealer will not bond with, stain, or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces when applied to most forms or form liners. A ready-to-use water based material formulated to reduce or eliminate surface imperfections, containing no mineral oil or organic solvents. Environmentally safe, meeting local, state, and federal regulations.

D. Rustication Grooves and Beveled Edge Corner Strips: Nonabsorbent material, compatible with form surface, fully sealed on all sides prohibiting loss of paste or water between the two surfaces.

E. Form Ties:

1. Material: Steel.
2. Spreader Inserts:
   a. Conical or spherical type.
   b. Design to maintain positive contact with forming material.
   c. Furnish units that will leave no metal closer than 1-inch to concrete surface when forms, inserts, and tie ends are removed.
3. Wire ties not permitted.
4. Flat bar ties for panel forms, furnish plastic or rubber inserts with minimum 1-inch depth and sufficient dimensions to permit patching of tie hole.
5. Water Stop Ties: For water-holding structures, basements, pipe galleries, and accessible spaces below finish grade, furnish one of the following:
   a. Integral steel water stop 0.103-inch thick and 0.625-inch in diameter tightly and continuously welded to tie.
   b. Neoprene water stop 3/16-inch thick and 15/16-inch in diameter whose center hole is 1/2 diameter of tie, or a molded plastic water stop of comparable size.
   c. Water Stop: Oriented perpendicular to tie and symmetrical about center of tie.
   d. Design ties to prevent rotation or disturbance of center portion of tie during removal of ends and to prevent water leaking along tie.
6. Through-Bolts: Tapered minimum 1-inch diameter at smallest end.
7. Elastic Vinyl Plug: Design and size of plug to allow insertion with tool to enable plug to elongate and return to original length, and diameter upon removal forming a watertight seal.
   a. Manufacturer and Product: Dayton Superior Co., Miamisburg, OH; Dayton Sure Plug.

PART 3 EXECUTION

3.1 SYSTEM DESIGN REQUIREMENTS

A. Design formwork in accordance with ACI 347-89 and ACI 318-89 to provide the concrete finishes specified in Section 03300, CAST-IN-PLACE CONCRETE.

B. Make joints in forms watertight.

C. Limit panel deflection to 1/360 of each component span to achieve tolerances specified.

3.2 ERECTION

A. General: Unless specified otherwise, follow the applicable recommendations of ACI 347-89.

B. Beveled Edges (Chamfer):

1. Form 3/4-inch bevels at concrete edges, unless otherwise shown.
2. Where beveled edges on existing adjacent structures are other than 3/4-inch, obtain ENGINEER's approval of size prior to placement of beveled edge.

C. Wall Forms:

1. Do not reuse forms with damaged surfaces.
2. Locate form ties and joints in an uninterrupted pattern for smooth and uniform surface.
3. Inspect form surfaces prior to installation to assure conformance with specified tolerances.

D. Forms for Curbs, Sidewalks, and Driveways:

1. Provide standard steel or wood forms to prevent movement.
2. Set forms to true lines and grades, and securely stake in position.

E. Form Tolerances: Provide forms in accordance with ACI 347-89 and ACI 318-89 and the following tolerances for finishes specified:

1. Wall Tolerances:
   a. Straight Vertical or Horizontal Wall Surface: Flat planes within tolerance specified.
   b. Wall Type W-A: Plumb within 1/4-inch in 10 feet or within 1-inch from top to bottom for walls over 40 feet high.
      1) Depressions in Wall Surface: Maximum 5/16-inch when 10-foot straightedge is placed on high points in all directions.
   c. Wall Type W-B: Plumb within 1/8-inch in 10 feet or within 1/2-inch from top to bottom for walls over 40 feet high.
      1) Depressions in Wall Surface: Maximum 1/8-inch when 10-foot straightedge is placed on high points in all directions.
   d. Thicknesses: Maximum 1/4-inch minus or 1/2-inch plus from dimensions shown.

2. Slab Tolerances:
   a. Exposed Slab Surfaces: Comprise of flat planes as required within tolerances specified.
   b. Slab Finish Tolerances and Slope Tolerances: Crowns on floor surface not too high as to prevent 10-foot straightedge from resting on end blocks, nor low spots that allow a block of twice the tolerance in thickness to pass under the supported 10-foot straightedge.
   c. Slab Type S-A: Steel gauge block 5/16-inch thick.
   d. Slab Type S-B: Steel gauge block 1/8-inch thick.
   e. Slab Type S-A and S-B:
      1) Finish Slab Elevation: Slope slabs to floor drain and gutter, and shall adequately drain regardless of tolerances.
      2) Thickness: Maximum 1/4-inch minus or 1/2-inch plus from thickness shown, except where thickness tolerance will not affect slope, drainage, or slab elevation.

3.3 FORM SURFACE PREPARATION

A. Thoroughly clean form surfaces in contact with concrete or previous concrete, dirt, and other surface contaminants prior to coating surface.

B. Exposed Wood Forms in Contact with Concrete: Apply form sealer as recommended by the sealer material manufacturer.

C. Steel Forms: Apply form sealer to steel forms as soon as they are cleaned to prevent discoloration of concrete from rust.

3.4 FORM REMOVAL

A. Formwork not supporting weight of concrete, (i.e., sides of beams, walls, columns, and similar parts of the Work) may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

B. Leave forms and shoring for elevated structural slabs or beams in place, in accordance with ACI 318-89, Chapter 6, and until concrete has reached compressive strength equal to 80 percent of the specified 28-day compressive strength as determined by test cylinders.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 03210
REINFORCING STEEL

PART 1 GENERAL

1.1 SUBMITTALS

A. Shop Drawings:

1. Prepare in accordance with CRSI 1990 Manual of Standard Practice and ACI SP-66 Detailing Manual:
   a. Bending lists.
   b. Placing drawings.
2. Welded splice, Cadweld splice, and mechanical threaded splice.

B. Quality Control Submittals:

1. Mechanical Threaded Connections:
   a. Current International Conference of Building Officials (ICBO) Research Report or equivalent code agency report listing findings to include acceptance, special inspection requirements, and restrictions.
   b. Manufacturer's instructions.
   c. Verification that device threads have been checked and meet all requirements for thread quality, in accordance with manufacturer's published methods.
2. Welding Qualification: Prior to welding, submit welder qualifications and radiographic nondestructive testing procedures.
3. Test results of field testing.

1.2 QUALITY ASSURANCE

A. Welder Qualifications: Certified in accordance with AWS D1.4-79.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Unload, store, and handle bars in accordance with CRSI publication "Placing Reinforcing Bars."

PART 2 PRODUCTS

2.1 MATERIALS

A. Deformed Billet-Steel Reinforcing Bars:

1. Includes stirrups, ties, and spirals.
2. ASTM A615-90, Grade 60, including Supplemental Requirements S1 where welding is not required.
3. ASTM A706/A706M-90, Grade 60, including Supplemental Requirements for reinforcing to be welded.

B. Splices and Mechanical Connections:

1. Metal Sleeve: Furnish with cast filler metal, capable of developing, in tension or compression, 100 percent of minimum tensile strength of the bar.
   a. Manufacturer and Product: Erico Products, Inc., Cleveland, OH; Cadweld T-Series.
2. Mechanical Threaded Connections: Furnish metal coupling sleeve for splicing reinforcing in secondary members or in areas of low stress with internal threads engaging threaded ends of bars developing in tension or compression 125 percent of yield strength of bar.
   a. Manufacturers and Products:
      1) Erico Products, Inc., Cleveland, OH; Lenton Reinforcing Steel Couplers.
      2) Richmond Screw Anchor Co., Inc., Fort Worth, TX; Richmond DB-SAE Dowel Bar Splicers.

2.2 ACCESSORIES

A. Tie Wire:

1. Black, soft-annealed 16 gauge wire.
2. Nylon-, epoxy-, or plastic-coated wire.

B. Bar Supports and Spacers:

1. Precast concrete bar supports, cementitious fiber-reinforced bar supports, or all-plastic bar supports and side form spacers meeting the requirements of CRSI Manual of Standard Practice. Do not use other types of supports or spacers.
2. In Walls and Slabs Exposed to View After Stripping: Small rectangular concrete blocks made up of same color and strength as concrete being placed around them or all-plastic bar supports and side form spacers.

3. Precast concrete supports of same strength as concrete for reinforcing in concrete placed on grade.

2.3 FABRICATION

A. Follow CRSI Manual of Standard Practice.

B. Bend all bars cold.

PART 3 EXECUTION

3.1 PREPARATION

A. Notify ENGINEER when reinforcing is ready for inspection and allow 24 hours for inspection prior to placing concrete.

B. Clean metal reinforcement of loose mill scale, oil, earth, and other contaminants.

C. Coat wire projecting from precast concrete bar supports with dielectric material, epoxy, or plastic.

3.2 REINFORCING BAR INSTALLATION

A. Bundle or space bars, instead of bending where construction access through reinforcing is necessary.

B. Spacing and Positioning: Conform to ACI 318/318R-89.

C. Location Tolerances: In accordance with CRSI publication, "Placing Reinforcing Bars".

D. Splicing:

1. Follow ACI 318/318R-89.
2. Use lap splices unless otherwise shown or permitted in writing by ENGINEER.
3. Welded Splices: Accomplish by full penetration groove welds and develop at least 125 percent of yield strength of bar.
4. Stagger splices in adjacent bars.
5. Metal sleeves may be used.

E. Mechanical Splices and Connections:

1. Use only in areas specifically approved in writing by the ENGINEER.
2. Install as required by manufacturer with threads tightened and in accordance with ICBO Research Report.

3. Maintain minimum edge distance and concrete cover.

F. Tying Deformed Reinforcing Bars:

1. Tie every other intersection on mats made up of Nos. 3, 4, 5, and 6 bars to hold them firmly at required spacing.
2. Bend all noncoated tie wire to prevent tie wire from being closer than 1 inch from the surface of concrete.

G. Reinforcement Around Openings: Place an equivalent area of steel bars or fabric around pipe or opening and extend as shown, on each side sufficiently to develop bond with each bar.

H. Welding Reinforcement:

1. Only A706/A706M-90 bars may be welded.
2. Do not perform welding until welder qualifications are approved.

I. Straightening and Rebending: Field bending of reinforcing steel bars is not permitted.

J. Unless permitted by ENGINEER, do not cut reinforcing bars in the field.

3.3 TESTS AND INSPECTION

A. Inspect each splice and verify each component is in accordance with manufacturer's instructions and ICBO Research Report.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 03251
CONSTRUCTION JOINTS

PART 1 GENERAL

1.1 SUBMITTALS

A. Shop Drawings:

1. Plastic Type Water Stops: Details of splices to be used and method of securing water stop in the forms and supporting water stop so as to maintain proper orientation and location during concrete placement.
2. Construction Joints: Layout and location indicating type to be used.
3. Water stop.

B. Quality Control Submittals: Water stop manufacturer's written instructions for product shipment, storage, handling, installation field splices, and repair.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site: Verify that water stops delivered are in accordance with cross-section dimensions as shown and manufacturer's product data prior to unloading and storing onsite.

PART 2 PRODUCTS

2.1 LABYRINTH WATER STOP

A. Extruded from polyvinyl chloride (PVC) in conformance with Corps of Engineers' Specification CRD-C-572.

B. Size and configuration as shown.

2.2 PLASTIC WATER STOP

A. Extruded from an elastomeric plastic compound of which the basic resin shall be polyvinyl chloride (PVC). Reclaimed PVC in the compound is not acceptable.

B. Specific Gravity: Approximately 1.37.

C. Shore Durometer Type A Hardness: Approximately 80.

D. Performance Requirements: Corps of Engineers' Specification CRD-C-572.

E. Type: Center bulb with a number of parallel ribs or protrusions on each side of strip center.

F. Corrugated or tapered type water stops are not acceptable.

G. Thickness: Constant from bulb edge to the outside stop edge.

H. Minimum Weight per Foot of Water Stop:

1. 0.90 pound for 3/16-inch by 4-inch.
2. 1.62 pounds for 3/8-inch by 6-inch.
3. 2.30 pounds for 3/8-inch by 9-inch.

I. Manufacturers and Catalog Numbers:

1. Vulcan Metal Products, Inc., Construction Materials Division, Birmingham, AL; Catalog No. 3/81-15M: Type 8067 (4-inch by 3/16-inch), Type 8069 (6-inch by 3/8-inch), and Type 8070 (9-inch by 3/8-inch).
2. Vinylex Corp., Knoxville, TN; Catalog No. 03250/VIN (1987): No. RB6-38H (6-inch by 3/8-inch) and No. RB9-38H (9-inch by 3/8-inch).
3. Greenstreak Plastic Products, St. Louis, MO; Catalog No. 03250/GRD (1987): Style 732 (6-inch by 3/8-inch) and Style 735 (9-inch by 3/8-inch).
4. A. C. Horn, Inc., Beltsville, MD; Catalog No. CSP-162 (1987): Type 3 (4-inch by 3/16-inch), Type 9 (6-inch by 3/8-inch), and Type 10 (3/8-inch by 9-inch).

2.3 WIRE LOOPED PLASTIC WATER STOP

A. Furnish as an alternative to plastic water stops.

B. Same material and geometry as plastic water stops.

C. Furnish with continuous galvanized wire looping at edge for convenience in positioning and securing stop in place in the forms.

D. Manufacturers and Catalog Numbers: Paul Murphy Plastics, Roseville, MI; "Wire Stop Water Stop"; geometry numbers ACR 6380, ACR 9380, as shown on Paul Murphy Plastics Co. Drawing No. CCP-120-12M dated 12-89.

2.4 ACCESSORIES

A. Nonshrink Grout:

1. As specified in Section 03600, GROUT.
2. Compatible with joint sealant.

B. Roofing Felt: ASTM D226-89, Type II, 30-pound asphalt-saturated or equal weight of ASTM D227-89 coal-tar saturated felt.

C. Reinforcing Steel: As specified in Section 03210, REINFORCING STEEL.

PART 3 EXECUTION

3.1 GENERAL

A. Construct straight joints; make vertical or horizontal, except where walls intersect sloping floors.

B. Commence concrete placement after the joint preparation is complete.

C. Time Between Concrete Pours: As specified in Section 03300, CAST-IN-PLACE CONCRETE.

3.2 SURFACE PREPARATION

A. Construction Joints: Prior to placement of abutting concrete, clean contact surface:

1. Remove laitance and spillage from reinforcing steel and dowels.
2. Roughen surface to a minimum of 1/4-inch amplitude:
   a. Sandblast after the concrete has fully cured.
   b. Water blast after the concrete has partially cured.
   c. Green cut fresh concrete with high pressure water and hand tools.
3. Perform cleaning so as not to damage water stop, if one is present.

3.3 INSTALLATION OF WATER STOPS

A. General:

1. Join water stops at intersections to provide continuous seal.
2. Center water stop on joint.
3. Secure water stop in correct position to avoid displacement during concrete placement.
4. Repair or replace damaged water stop.
5. Place concrete and vibrate to obtain impervious concrete in the vicinity of all joints.

6. Joints in Footings and Slabs:
   a. Ensure that space beneath plastic water stop is completely filled with concrete.
   b. During concrete placement, make a visual inspection of the entire water stop area.
   c. Limit concrete placement to elevation of water stop in first pass, vibrate the concrete under the water stop, lift the water stop to confirm full consolidation without voids, then place remaining concrete to full height of slab.
   d. Apply procedure to full length of plastic water stops.

B. Labyrinth Water Stops: Install in accordance with the manufacturer's written instructions. Use heat butt weld splices only.

C. Plastic Water Stop:

1. Install in accordance with manufacturer's written instructions.
2. Splice in accordance with the water stop manufacturer's written instructions using a thermostatically controlled heating iron. Butt splice unless specifically detailed otherwise.
   a. Allow at least 10 minutes before the new splice is pulled or strained in any way.
   b. Finished splices shall provide a cross-section that is dense and free of porosity with tensile strength of not less than 80 percent of the unspliced materials.
3. Wire looped plastic water stop may be substituted for plastic water stop.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 DEFINITIONS

A. *Defective* Areas: Surface defects that include honeycomb, rock pockets, indentations, cracks 0.005-inch wide and larger, and cracks that leak in water-holding basins, spalls, chips, air bubbles, pinholes, bug holes, embedded debris, lift lines, sand lines, bleed lines, leakage from form joints, fins and other projections, form popouts, texture irregularities, and stains and other color variations that cannot be removed by cleaning.

B. New Concrete: Less than 60 days old.

1.2 SUBMITTALS

A. Shop Drawings:

1. Product Data: Admixtures, bonding agent, and patching materials.
2. Design Data: Concrete mix designs signed by qualified mix designer.
3. Placement Drawings:
   a. Concrete, identifying location of each type of construction joint.
   b. Tremie concrete.
4. Gradation for coarse and fine aggregates, and combined together. List gradings, percent passing through each sieve size.
5. Detailed plan for cold weather curing and protection of concrete placed and cured in weather below 40 degrees F.
6. Water-holding repair methods.

B. Quality Control Submittals:

1. Manufacturer's application instructions for bonding agent.
2. Proposed application instructions for patching materials.
3. Manufacturers' Certificate of Compliance:
   a. Portland cement.
   b. Admixtures.
   c. Fly ash.
   d. Aggregates.
   e. Bonding agent.
   f. Patching materials.
4. Admixtures: Manufacturers' Certificate of Proper Installation.

5. Statements of Qualification:
   a. Mix designer.
   b. Batch plant.
   c. Epoxy injection applicator.
6. Test Reports:
   a. Admixtures, test reports showing chemical ingredients and percentage of chloride in each admixture and fly ash.
   b. Source test analysis report for fly ash.
   c. Statement identifying aggregates reactivity and aggregate effects on concrete finish and appearance. Showing total chloride in each component of aggregates utilizing grinding to 50-mesh screen and determination of total chloride. Use Florida DOT method.
   d. For each trial mix design and signed by qualified mix designer.
   e. Cylinder test results from laboratory mixes.
7. Concrete Delivery Tickets:
   a. For each batch of concrete before unloading at site.
   b. Record of drum revolution counter, type, brand, test certification, and amount of fly ash if used in accordance with ASTM C94-90, Section 16.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Mix Designer: Licensed professional engineer registered in the state of Project.
2. Batch Plant: Currently certified by the National Ready Mixed Concrete Association.
3. Epoxy Injection Applicator: Licensed by epoxy manufacturer.
4. CONTRACTOR's Resident Superintendent for Installation of Wet Pit Using Caisson Method:
   a. Supervised successful construction of at least two caissons.
   b. Experience shall have included cast-in-place concrete walls, excavating within open caisson to sink it, casting tremie concrete slab, and aligning the caisson walls to within 1 percent from plumb.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Placement:

1. Do not place concrete when ambient temperature is below 40 degrees F or approaching 40 degrees F and falling, without special protection as specified or approved by ENGINEER.

2. Do not place concrete against frozen earth or ice, or against forms and reinforcement with frost or ice present.
3. Provide heated enclosures when air temperatures are below 40 degrees F.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cement: Furnish from one source.

1. Portland Cement Type I or Type II:
   a. Meet ASTM C150-89.
   b. Alkalies: Maximum 0.60 percent.
   c. Tricalcium Aluminate Content of Type I Cement: Maximum 12 percent.
   d. Nonhydraulic Abovegrade Structures: Type I or Type II cement.
   e. Hydraulic and Belowgrade Structures and Sewers: Type II cement or combination of Type I mixed with fly ash.
   f. Combine fly ash with cement at batch plant or during production of cement in accordance with ASTM C595-89e, Type IP cement.

B. Aggregates: Furnish from one source.

1. Natural Aggregates:
   a. Free from deleterious coatings and substances in accordance with ASTM C33-90, except as modified herein.
   b. Free of materials and aggregate types causing popouts, discoloration, staining, or other defects on surface of concrete.
2. Nonpotentially Reactive: In accordance with ASTM C33-90, Appendix XI, paragraph X1.1.
3. Aggregate Soundness: Test for fine and coarse aggregates in accordance with ASTM C33-90 and ASTM C88-90 using sodium sulfate solution.
4. Fine Aggregates:
   a. Clean, sharp, natural sand.
   b. ASTM C33-90.
   c. Materials Passing 200 Sieve: 4 percent maximum.
   d. Limit deleterious substances in accordance with ASTM C33-90, Table 1 with material finer than 200 sieve limited to 3 percent, coal and lignite limited to 0.5 percent.
5. Coarse Aggregate:
   a. Natural gravels, combination of gravels and crushed gravels, crushed stone, or combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension).

b. Materials Passing 200 Sieve: 0.5 percent maximum.
c. Limit deleterious substances in accordance with ASTM C33-90, Table 3 for exposed architectural concrete.

C. Admixtures: Furnish from one manufacturer.

1. Characteristics: Compatible with each other and free of chlorides or other corrosive chemicals.
2. Air-Entraining Admixture:
   a. ASTM C260-86, nontoxic after 30 days and contain no chlorides.
   b. Concrete with air-entrainment admixture added shall maintain air percentage as batched, within plus or minus 2 percent for time required for placement into structure.
3. Water-Reducing Admixtures: ASTM C494-90, Type A or Type D.
   a. Manufacturers and Products:
      1) Master Builders, Inc., Cleveland, OH; Pozzolith or Pozzolith Polyheed.
      2) W. R. Grace & Co., Cambridge, MA; WRDA HYCOL.
      3) Euclid Chemical Co., Cleveland, OH; Eucon WR-90.
4. Superplasticizers:
   a. ASTM C494-90.
   b. Hold slump of 5 inches or greater for time required for placement into structure with water-cement ratio.
   c. Furnish type as recommended by manufacturer for allowed temperature ranges.
   d. Type F or G.
   e. Manufacturers and Products:
      1) Master Builders, Inc., Cleveland, OH; Rheobuild or Pozzolith Polyheed at dosage greater than 10 ounces per 100 pounds of cement.
      2) W. R. Grace & Co., Cambridge, MA; Daracem 100.
      3) Euclid Chemical Co., Cleveland, OH; Eucon Super F or 537G.
      4) No "or-equal" or substitute products will be considered.
5. Pozzolan (Fly Ash): Class C or Class F fly ash in accordance with ASTM C618-91, Table 1 and 2, except as modified herein:
   a. Loss on Ignition: Maximum 3 percent.
   b. Water Requirement: Maximum 100 percent of control.
      $\frac{CaO(\%) - 5}{FE_2O_3(\%)}$: *Maximum* 1.5
   c. ASTM C618-91, Table 1A apply when aggregates or portion of coarse or fine aggregates used are reactive as specified under paragraph Aggregates.

d. ASTM C618-91, Table 2A, Reactivity with Cement Alkalies, apply when aggregates or portions of aggregates are reactive as specified under paragraph Aggregates.
e. ASTM C618-91, Table 2A, Uniformity Requirements, apply when loss on ignition of fly ash furnished exceeds 3 percent.

6. For fly ash not meeting the requirements of the chemical ratio listed above, furnish the following:
   a. Test fly ash in accordance with ASTM C1012-89.
   b. Furnish test data confirming fly ash in combination with cement used meets strength requirements, is compatible with air-entraining agents and other additives, and provides increased sulfate resistance equivalent to or better than Type II cement.
   c. Conduct tests using proposed fly ash and cement samples together with control samples using Type II cement without fly ash.

D. Water: Clean and potable containing less than 50 ppm of chlorides.

2.2 ANCILLARY MATERIALS

A. Crack Repair Epoxy Manufacturers: Water insensitive two-component epoxy injection system by Master Builders Technologies (H. S. Peterson Co.), Cleveland, OH; Sika Chemical Corp., Lyndhurst, NJ; or Euclid Chemical Co., Cleveland, OH.

B. Bonding Agent: Furnish as recommended by manufacturer for surface finish, pot life, set time, vertical or horizontal application, and forming restrictions.

1. Manufacturers:
   a. Master Builders Technologies, Cleveland, OH.
   b. Sika Chemical Corp., Lyndhurst, NJ.
   c. Euclid Chemical Co., Cleveland, OH.

C. Patching Material:

1. Contain no chlorides or other chemicals causing steel corrosion.
2. Low pressure silica fume mortar, EMACO as manufactured by Master Builders Co.

2.3 CONCRETE MIX DESIGN

A. Design: Select and proportion ingredients using trial batches; sample, cure and test concrete mix through an approved independent testing laboratory in accordance ACI 309-89 per ACI 211.1-91.

1. Concrete Compressive Strength, F'c:
   a. 4,000 psi at 28 days, unless otherwise shown. 3,000 psi at 28 days may be used in lieu of 4,000 psi at slabs on grade.
   b. Design lab-cured trial mix cylinders.
   c. Use additional cement or cement plus fly ash above minimum specified if required to meet average compressive strength, F'cr.
   d. Use F'cr as basis for selection of concrete proportions as set forth in Chapter 5 of ACI 318-89 and commentary ACI 318R-89.
   e. F'cr: Equal to F'c plus 1,200 when data is not available to establish standard deviation.
2. Concrete Fill:
   a. Design for 2,500 psi at 28 days using 1-inch aggregate, 4-inch maximum slump and 0.46 maximum water-cement ratio.
   b. Use water-reducing admixture.

B. Proportions:

1. Design mix to meet aesthetic and structural concrete requirements.
2. In accordance with ACI 211.1-89, unless specified otherwise.
3. Water-cement ratio (or water-cement plus fly ash ratio) shall control amount of total water added to concrete as follows:

Coarse Aggregate Size	W/C Ratio With Superplasticizer	W/C Ratio Without Superplasticizer
1-1/2-inch	0.40	0.46
1-inch	0.385	0.45
3/4-inch	0.375	0.44

4. Minimum Cement Content (or Combined Cement Plus Fly Ash Content When Fly Ash is Used):
   a. 517 pounds per cubic yard for concrete with 1-1/2-inch maximum size aggregate.
   b. 540 pounds per cubic yard for 1-inch maximum size aggregate.
   c. 564 pounds per cubic yard for 3/4-inch maximum size aggregate.
   d. Increase cement content or combined cement plus fly ash content, as required to meet strength requirements and water-cement ratio.

C. Admixtures:

1. Air Content: 4 to 6 percent when tested in accordance with ASTM C231-91; 3 percent maximum for interior slabs where heavy-duty concrete floor finish is required.
2. Fly Ash: Maximum 25 percent, minimum 15 percent of total weight of fly ash plus cement.

3. Water Reducers: Use in all concrete.
4. Superplasticizers: For all caisson structures, optional elsewhere.

D. Slump Range at Site:

1. Minimum: 4 inches with superplasticizer, 3 inches without.
2. Maximum: 8 inches with superplasticizer, 5 inches without.
3. Take design mix test cylinders from concrete with slump equal to that used on Project.

E. Combined Aggregate Gradings:

1. Structures: 1-1/2-inch maximum grading, as shown in table.
2. Limit water-cement ratio to value specified for combined grading selected.
3. Grading Limits:

Sieve Sizes	Percentage Passing		
	1-1/2" Max.	1" Max.	3/4" Max.
2"	- 100	-	-
1-1/2"	95 - 100	- 100	-
1"	65 - 85	90 - 100	- 100
3/4"	55 - 75	70 - 90	92 - 100
1/2"	-		68 - 86
3/8"	40 - 55	45 - 65	57 - 74
No. 4	30 - 45	31 - 47	38 - 57
No. 8	23 - 38	23 - 40	28 - 46
No. 16	16 - 30	17 - 35	20 - 36
No. 30	10 - 20	10 - 23	14 - 25
No. 50	4 - 10	2 - 10	5 - 14
No. 100	0 - 3	0 - 3	0 - 5
No. 200	0 - 2	0 - 2	0 - 2

2.4 CONCRETE MIXING

A. General: In accordance with ACI 304R-89.

B. Concrete Mix Temperatures: As shown below for various stages of mixing and placing:

CONCRETE TEMPERATURES				
	Concrete Member Size, Minimum Dimension			
Ambient Air Temp.	<12"	12"-36"	36"-72"	>72"
Minimum concrete temperature as mixed for indicated air temperature:				
Above 30 deg. F	60 deg. F	55 deg. F	50 deg. F	45 deg. F
0-30 deg. F	65 deg. F	60 deg. F	55 deg. F	50 deg. F
Below 0 deg. F	70 deg. F	65 deg. F	60 deg. F	55 deg. F
Maximum allowable gradual temperature drop in first 24 hours after curing period and after end of protection:				
–	50 deg. F	40 deg. F	30 deg. F	20 deg. F

C. Truck Mixers:

1. Equip with electrically actuated counters to readily verify number of revolutions of drum or blades.
2. Counter:
   a. Resettable, recording type, mounted in driver's cab.
   b. Actuated at time of starting mixers at mixing speeds.
3. Truck mixer operation shall furnish a concrete batch as discharged that is homogeneous with respect to consistency, mix, and grading.
4. If slump tests taken at approximately 1/4 and 3/4 points of load during discharge give slumps differing by more than 2 inches when specified slump is more than 5 inches, discontinue use of truck mixer unless causing condition is corrected and satisfactory performance is verified by additional slump tests.
5. Before attempting to reuse unit, check mechanical details of mixer, such as water measuring, and discharge apparatus, condition of blades, speed of rotation, general mechanical condition of unit, admixture dispensing equipment, and clearance of drum.
6. Do not use nonagitating or combination truck and trailer equipment for transporting ready-mixed concrete.

7. Concrete Volume in Truck:
   a. Limit to 63 percent of total volume capacity in accordance with ASTM C94-90 when truck mixed.
   b. Limit to 80 percent of total volume capacity when central mixed.
8. Mix each batch of concrete in truck mixer for minimum 70 revolutions of drum or blades at rate of rotation designated by equipment manufacturer.
9. Perform additional mixing, if required, at speed designated by equipment manufacturer as agitating speed.
10. Place materials, including mixing water, in mixer drum before actuating the revolution counter for determining number of mixing revolutions.

D. Aggregates: Thoroughly and uniformly wash before use.

E. Admixtures:

1. Air-Entraining Admixture: Add at plant through manufacturer-approved dispensing equipment.
2. Water Reducers: Add prior to addition of superplasticizer.
3. Superplasticizers and Air-Entraining Admixtures:
   a. Add at concrete plant only through equipment furnished or approved by admixture manufacturer.
   b. Accomplish variations in slump, working time, and air content for flowable mixes by increasing or reducing superplasticizer dose or air-entraining admixture dose at ready-mix plant only.
   c. Equipment shall provide for easy and quick visual verification of admixture amount used for each dose.
   d. Add discharge amount to each load of concrete into separate dispensing container, verify amount is correct, then add to concrete.
   e. Additional dosage of superplasticizer may be added in the field using manufacturer-approved dispensing when unexpected delays cause too great of a slump loss.

2.5 SOURCE QUALITY CONTROL

A. Cement: Test for total chloride content.

B. Fly Ash: Test in accordance with ASTM C311-90.

C. Batch Plant Inspection: ENGINEER shall have access to and have the right to inspect batch plants, cement mills, and supply facilities of Suppliers, manufacturers, and Subcontractors, providing products included in these Specifications.

1. Weighing Scales: Tested and certified within tolerances set forth in the National Bureau of Standards Handbook No. 44.
2. Batch Plant Equipment: Either semiautomatic or fully automatic in accordance with ASTM C94-90.

PART 3 EXECUTION

3.1 PLACING CONCRETE

A. Preparation: Meet requirements and recommendations of ACI 304R-89 and ACI 301-89, except as modified herein.

B. Inspection: Notify ENGINEER at least 1 full working day in advance before starting to place concrete.

C. Discharge Time:

1. As determined by set time, do not exceed 1-1/2 hours after adding cement to water unless special approved time delay admixtures are used. Coordinate information with admixture manufacturer and ENGINEER prior to placing concrete.
2. Adjust slump or air content at site by adding admixtures for particular load when approved by ENGINEER, then adjust plant dose rest of placement. Additional dosage at site shall be through an approved dispenser supplied by admixture manufacturer.
3. Maintain required slump throughout time of concrete placement and consolidation. Discontinue use of superplasticizer if it fails to maintain slump in required range for the length of time required. Redesign mix adjusting set control admixtures to maintain setting time in the range required.

D. Placement into Formwork:

1. Before depositing concrete, remove debris from space to be occupied by concrete.
2. Prior to placement of concrete, dampen fill under slabs on ground, dampen sand where vapor retarder is specified, and dampen wood forms.
3. Reinforcement: Secure in position before placing concrete.
4. Place concrete soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 1.5 feet deep, except for slabs. Place and consolidate successive layers prior to initial set of first layer to prevent cold joints.
5. Use placement devices, for example, chutes, pouring spouts, and pumps.

6. Vertical Free Fall Drop to Final Placement: 5 feet in forms, 8-inch or less wide and 8 feet in forms wider than 8 inches, except as specified.
   a. Superplasticized Mixes: Up to 15 feet if slump is over 6 inches.
   b. For placements where drops are greater than specified, use placement device such that free fall below placement device conforms to required value.
   c. Free fall limit to prevent segregation caused by aggregates hitting reinforcing steel.
7. Do not use aluminum conveying devices.
8. Provide sufficient illumination for interior of forms so concrete at places of deposit are visible permitting confirmation of consolidation quality.
9. Joints in Footings and Slabs:
   a. Ensure space beneath plastic water stop completely fills with concrete.
   b. During concrete placement, make visual inspection of entire water stop area.
   c. Limit concrete placement to elevation of water stop in first pass, vibrate concrete under water stop, lift water stop to confirm full consolidation without voids, place remaining concrete to full height of slab.
   d. Apply procedure to full length of water stops.
10. If reinforcement is in direct sunlight or is more than 20 degrees F higher in temperature than concrete temperature before placement, wet reinforcement with water fog spray before placing concrete to cool reinforcement.
11. Round off top exposed edges of walls with a 1/4-inch radius steel edging tool.

E. Conveyor Belts and Chutes:

1. Design and arrange ends of chutes, hopper gates, and other points of concrete discharge throughout conveying, hoisting, and placing system for concrete to pass without becoming segregated.
2. Do not use chutes longer than 50 feet.
3. Minimum Slopes of Chutes: Angled to allow concrete to readily flow without segregation.
4. Conveyor Belts:
   a. Approved by ENGINEER.
   b. Wipe clean with device which does not allow mortar to adhere to belt.
   c. Cover conveyor belts and chutes.

F. Retempering: Not permitted for concrete where cement has partially hydrated.

G. Pumping of Concrete:

1. Provide standby pump, conveyor system, crane and concrete bucket, or other system onsite during pumping, for adequate redundancy to assure completion of concrete placement without cold joints in case of a primary placing equipment breakdown.
2. Minimum Pump Hose (Conduit) Diameter: 4 inches.
3. Replace pumping equipment and hoses (conduits) that are not functioning properly.

H. Maximum Size of Concrete Placements: Should placement sequence result in cold joint located below finished water or ground surface, install water stop in joint.

I. Minimum Time Between Adjacent Placements:

1. At least 2 hours shall elapse after depositing concrete in long columns and walls thicker than 8 inches before depositing concrete in beams, girders, or slabs supported thereon.
2. For columns and walls, 10 feet in height or less, wait at least 45 minutes prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.

J. Removal of Water: Unless tremie method for placing concrete is specified, remove water from space to be occupied by concrete.

K. Consolidation and Visual Observation:

1. Consolidate concrete with internal vibrators with minimum frequency of 8,000 cycles per minute and amplitude required to consolidate concrete in section being placed.
2. Provide at least one standby vibrator in operable condition at placement site prior to placing concrete.
3. Consolidation Equipment and Methods: ACI 309R-87.
4. Provide sufficient windows in forms or limit form height to allow for concrete placement through windows and for visual observation of concrete.
5. Vibration consolidation shall not exceed a distance of 5 feet from point of placement.
6. Vibrate concrete in vicinity of joints to obtain impervious concrete there.

L. Hot Weather:

1. Prepare ingredients, mix, place, cure, and protect in accordance with ACI 305R-89.

2. Placement frequency shall be such that lift lines will not be visible in architectural concrete finishes.
3. Maintain concrete temperature below 80 degrees F at time of placement. Ingredients may be cooled before mixing.
4. Make provisions for windbreaks, shading, fog spraying, sprinkling, ice, or wet cover, or other means to provide concrete with temperature specified.
5. Prevent differential temperature between reinforcing steel and concrete.
6. Evaporation Retardant: As specified in Section 03370, CONCRETE CURING.

M. Cold Weather:

1. Maintain surface temperature of concrete above 40 degrees F and cure concrete as specified in Section 03370, CONCRETE CURING, for minimum of 7 days.
2. Provide maximum and minimum thermometers placed on concrete surfaces spaced throughout Work to allow monitoring of concrete surface temperatures representative of Work.
3. In accordance with ACI 306R-88 and ACI 318-89.
4. External Heating Units:
   a. Vent heating units to atmosphere, and do not locally heat or dry concrete. Where water cure is specified, maintain wet condition.
   b. Do not exhaust flue gases directly into an enclosed area to prevent concentrated carbon dioxide from causing concrete carbonation.
5. Maintain curing conditions as specified in Section 03370, CONCRETE CURING.

3.2 PLACING TREMIE CONCRETE SEALS

A. Refer to Section 02468, CAISSONS.

B. Prior to placing tremie concrete plug, remove all loose material from the bottom of the excavation, and remove all soil debris from inside concrete wall surface at tremie slab by high pressure spray or other mechanical means.

C. Place concrete when water level inside area to be filled with concrete is equal to groundwater elevation outside.

D. Maintain relation of water levels until concrete design strength is obtained.

E. Refer to Section 304R, Chapter 8, in ACI Manual of Concrete Practice 1996, for methods and procedures of placing concrete under water.

3.3 CONCRETE BONDING

A. To New Concrete Wall Horizontal Construction Joints:

1. Thoroughly clean and saturate joint with water.
2. Cover horizontal wall surfaces with minimum 2 inches of grout, as specified in Section 03600, GROUT, and immediately place concrete.
3. Limit concrete lift placed immediately on top of grout to 12 inches thick.
4. Thoroughly vibrate to mix and consolidate grout and concrete together.

B. To Old Concrete:

1. Mechanically roughen existing concrete surfaces to a clean, rough surface using a "Blastrac" by Wheelabrator-Frye, Inc.; or "Porta-Shotblast" by Nelco Manufacturing Corp, to remove existing concrete surface, and provide a minimum roughness profile of 1/4-inch.
2. Saturate surface with water for 24 hours, cover with 2 inches of grout and place grout as specified for new concrete.

3.4 CONSTRUCTION JOINTS

A. As specified in Section 03251, CONSTRUCTION JOINTS.

3.5 PATCHING

A. General:

1. Inject cracks with crack repair epoxy.
2. Prior to starting patching work, obtain quantities of color-matched patching material and manufacturer's detailed instructions for use to provide a structural patch with finish to match adjacent surface.
3. Develop patching techniques with epoxy manufacturer on mockup panel.
4. Dress surface of patches that will remain exposed to view to match color and texture of adjacent surfaces. Patching of concrete shall provide a structurally sound surface finish, uniform in appearance or upgrade finish by other means until acceptable to ENGINEER.

B. Tie Holes:

1. Fill with Category I or II grout as specified in Section 03600, GROUT, except where sealant is shown. Use only enough water to dry pack.
2. Match color of adjacent concrete.
3. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

C. Alternate Form Ties-Through-Bolts:

1. Seal through-bolt hole by sandblasting or mechanically cleaning and roughening entire interior surface of hole, epoxy coating roughened surface and driving elastic vinyl plug and then dry packing entire hole on each side of plug with Category II grout, as specified in Section 03600, GROUT. Use only enough water to dry pack grout. Dry pack while epoxy is still tacky or remove epoxy by mechanical means and reapply new epoxy.
2. Fill through-bolt openings with Category II grout, as specified in Section 03600, GROUT.
3. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

D. Defective Areas:

1. Remove *defective* concrete to a depth of sound concrete.
2. Small shallow holes caused by air entrapment at surface of forms shall not be considered *defective* unless amount is so great as to be considered not the standard of the industry.
3. If chipping is required, make edges perpendicular to surface with a minimum of 1/2-inch in depth. Do not feather edges. Obtain ENGINEER's approval of chipping work.
4. Patch *defective* area to match appearance of adjacent concrete surfaces after cracks are filled.

E. Blockouts at Pipes or Other Penetrations:

1. Meet details shown or submit proposed blockouts for review.
2. Use nonshrink, nonmetallic grout, Category I or II.

3.6 CONCRETE WALL FINISHES

A. Type W-1 (Ordinary Wall Finish):

1. Patch tie holes.
2. Knock off projections.
3. Patch *defective* areas.

B. Type W-2 (Finish for Waterproofing):

1. Fill cracks by epoxy injection.
2. Patch tie holes.
3. Knock off projections.
4. Patch *defective* areas.

C. Type W-3 (Smooth Wall Finish):

1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch *defective* areas and repair rough spots resulting from form release agent failure or other reasons to provide smooth uniform appearance.

3.7 CONCRETE SLAB FINISHES

A. General:

1. Do not use "jitterbugs" or other special tools designed for the purpose of forcing coarse aggregate away from the surface and allowing a layer of mortar, which will be weak and cause surface cracks or delamination, to accumulate.
2. Do not dust surfaces with dry materials.
3. Use evaporation retardant.
4. Round off edges of slabs with a steel edging tool, except where a cove finish is shown. Steel edging tool radius shall be 1/4-inch for slabs subject to wheeled traffic.

B. Type S-1 (Steel Troweled Finish):

1. Finish by screeding and floating with straightedges to bring surfaces to required finish elevation. Use evaporation retardant.
2. While concrete is still green, but sufficiently hardened to bear a person's weight without deep imprint, wood float to true, even plane with no coarse aggregate visible.
3. Use sufficient pressure on wood floats to bring moisture to surface.
4. After surface moisture has disappeared, hand trowel concrete to produce smooth, impervious surface, free from trowel marks.
5. Burnish surface with an additional troweling. Final troweling shall produce a ringing sound from trowel.
6. Do not use dry cement or additional water during troweling, nor will excessive troweling be permitted.
7. Power Finishing:
   a. An approved power machine may be used in lieu of hand finishing in accordance with directions of machine manufacturer.
   b. Do not use power machine when concrete has not attained the necessary set to allow finishing without introducing high and low spots in slab.
   c. Do first steel troweling for slab S-1 finish by hand.

C. Type S-2 (Wood Float Finish):

1. Finish slabs to receive fill and mortar setting beds by screeding with straightedges to bring surface to required finish plane.
2. Wood float finish to compact and seal surface.
3. Remove laitance and leave surface clean.
4. Coordinate with other finish procedures.

D. Type S-3 (Underside Elevated Slab Finish): When forming is removed, grind off projections on underside of slab and patch *defective* areas.

E. Type S-5 (Broomed Finish): Finish as specified for Type S-1 floor finish, except omit final troweling and finish surface by drawing a fine-hair broom lightly across the surface.

1. Brooming: In same direction and parallel to expansion joints, or, in the case of inclined slabs, perpendicular to slope, except for round roof slab, broom surface in radial direction.

3.8 BACKFILL AGAINST WALLS

A. Do not backfill against walls until concrete has obtained 28-day compressive strength.

B. Place backfill simultaneously on both sides of wall, where required, to prevent differential pressures.

3.9 FIELD QUALITY CONTROL

A. General:

1. Provide adequate facilities for safe storage and proper curing of concrete test cylinders onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
2. Provide concrete for testing of slump, air content, and for making cylinders from the point of discharge into forms. When concrete is pumped, Samples used shall be taken from discharge end of pump hose.
3. Evaluation will be in accordance with ACI 301-89, Chapter 17 and Specifications. Where the term "building official" is used, the term shall be redefined to "the OWNER's representative".
4. Specimens will be made, cured, and tested in accordance with ASTM C31-90a and ASTM C39-86.
5. Frequency of testing may be changed at discretion of ENGINEER.
6. Pumped Concrete: Take concrete samples for slump (ASTM C143-90a) and test cylinders (ASTM C31-90a and C39-86) and shrinkage specimens (ASTM C157-89) at placement (discharge) end of line.

B. Admixture Segregation Test: Test each truck prior to use on job.

1. Segregation Test Objective: Concrete with 5- to 9-inch slump must stay together when slumped. Segregation is assumed to cause mortar to flow out of mix even though aggregate may stay piled enough to meet slump test.
2. Test Procedure: Make slump test and check for excessive slump and observe to see if mortar or moisture flows from slumped concrete.
3. Reject concrete if mortar or moisture separates and flows out of mix.

C. Cold Weather Placement Tests:

1. During cold weather concreting, cast cylinders for field curing as follows. Use method that will produce greater number of specimens:
   a. Six extra test cylinders from the last 100 cubic yards of concrete.
   b. Minimum three specimens for each 2 hours of placing time or for each 100 cubic yards.
2. These specimens shall be in addition to those cast for lab testing.
3. Protect test cylinders from the weather until they can be placed under same protection provided for the concrete of the structure that they represent.
4. Keep field test cylinders in same protective environment as the parts of the structure they represent to determine if specified strength has been obtained.
5. Test cylinders in accordance with applicable sections of ASTM C31-90a and C39-86.
6. Use test results to determine specified strength gain prior to falsework removal or for prestressing.

D. Tolerances:

1. Walls: Measure and inspect walls for compliance with tolerances specified in Section 03100, CONCRETE FORMWORK.
2. Slab Finish Tolerances and Slope Tolerances:
   a. Floor flatness measurements will be made the day after floor is finished and before shoring is removed, to eliminate effects of shrinkage, curing, and deflection.
   b. Support 10-foot long straightedge at each end with steel gauge blocks of thicknesses equal to specified tolerance.
   c. Compliance with designated limits in four of five consecutive measurements is satisfactory unless *defective* conditions are observed.

3.10 PROTECTION OF INSTALLED WORK

A. After curing as specified in Section 03370, CONCRETE CURING, and after applying final floor finish, cover slabs with plywood or particle board or plastic sheeting or other material to keep floor clean and protect it from material and damage due to other construction work.

B. Patch and repair *defective* areas and areas damaged by construction.

3.11 SCHEDULE OF CONCRETE FINISHES

A. Form Tolerances: As specified in Section 03100, CONCRETE FORMWORK.

B. Provide concrete finishes as scheduled:

Area	Type of Finish	Required Form Tolerances
EXTERIOR WALL SURFACES		
Abovegrade/exposed (above a point 6" below finish grade)	W-3	W-A
Backfilled (below a point 6" below final grade)	W-1	W-A
INTERIOR WALL SURFACES		
Valve vault	W-1	W-A
Wet pit	W-2	W-A
EXTERIOR SLABS		
Vault top slab	S-5	S-B
Wet pit top slab	S-1	S-B
INTERIOR SLABS		
Vault base slab	S-1	S-A
Wet pit base slab	S-1	S-A
Underside of elevated slabs	S-3	S-A

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 03370
CONCRETE CURING

PART 1 GENERAL

1.1 SUBMITTALS

A. Shop Drawings:

1. Curing methods proposed.
2. Manufacturers' data for the following products:
   a. Evaporation retardant.
   b. Curing compound.

PART 2 PRODUCTS

2.1 MATERIALS

A. Curing Compound:

1. Solvent-based, high chlorinated rubber solids content curing compound meeting requirements of ASTM C309-89.
   a. Moisture Loss: 0.030 gm/square cm/72 hours maximum.
   b. Capable of meeting moisture retention with one coat.
2. Manufacturers and Products:
   a. Master Builders Co., Cleveland, OH; Masterkure CR.
   b. Euclid Chemical Co., Cleveland, OH; Euco Super Floor Coat.

B. Evaporation Retardant:

1. Optional: Fluorescent color tint that disappears completely upon drying.
2. Manufacturers and Products:
   a. Master Builders Co., Cleveland, OH; CONFILM.
   b. Euclid Chemical Co., Cleveland, OH; Eucobar.
   c. No "or-equal" or substitute products will be considered.

C. Water: Clean and potable, containing less than 50 ppm of chlorides.

PART 3 EXECUTION

3.1 CURING OF CONCRETE

A. Use one of the following methods as approved by ENGINEER:

1. Walls:
   a. General: Where walls are to receive coatings, painting, cementitious material, or other similar finishes, or where solvent-based coatings are not permitted, use only water curing procedures.
   b. Method 1: Leave concrete forms in place and keep entire surfaces of forms and concrete wet for 7 days.
   c. Method 2: Apply curing compound, where allowed, immediately after removal of forms.
   d. Method 3: Continuously sprinkle with water 100 percent of exposed surfaces for 7 days starting immediately after removal of forms.
2. Slabs and Curbs:
   a. Method 1: Protect surface by water ponding for 7 days.
   b. Method 2: Cover with burlap or cotton mats and keep continuously wet for 7 days.
   c. Method 3: Cover with 1-inch layer of wet sand, earth, or sawdust, and keep continuously wet for 7 days.
   d. Method 4: Continuously sprinkle exposed surface for 7 days.
   e. Other agreed upon method that will keep moisture present and uniform at all times on surface of slabs. Do not use curing compounds.
   f. Where water curing for slabs during cold weather is not possible, use an ENGINEER-approved curing compound at manufacturer's recommended coverage per gallon.
   g. Where curing compound cannot be used, special methods using moisture shall be agreed upon prior to placing the concrete slabs.
   h. Protect slabs during cold weather with plastic sheets or other material inside required heated enclosure if foot traffic is permitted on slabs.

3.2 EVAPORATION RETARDANT APPLICATION

A. Where required by environmental conditions, spray onto surface of fresh flatwork concrete immediately after screeding to react with surface moisture.

B. Reapply as needed to ensure a continuous moist surface until final finishing is completed.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 03600
GROUT

PART 1 GENERAL

1.1 SUBMITTALS

A. Shop Drawings:

1. Product data of grouts.
2. Proposed method for keeping existing concrete surfaces wet prior to placing grout.

B. Quality Control Submittals:

1. Manufacturer's Written Instructions: Mixing of grout.
2. Manufacturer's Certificate of Compliance:
   a. Grout free from chlorides and other corrosion-causing chemicals.
   b. Nonshrink grout properties of Categories II and III, verifying expansion at 3 or 14 days will not exceed the 28 day expansion and nonshrink properties are not based on gas or gypsum expansion.
3. Manufacturer's Certificate of Proper Installation.
4. Statements of Qualification: Nonshrink grout manufacturer's representative.
5. Test Reports:
   a. Test report for 24-hour evaluation of nonshrink grout. Independent testing laboratory to certify that testing was conducted within the past 18 months.
   b. Field test reports and laboratory test results for field-drawn samples.

PART 2 PRODUCTS

2.1 NONSHRINK GROUT SCHEDULE

A. Furnish nonshrink grout for applications in grout category in the following schedule:

Application	Temperature Range	Max. Placing Time	
	40 to 100 deg F	20 min	Greater than 20 min
Filling tie holes	I	I	I
Machine bases 25 hp or less	II	II	II
Through-bolt openings	II	II	II
Patching concrete walls	II	II	II
Machine bases 26 hp and up	III	III	III
Baseplates and/or soleplates with vibration, thermal movement, etc.	III	III	III

2.2 NONSHRINK GROUT

A. Category I:

1. Nonmetallic and nongas-liberating flowable fluid.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Test in accordance with ASTM C1107-91:
   a. Flowable consistency 140 percent, five drops in 30 seconds, in accordance with ASTM C230-90.
   b. Flowable for 15 minutes.
4. Grout shall not bleed at maximum allowed water.
5. Minimum strength of grout, 3,000 psi at 3 days, 5,000 psi at 7 days, and 7,000 psi at 28 days.
6. Manufacturers and Products:
   a. Master Builders Co., Cleveland, OH; SET GROUT.
   b. Euclid Chemical Co., Cleveland, OH; NS Grout.
   c. Dayton Superior Corp., Miamisburg, OH; Sure-Grip High Performance Grout.

B. Category II:

1. Nonmetallic, nongas-liberating flowable fluid.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
4. Test in accordance with CRD-C621-83 and ASTM C1107-91, Grade B:
   a. Fluid consistency 20 to 30 seconds in accordance with CRD-C611-81.
   b. Temperatures of 40, 80, and 100 degrees F.
5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
6. Minimum strength of grout, 2,500 psi at 1 day, 4,500 psi at 3 days, and 7,000 psi at 28 days.
7. Maintain fluid consistency when mixed in 1 to 9 yard loads in ready-mix truck.
8. Manufacturers and Products:
   a. Master Builders Co., Cleveland, OH; Master Flow 928.
   b. Five Star Products Inc., Fairfield, CT; Five Star 100.
   c. Euclid Chemical Co., Cleveland, OH; Hi Flow Grout.

C. Category III:

1. Metallic and nongas-liberating flowable fluid.
2. Prepackaged aggregate grout requiring only the addition of water.
3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
4. Test in accordance with CRD-C621-83 and ASTM C1107-91, Grade B:
   a. Fluid consistency 20 to 30 seconds in accordance with CRD-C611-81.
   b. Temperatures of 40 and 100 degrees F.
5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
6. Minimum strength of grout, 4,000 psi at 1 day, 5,000 psi at 3 days, and 9,000 psi at 28 days.
7. Maintain fluid consistency when mixed in 1 to 9 yard loads in ready-mix truck.
8. Manufacturers and Products: Master Builders Co., Cleveland, OH; EMBECO 885.

2.3 GROUT FOR HORIZONTAL CONSTRUCTION JOINTS IN WALLS

A. Flowable, consisting of sand, water, and minimum 12 sacks of cement per cubic yard.

PART 3 EXECUTION

3.1 NONSHRINK GROUT

A. General: Mix, place, and cure nonshrink grout in accordance with grout manufacturer's representative training instructions.

B. Form Tie or Through-Bolt Holes: Provide nonshrink grout, Category I and II, fill space with dry pack dense grout hammered in with steel tool and hammer. Through-bolt holes, coordinate dry pack dense grout application with vinyl plug in Section 03100, CONCRETE FORMWORK and bonding agent in Section 03300, CAST-IN-PLACE CONCRETE.

C. Grouting Machinery Foundations:

1. Block out original concrete or finish off at distance shown below bottom of machinery base with grout. Prepare concrete surface by sandblasting, chipping, or by mechanical means to remove any soft material.
2. Set machinery in position and wedge to elevation with steel wedges, or use cast-in leveling bolts.
3. Form with watertight forms at least 2 inches higher than bottom of plate.
4. Fill space between bottom of machinery base and original concrete in accordance with manufacturer's representative training instructions.

3.2 HORIZONTAL CONSTRUCTION JOINTS IN REINFORCED CONCRETE WALLS

A. Use positive measuring device such as a bucket or other device that will contain only enough sand-cement grout, for depositing in one place in wall to ensure that portion of form does not receive too much grout. Limit grout placement to 2-inch maximum thickness.

B. Do not deposit grout from pump hoses or large concrete buckets, unless inspection windows close to joint are available to allow visual measurement of grout thickness and means for excess grout removal are available.

3.3 FIELD QUALITY CONTROL

A. Evaluation and Acceptance of Nonshrink Grout:

1. Consistency: As specified in Article NONSHRINK GROUTS. Reject grout with consistencies outside range requirements.
2. Segregation: As specified in Article NONSHRINK GROUTS. Reject grout when aggregate separates.
3. Nonshrink grout cubes shall test equal to or greater than minimum strength.

4. Strength Test Failures: Reject nonshrink grout work failing strength tests, remove and replace grout.
5. Perform bleeding test to demonstrate grout will not bleed.
6. Store cubes at 70 degrees F.
7. Independent testing laboratory shall prepare, store, cure, and test cubes in accordance with CRD-C621-83.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 05500
METAL FABRICATIONS AND CASTINGS

PART 1 GENERAL

1.1 SUBMITTALS

A. Shop Drawings:

1. Metal fabrications, including welding and fastener information.
2. Specific instructions for concrete anchor installation, including drilled hole size, preparation, placement, procedures, and instructions for safe handling of anchoring systems.

B. Quality Control Submittals:

1. Adhesive Anchors:
   a. Manufacturer's product description and installation procedures.
   b. Current test data or ICBO evaluation report.
   c. Adhesive Anchor Installer Certification.
2. Welder/welding operator qualifications.

1.2 QUALITY ASSURANCE

A. Qualifications:

1. Adhesive Anchor Installers: Trained and certified by manufacturer.
2. Welder/Welding Operator: In accordance with AWS D1.1-96 (Annex E), AWS B2.1-84 (App. A), or ASME BPVC SEC IX-95 (Form QW-484).

1.3 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Shipment:

1. Insofar as practical, factory assemble items specified herein.
2. Package and clearly tag parts and assemblies that are of necessity shipped unassembled, in a manner that will protect materials from damage, and facilitate identification and field assembly.

B. Storage of Adhesive:

1. Store adhesive cartridges on pallets or shelving in a covered storage area.

2. Control storage temperature in accordance with manufacturer's written instructions.
3. Dispose of cartridges if shelf life has expired.

PART 2 PRODUCTS

2.1 GENERAL

A. Unless otherwise indicated, meet the following requirements:

Item	ASTM Reference
Steel Shapes and Plates	A36 REV B-93
Stainless Steel:	
Bars	A276-92, AISI Type 316
Shapes	A276-92, AISI Type 304
Steel Plate, Sheet, and Strip	A167-92b, AISI Type 316
Bolts and Threaded Rods	A193-92, AISI Type 316, B8MN, B8M2, or B8M3
Nuts	A194-92a, AISI Type 316, B8MN, B8M2, or B8M3

2.2 CONCRETE AND MASONRY ANCHORS

A. General:

1. AISI Type 316 stainless steel.
2. Current evaluation and acceptance reports by ICBO or other similar code organization.

B. Adhesive Anchors:

1. Anchor Rod:
   a. Stainless steel threaded rod, diameter as shown.
   b. Length as required to provide minimum depth of embedment.
   c. Clean and free of grease, oil, or other deleterious material.
2. Adhesive:
   a. ASTM C881-90.
   b. Two-component, insensitive to moisture, designed to be used in adverse freeze/thaw environments, with gray color after mixing.
   c. Cure Temperature, Pot Life, and Workability: Compatible for intended use and environmental conditions.

d. Nonsag, with selected viscosity based on installation temperature and overhead application where applicable.

3. Packaging:
   a. Disposable, self-contained cartridge system capable of dispensing both components in the proper mixing ratio and fitting into a manually or pneumatically operated caulking gun.
   b. Cartridge Markings: Include manufacturer's name, product name, material type, batch or serial number, and adhesive expiration date.
4. Manufacturers and Products:
   a. Adhesives Technology Corp., Kent, WA; Anchor-It Fastening Systems, HS 200 Epoxy.
   b. ITW Ramset/Red Head, Wood Dale, IL; Epcon Ceramic 6 Epoxy Anchor System.
   c. Covert Operations Inc., Signal Hill, CA; CIA-Gel 7000 Epoxy Anchors.
   d. The Rawlplug Co., Inc., New Rochelle, NY; Foil Fast Epoxy Injection Gel System.
   e. Hilti, Inc., Tulsa, OK; HIT Doweling Anchor System (HIT C-100).
   f. Ackerman Johnson Fastening Systems, Inc., Addison, IL; Poly-All PAC-24 Epoxy.
   g. Unitex, Kansas City, MO; Pro-Poxy 300.

2.3 ACCESS COVERS

A. Sidewalk Doors:

1. Exterior type waterproof aluminum single- or double-leaf.
2. Component Fabrication:
   a. Access Door Leaf(s): 1/4-inch diamond pattern plate with reinforcing on underside to withstand live load of 300 pounds per square foot with maximum deflection of 1/150th of the span.
   b. Channel Frame: 1/4-inch with full anchor flange around perimeter.
   c. Equip door(s) with heavy forged brass or stainless steel hinges with stainless steel pins.
   d. Hinges:
      1) Through-bolt to cover with tamper-proof stainless steel bolts or "lock bolts" to resist vandalism.
      2) Through-bolted to frame with stainless steel bolts and fiber locknuts.
   e. Equip doors with fully enclosed and lubricated compression springs with lower enclosing telescopic tube locked into supporting "boot" firmly attached to frame to retard downward

motion of door leaves or corrosion-resistant stainless steel gas springs designed to limit to 17 pounds the lifting force required to open.

f. Equip doors with hold-open arm with positive locking device with conveniently positioned release handle for easy and controlled closing.

g. Furnish stainless steel snap lock mounted on bottom of leaf with removable topside handle and socket recessed in cover and provided with threaded plug for flush surface with handle removed.

h. Locate 1-1/2-inch drainage coupling in front right corner of channel frame.

i. Hardware: AISI Type 304 stainless steel.

3. Aluminum Finish: Mill finish with bituminous coating applied to surfaces in contact with concrete.

4. Manufacturers:
   a. Bilco Co., New Haven, CT.
   b. Or equal.

2.4 ACCESSORIES

A. Neoprene Gasket:

1. ASTM D1056-91 RE-41-E, soft, closed-cell neoprene gasket material, suitable for exposure to sewage and sewage gases, unless otherwise shown.
2. Thickness: Minimum 1/4-inch.
3. Furnish without skin coat.
4. Manufacturers and Products:
   a. Rubatex Division of Great American Industries, Bedford, VA; Rubatex No. R-411-N.
   b. Garlock Manufacturing, San Francisco, CA.

2.5 FABRICATION

A. Materials: Use steel shapes unless otherwise noted.

B. Fabrication:

1. Fabricate as shown on Drawings and in accordance with ASTM A385-80.
2. Welding:
   a. Weld connections and grind exposed welds smooth. When required to be watertight, make welds continuous.

b. Steel:
   1) Meet requirements of AWS D1.1-96 for techniques of welding employed, appearance, quality of welds made, and the methods of correcting defective work.
   2) Meet visual acceptance standards of AWS D1.1-96, paragraph 8.15.1.
   3) Complete welding before applying finish.
c. Aluminum: Meet requirements of AWS D1.2-90.

3. Use fasteners as shown or scheduled.
4. Grind cut edges smooth and straight.

C. Finish: For aluminum items to be embedded in concrete, coat with wash primer (0.4 MDFT) and bituminous paint (10 MDFT).

D. Accessories: Furnish as required for a complete installation. Fasten by welding or with stainless steel bolts or screws.

E. Aluminum:

1. Fabricate in accordance with AA 30-86 and manufacturers' recommendations as approved.
2. Grind smooth sheared edges exposed in finished work.

PART 3 EXECUTION

3.1 INSTALLATION OF METAL FABRICATIONS

A. General:

1. Install metal fabrications plumb or level, accurately fitted, free from distortion or defects.
2. Install rigid, substantial, and neat in appearance.
3. Install manufactured products in accordance with manufacturer's recommendations.
4. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
5. Field weld components indicated.
6. Perform field welding in accordance with AWS D1.1-96.
7. Obtain ENGINEER approval prior to site cutting or making adjustments not scheduled.

B. Erection Tolerances:

1. Maximum Offset from True Alignment: 1/4-inch.

3.2 CONCRETE AND MASONRY ANCHORS

A. Begin installation only after concrete or masonry to receive anchors has attained design strength.

B. Do not install an anchor closer than six times its diameter to an edge of concrete or masonry or closer than twelve diameters to another anchor, unless shown otherwise.

C. Install in accordance with manufacturer's instructions.

D. Use only drill type and diameter recommended by anchor manufacturer. Clean hole of debris and dust with brush and compressed air.

E. Do not install when temperature of concrete is below 40 degrees F or above 100 degrees F.

3.3 ACCESS COVERS

A. Install in accordance with manufacturer's instructions.

B. Accurately position prior to placing concrete, such that covers are flush with floor surface.

C. Protect from damage resulting from concrete placement. Thoroughly clean exposed surfaces of concrete spillage to obtain a clean, uniform appearance.

3.4 ELECTROLYTIC PROTECTION

A. Aluminum:

1. Where embedded in concrete, protect surfaces with wash primer (0.4 MDFT) and bituminous paint (10 MDFT).
2. Allow coating to dry before installation of the material.
3. Protect coated surfaces during installation.
4. Should coating become marred, prepare and touch up in accordance with paint manufacturer's written instructions.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 07300
FIBERGLASS SHELTER

PART 1 GENERAL

1.1 WORK OF THIS SECTION

A. This section includes the design, fabrication, and installation of the fiberglass shelter.

1.2 SUBMITTALS

A. Shop Drawings:

1. Complete catalog information, descriptive literature, specifications and identification of material of construction.
2. Shop drawings showing inside and outside dimensions and locations of factory installed equipment.
3. Electrical wiring diagrams.
4. Manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 GENERAL

A. Shelter shall be completely pre-assembled by the factory and shipped to the site for installation. No construction, other than installation of the shelter, shall be required at the site.

2.2 BACKFLOW PREVENTER SHELTER CONSTRUCTION

A. Furnish corrosion-resistant molded fiberglass enclosure with 1-inch polyurethane insulation. Size as required to cover backflow preventer, heater, and hose valve.

B. Cover shall be hinged with stainless steel hinges with stainless steel bolts.

C. Provide stainless steel hasp for locking cover.

D. Color for cover exterior shall be Lilly Gel Coat Color No. 2-0008.

E. Manufacturers:

1. NFE, Inc.:
   a. Brand: Hot Box.
   b. Style: Lock Box.

2. Or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Shelter shall be installed in accordance to manufacturer's instructions.

B. Shelter shall be located on concrete pad as shown on the Drawings.

C. Use stainless steel mounting hardware.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 09902
PAINTING

PART 1 GENERAL

1.1 ABBREVIATIONS

ANSI	American National Standards Institute
AWWA	American Water Works Association
FRP	Fiberglass Reinforced Plastic
HC1	Hydrochloric Acid
MDFT	Minimum Dry Film Thickness
MDFTPC	Minimum Dry Film Thickness Per Coat
mil	Thousandths of an Inch
MIL-P	Military Specification - Paint
NACE	National Association of Corrosion Engineers
OSHA	Occupational Safety and Health Act
PSDS	Paint System Data Sheet
SFPG	Square Feet Per Gallon
SFPGPC	Square Feet Per Gallon Per Coat
SP	Surface Preparation
SSPC	Steel Structures Painting Council

1.2 SUBMITTALS

A. Product Data: Furnish the following:

1. Data Sheets:
   a. For each paint system used herein, furnish a Paint System Data Sheet (PSDS), Technical Data Sheets, and paint colors available (where applicable) for each product used in the paint system, except for products applied by equipment manufacturers. A sample PSDS form is appended to the end of this section.
   b. Submit required information on a system-by-system basis.
   c. Also provide copies of paint system submittals to the coating applicator.
   d. Indiscriminate submittal of manufacturer's literature only is not acceptable.

1.3 PAINT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in unopened containers that plainly show, at time of use, designated name, date of manufacture, color, and manufacturer.

B. Store paints in a protected area that is heated or cooled to maintain temperature range recommended by paint manufacturer.

C. Shipping:

1. Where precoated items are to be shipped to the jobsite, protect coating from damage. Batten coated items to prevent abrasion.
2. Use nonmetallic or padded slings and straps in handling.
3. Items will be rejected for excessive damage.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Do not apply paint in extreme heat, temperatures below 40 degrees F, nor in dust, smoke-laden atmosphere, damp or humid weather.

B. Do not perform abrasive blast cleaning whenever relative humidity exceeds 85 percent, nor whenever surface temperature is less than 5 degrees F above dewpoint of ambient air. Strictly adhere to coating manufacturer's recommendations.

1.5 WARRANTY

A. The CONTRACTOR and coating manufacturer shall jointly and severally warrant to the OWNER and guarantee the work under this section against defective workmanship and materials for a period of 1 year commencing on the date of final acceptance of the work.

PART 2 PRODUCTS

2.1 PAINT AND COATINGS MANUFACTURERS

A. The letter code will be found following the generic descriptions of materials outlined in the Specifications. General office addresses are given; contact them for information regarding their representative nearest the project site.

1. MANUFACTURER CODE A - COATINGS MANUFACTURERS (Able to supply most heavy-duty industrial coatings and architectural paints):
   a. Ameron Protective Coatings, Brea, CA.
   b. Carboline Coatings Company, St. Louis, MO.
   c. Devoe & Raynolds, Louisville, KY.

d. Porter-International, Louisville, KY.
e. Valspar Corporation, Azusa, CA.

2. MANUFACTURER CODE B - PAINT MANUFACTURERS (Able to supply most architectural and institutional paints):
   a. Ameritone, Long Beach, CA.
   b. Fuller/O'Brien Paint Company, San Francisco, CA.
   c. Benjamin Moore Paints, New York, NY.
   d. Pratt & Lambert, Inc., Buffalo, NY.
   e. Sherwin Williams, Cleveland, OH.

2.2 PAINT MATERIALS

A. Products shall comply with federal, state, and local requirements limiting the emission of volatile organic compounds. Specific information may be secured through the local office of the Air Pollution Control Officer.

B. Materials Including Primer and Finish Coats: Produced by same paint manufacturer.

C. Thinners, Cleaners, Driers, and Other Additives: As recommended by paint manufacturer of the particular coating.

D. Paint products as follows are listed according to their approximate order of appearance in the paint systems. The letter designating the manufacturer code refers to Article PAINT AND COATINGS MANUFACTURERS.

Product	Definition
Polyamide, Anti-Corrosive, Epoxy Primer	Converted epoxy primer containing rust-inhibitive pigments MANUFACTURER CODE: A
Coal-Tar Epoxy	Amine or polyamide type; 70% volume solids minimum, suitable for immersion service MANUFACTURER CODE: A
Bituminous Paint	Single-component, coal-tar pitch based MANUFACTURER CODE: A
Polyurethane Enamel	Two-component, aliphatic or acrylic based polyurethane; high gloss finish MANUFACTURER CODE: A-B

2.3 COLORS

A. Provide as selected by OWNER.

B. Formulate with colorants free of lead, lead compounds, or other materials which might be affected by presence of hydrogen sulfide or other gas likely to be present at the project.

2.4 TESTING GAUGES

A. Furnish a magnetic type dry film thickness gauge, to test coating thickness specified in mils, as manufactured by:

1. Nordson Corp., Anaheim, CA, Mikrotest.
2. Or equal.

PART 3 EXECUTION

3.1 GENERAL

A. Surface Preparation Inspection:

1. Inspect and provide substrate surfaces prepared in accordance with these Specifications and the printed directions and recommendations of paint manufacturer whose product is to be applied.
2. Provide ENGINEER minimum 3 days' advance notice prior to start of surface preparation work or coating application work.
3. Perform such work only in presence of ENGINEER, unless ENGINEER grants prior approval to perform such work in ENGINEER's absence.

B. For coatings subject to immersion, obtain full cure for completed system. Consult coatings manufacturer's written instructions for these requirements. Do not immerse coating for any purpose until completion of curing cycle.

C. The intention of these Specifications is for existing and new, interior and exterior metal and submerged metal surfaces to be painted, whether specifically mentioned or not.

D. Do not apply paint in temperatures exceeding manufacturer's recommended maximum or minimum allowable, or in dust, smoke-laden atmosphere, damp or humid weather.

E. Do not perform abrasive blast cleaning whenever relative humidity exceeds 85 percent, or whenever surface temperature is less than 5 degrees F above dewpoint of ambient air.

3.2 SURFACES NOT REQUIRING PAINTING

A. Unless otherwise stated herein or shown, the following areas or items will not require painting:

1. Concrete and masonry surfaces.
2. Nonferrous and corrosion-resistant ferrous alloys such as copper, bronze, monel, aluminum, chromium plate, atmospherically exposed weathering steel, and stainless steel, except where:
   a. Required for electrical insulation between dissimilar metals.
   b. Aluminum and stainless steel are embedded in concrete or masonry, or aluminum is in contact with concrete or masonry.
3. Nonmetallic materials such as glass, PVC, wood, porcelain, and plastic (FRP) except as required for architectural painting or color coding.
4. Prefinished electrical and architectural items such as motor control centers, switchboards, switchgear, panelboards, transformers, disconnect switches, acoustical tile, cabinets, elevators, building louvers, wall panels, etc.; color coding of equipment is required.
5. Nonsubmerged electrical conduits attached to unpainted concrete surfaces.
6. Items specified to be galvanized after fabrication unless specified elsewhere or subject to immersion.
7. Insulated piping and/or insulated piping with jacket will not require exterior coating, except as required for architectural painting or color coding.

3.3 PROTECTION OF MATERIALS NOT TO BE PAINTED

A. Remove, mask, or otherwise protect hardware, lighting fixtures, switchplates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted.

B. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces.

C. Protect working parts of mechanical and electrical equipment from damage. Mask openings in motors to prevent paint and other materials from entering.

D. Mask openings in motors to prevent paint and other materials from entering the motors.

3.4 APPLICATION SAFETY

A. Perform painting in accordance with recommendations of the following:

1. Paint manufacturer's instructions.

2. NACE, contained in the publication, Manual for Painter Safety.
3. Federal, state, and local agencies having jurisdiction.

B. CONTRACTOR will be solely and completely responsible for conditions of the jobsite, including safety of all persons (including employees) and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours. Safety provisions will conform to U.S. Department of Labor, Occupational Safety and Health Act, any equivalent state law, and all other applicable federal, state, county, and local laws, ordinances, and codes.

C. CONTRACTOR will comply with all safety training requirements promulgated or required for this project.

3.5 PAINT MIXING

A. Keep paint materials sealed when not in use.

B. Where more than one coat of a material is applied within a given system, alternate color to provide a visual reference that the required number of coats have been applied.

3.6 SHOP BLAST CLEANING

A. Structural steel items may be shop prepared and primed. Centrifugal wheel blast cleaning is an acceptable alternate to shop blast cleaning. Blast clean and prime work in accordance with these Specifications.

B. Finish Painting at Jobsite: As specified herein.

3.7 FIELD SANDBLASTING

A. Perform sandblasting for items and equipment where specified and as required to restore damaged surfaces previously shop or field blasted and primed. Materials, equipment, procedures shall meet requirements of Steel Structures Painting Council.

3.8 PREPARATION OF SURFACES

A. Metal Surface Preparation:

1. General:
   a. Conform to current Steel Structures Painting Council (SSPC) Specifications as follows:
      1) Solvent Cleaning: SP 1.
      2) Hand Tool Cleaning: SP 2.

3) Power Tool Cleaning: SP 3.
4) White Metal Blast Cleaning: SP 5.
5) Commercial Blast Cleaning: SP 6.
6) Brush-Off Blast Cleaning: SP 7.
7) Pickling: SP 8.
8) Near-White Blast Cleaning: SP 10.
9) Power Tool Cleaning to Bare Metal: SP 11.

b. Where OSHA or EPA regulations preclude standard abrasive blast cleaning, wet or vacu-blast methods may be required. Follow coatings manufacturers' recommendations for wet blast additives and first coat application.

c. Hand tool clean areas that cannot be cleaned by power tool cleaning.

2. Blast Cleaning Requirements:

a. Comply with applicable federal, state, and local, air pollution and environmental control regulations for blast cleaning and disposition of spent aggregate and debris.

b. Alternatives to standard abrasive blast cleaning methods subject to ENGINEER review.

3.9 APPLICATION OF PAINT

A. General:

1. Inspection: Schedule with ENGINEER in advance for cleaned surfaces and all coats prior to succeeding coat.
2. Apply coatings in accordance with paint manufacturer's recommendations. Allow sufficient time between coats to assure thorough drying of previously applied paint.

B. Shop Primed or Factory Finished Surfaces:

1. Inspection: Schedule with ENGINEER in advance for shop primed or factory finished items delivered to jobsite for compliance with Specifications.
2. Hand or power sand areas of chipped, peeled, or abraded coating, feathering the edges. Follow with a spot primer using specified primer.
3. Prior to application of finish coats, clean shop primed surfaces free of dirt, oil, and grease and apply mist coat of specified primer, 1-mil dry film thickness.
4. After welding, prepare and prime holdback areas as required for specified paint system. Apply primer in accordance with manufacturer's instructions.

C. Manufacturer Applied Paint Systems:

1. Repair abraded areas on factory finished items in accordance with the equipment manufacturer's directions.
2. Carefully blend repaired areas into original finish.

D. Film Thickness:

1. Coverage is listed as either total minimum dry film thickness in mils (MDFT) or the spreading rate in square feet per gallon (SFPG). Per coat determinations are listed as MDFTPC or SFPGPC.
2. Number of Coats: Minimum required irrespective of coating thickness. Additional coats may be required to obtain minimum required paint thickness, depending on method of application, differences in manufacturers' products, and atmospheric conditions.
3. Maximum film build per coat shall not exceed coating manufacturer's recommendations.
4. Film Thickness Measurements of Coated Surfaces:
   a. Perform with properly calibrated instruments.
   b. Recoat and repair as necessary for compliance with the Specifications.
   c. All coats will be subject to inspection by ENGINEER and coating manufacturer's representative.
5. Give particular attention to edges, angles, flanges, and other similar areas, where insufficient film thicknesses are likely to be present, and ensure proper millage in these areas.
6. Thickness Testing:
   a. After repaired and recoated areas have dried sufficiently, final tests will be conducted by the ENGINEER.
   b. Measure coating thickness specified in mils with a magnetic type dry film thickness gauge as specified.
   c. Check each coat for correct millage. Do not make measurement before a minimum of 8 hours after application of coating.

E. Damaged Coatings, Pinholes, and Holidays:

1. Feather edges and repair in accordance with recommendations of paint manufacturer.
2. Apply finish coats, including touchup and damage-repair coats, in a manner which will present a uniform texture and color-matched appearance.

F. Unsatisfactory Application:

1. If item has improper finish color or insufficient film thickness, clean and top coat surface with specified paint material to obtain specified color and coverage. Obtain specific surface preparation information from coating manufacturer.
2. Hand or power sand visible areas of chipped, peeled, or abraded paint, and feather the edges. Follow with primer and finish coat in accordance with the Specifications. Depending on extent of repair and appearance, a finish sanding and topcoat may be required.
3. Evidence of runs, bridges, shiners, laps, or other imperfections shall be cause for rejection.
4. Repair defects in coating system per written recommendations of coating manufacturer.
5. Leave all staging up until ENGINEER has inspected surface or coating. Replace staging removed prior to approval by ENGINEER.

3.10 CLEANUP

A. Place cloths and waste that might constitute a fire hazard in closed metal containers or destroy at the end of each day.

B. Upon completion of the work, remove staging, scaffolding, and containers from the site or destroy in a legal manner.

C. Completely remove paint spots, oil, or stains upon adjacent surfaces and floors and leave entire job clean.

3.11 PROTECTIVE COATINGS SYSTEMS

A. System No. 2 Submerged Metal - Domestic Sewage:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 5)	Prime in accordance with manufacturer's recommendations	
	Coal-Tar Epoxy	2 coats, 16 MDFT

B. System No. 5 Exposed Metal - Mildly Corrosive:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 10)	Polyamide, Anti-Corrosive Epoxy Primer	1 coat, 2.5 MDFT
	Polyurethane Enamel	1 coat, 3 MDFT

C. System No. 27 Aluminum and Dissimilar Metal Insulation:

Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1)	Wash Primer	1 coat, 0.4 MDFT
	Bituminous Paint	1 coat, 10 MDFT

3.12 PAINT APPLICATION SCHEDULE

A. Unless otherwise shown or specified in these Specifications, paint or coat the work in accordance with the following application schedule. In the event of discrepancies or omissions in the following, request clarification from the ENGINEER before starting work in question.

B. System No. 2 Submerged Metal - Domestic Sewage: Use on the following items or areas:

1. Ductile iron piping inside wet well.

C. System No. 5 Exposed Metal - Mildly Corrosive: Use on the following items or areas:

1. Exposed metal surfaces, piping, and valves, located inside valve vaults.

D. System No. 27 Aluminum and Dissimilar Metal Insulation: Use on concrete embedded aluminum surfaces.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

4.2 SUPPLEMENTS

A. The supplements listed below, following "END OF SECTION," are a part of this Specification.

1. Paint System Data Sheet.

END OF SECTION

PAINT SYSTEM DATA SHEET

Attached products' Technical Data Sheet (if applicable) to this sheet for each paint system submittal.

Paint System Number (from Spec.):		
Paint System Title (from Spec.):		
Coatings Supplier:		
Representative:		
Surface Preparation:		
Paint Material (Generic)	**Product Name/Number (Proprietary)**	**Min. Coats Coverage**

SECTION 11305
SUBMERSIBLE PUMPS

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. National Fire Protection Association (NFPA):
   a. 70, National Electric Code, Article 500.
   b. 497A, Classification of Class I Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.
   c. 820, Recommended Practice for Fire Protection in Wastewater Treatment and Collection Facilities.

1.2 DEFINITIONS

A. Terminology pertaining to pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards.

1.3 SUBMITTALS

A. Shop Drawings:

1. Make, model, weight, and horsepower of each equipment assembly.
2. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
3. Performance data curves showing head, capacity, horsepower demand, and pump efficiency over the entire operating range of the pump, from shutoff to maximum capacity. Indicate separately the head, capacity, horsepower demand, overall efficiency, and minimum submergence required at the guarantee point.
4. Power and control wiring diagrams, including terminals and numbers.
5. Complete motor nameplate data, as defined by NEMA, motor manufacturer, and including any motor modifications.
6. Factory finish system.

B. Quality Control Submittals:

1. Special shipping, storage and protection, and handling instructions.
2. Manufacturer's printed installation instructions.
3. Manufacturer's Certificate of Proper Installation.
4. Suggested spare parts list to maintain the equipment in service for a period of 1 year and 5 years. Include a list of special tools required for

checking, testing, parts replacement, and maintenance with current price information.

5. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
6. Operation and maintenance manual.

1.4 EXTRA MATERIALS

A. Furnish for each pump:

1. One set of mechanical seals for each set of pumps.
2. One complete set of any special tools for each pump size required to dismantle pump.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Flygt Corp. (ITT).

B. For uniformity of equipment, operation, and interchangeability of parts within its pump station system, the OWNER will accept only pumps manufactured by Flygt Corp.

2.2 PUMPING SYSTEM

A. Pump and Electrical Driver: Meet requirements for Class I, Division 1, Group D, location in accordance with NFPA 70.

B. Pump equipment shall consist of pumps complete with motors control system, discharge connections, guide rail and anchoring brackets, power cables, and pump lifting chains.

C. Pump equipment shall include discharge connections that will fit the specified pumps and also fit larger pumps intended to be installed in the future, without having to dewater the wet pit or modify the discharge connections in any way. The pumps to be installed in the future will be Flygt Model CP3300, 88 hp, with 350 mm impellers.

D. One of the pumps shall be provided with a Flygt Mix-Flush System, Model 4901.

2.3 SUPPLEMENTS

A. Some specific requirements are attached to this section as supplements.

2.4 ACCESSORIES

A. Lifting Lugs: Equipment weighing over 100 pounds.

B. Anchor Bolts: Type 316 stainless steel, sized by equipment manufacturer, and as specified in Section 05500, METAL FABRICATIONS AND CASTINGS.

2.5 FACTORY FINISHING

A. Manufacturer's standard baked enamel finish.

2.6 SOURCE QUALITY CONTROL

A. Factory Inspections: Inspect control panels for required construction, electrical connection, and intended function.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's printed instructions.

B. Anchor Bolts: Accurately place using equipment templates and as specified in Section 05500, METAL FABRICATIONS AND CASTINGS.

3.2 FIELD QUALITY CONTROL

A. Functional Test: Conduct on each pump.

1. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
2. Removal: Remove and reinstall pumps to demonstrate proper installation of guide rails, base support, and hatch opening.

B. Performance Test: In accordance with Hydraulic Institute Standards.

3.3 MANUFACTURER'S SERVICES

A. Manufacturer's Representative: Present at site or classroom designated by OWNER, for minimum person-days listed below, travel time excluded:

1. 1 person-day for installation assistance and inspection.
2. 1 person-day for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.

3.4 SUPPLEMENTS

A. The supplements listed below, following "END OF SECTION," are a part of this Specification.

1. Pump Data Sheet.
2. Induction Motor Data Sheet.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

PUMP DATA SHEET

PUMP NAME	EQUIPMENT NUMBER	SPEED TYPE
Raw Sewage Pump	1	Constant
Raw Sewage Pump	2	Constant

PUMP MANUFACTURER	MODEL
FLYGT	NP3171, Impeller 286 mm

SERVICE CONDITIONS	PERFORMANCE REQUIREMENTS
Liquid Pumped: Raw Sewage	Rated Capacity: 630 gpm
Largest Solid: 3 inch	Head at Rated Capacity: 112 feet
Pumping Temperature (PT): 60	Efficiency at Rated Capacity: 69.7 percent
Specific Gravity at PT: 1	Speed at Rated Capacity: 1755 rpm
Viscosity at PT:	
Minimum NPSHA at PT:	

EQUIPMENT DESCRIPTION

Bearing Frame and Volute Casing: Cast Iron.

Suction Cover and Liner: Cast Iron.

Impeller: Cast Iron.

Stuffing Box: Tandem mechanical seals shall be independent mechanical shaft seals, easily replaceable.

Stuffing Box Lubrication: Oil lubrication.

Shaft: Type 316, 420, or 431 stainless steel.

Shaft Sleeve: A276 Type 420 stainless steel.

Bearings: Manufacturers standard heavy duty bearings.

Bearing Lubrication: Grease.

Guide Rails: Type 316 stainless steel double guide rail.

Lifting Chain: Type 316 stainless steel.

Factory Test:

INDUCTION MOTOR DATA SHEET

Project: Chehalem Drive Sewage Pump Station

Owner: City of Newberg

Equipment Name: Raw Sewage Pumps

Equipment Tag Number(s): 1 and 2

Type: Squirrel-cage submersible induction motor.

Manufacturer: For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer

Hazardous Location: ☒ Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing mark

Motor Horsepower: 30

Voltage: 460

Phase: 3

Frequency: 60

Synchronous Speed: 1,800 rpm

☐ Multispeed, Two-Speed:

_____ / _____ rpm

☐ Constant Horsepower

☐ Variable Torque

☐ Constant Torque

Winding: ☐ One ☐ Two

Guaranteed Minimum Efficiency at Full Load: 89.0 percent

Guaranteed Minimum Power Factor at Full Load: 0.87 percent

Service Factor (@ rated max. amb. temp.): ☐ 1.0 ☒ 1.15

Enclosure Type: Submersible

Mounting Type: ☐ Horizontal ☒ Vertical

☐ Vertical Shaft: ☐ Solid ☐ Hollow

☐ Vertical Thrust Capacity (lb): Up _____ Down _____

☐ Adjustable Speed Drive: See Section 16485, ADJUSTABLE FREQUENCY, CONTROLLED SPEED, DRIVE SYSTEMS.

Operating Speed Range: _____ to _____% of Rated Speed

☒ Thermal Protection: Thermal Overload Protection

☐ Space Heater: _____ volts, single phase

☐ Oversize main terminal (conduit) box for motors

☐ Terminal for connection of equipment grounding wire in each terminal box

Additional Motor Requirements: ☐ See Section 16405, AC INDUCTION MOTORS

Special Features:

Provide Flygt Mini-CAS motor monitoring system.

SECTION 15068
DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section covers the work necessary for furnishing and installing the ductile iron pipe and fittings for the pump discharge piping, complete.

PART 2 PRODUCTS

2.1 JOINTS

A. Pipe joints for raw sewage piping shall be flanged joints, except where specifically shown or detailed otherwise.

B. Fitting joints for raw sewage piping shall be flanged ends, except where specifically shown or detailed otherwise.

2.2 FLANGED DUCTILE IRON FITTINGS

A. Flanged fittings shall conform to ANSI B16.1 and shall be faced and drilled 125-pound ANSI. The fittings shall be 125 psi rated working pressure and cement-mortar lined to same thickness specified for pipe.

2.3 FLANGED COUPLING ADAPTORS

A. All flanged coupling.

B. Manufacturers and Products:

1. Smith-Blair; Series 912.
2. Dresser Industries, Inc.; Style 127.

2.4 GASKETS

A. Gasket material for flanged joints in ductile iron pipe shall be cloth-inserted sheet rubber gaskets conforming to AWWA C207 and ANSI B16.21, 1/8-inch thick. The gasket shall be full-cut, with holes to pass bolts. Gasket material shall be free from corrosive alkali or acid ingredients.

2.5 BOLTS

A. Ductile iron or corten bolts shall be used on all mechanical joints. Stainless steel bolts shall be used on all flanged joints.

2.6 DUCTILE IRON PIPE

A. Ductile iron pipe shall be centrifugally cast of 60-42-10 iron and shall conform to ANSI A21.51 or AWWA C151. Thickness class shall be 52. The pipe shall be cement-mortar lined and seal coated in accordance with ANSI A21.4.

2.7 MANUFACTURER

A. All pipe and fittings shall be by a domestic manufacturer.

2.8 HANDLING

A. Handle the pipe so as to prevent injury to the coating and lining. Place no pipe or other material inside any other pipe at any time after it has been coated.

2.9 IMPORTED GRANULAR MATERIAL FOR PIPE BASE AND FOR PIPE ZONE

A. For pipe 18 inches in diameter and smaller use crushed rock with a maximum size of 3/4-inch, uniformly graded from coarse to fine.

2.10 MODULAR MECHANICAL SEAL

A. Type: Interconnected synthetic rubber links shaped and sized to continuously fill annular space between pipe and wall sleeve opening.

B. Fabrication: Assemble interconnected rubber links with ASTM A276-94, Type 316 stainless steel bolts, nuts, and pressure plates.

C. Size: According to manufacturer's instructions for the size of pipes shown to provide a watertight seal between pipe and wall sleeve opening, and to withstand a hydrostatic head of 40 feet of water.

D. Manufacturer: Thunderline Link-Seal.

PART 3 EXECUTION

3.1 PREPARATION OF TRENCH

A. Grade: Grade the bottom of the trench by hand to the line and grade to which the pipe is to be laid, with proper allowance for pipe thickness and for pipe

base when specified or indicated. Before laying each section of the pipe, check the grade and correct any irregularities found.

B. Imported Granular Material for Pipe Base: Provide imported granular material for pipe base under all pipe. Place granular base for pipe in the trench to a minimum depth of 4 inches. Grade the top of the base to the bottom of the pipe ahead of pipe laying for the full width of the trench. Base shall provide a firm support along entire pipe length.

C. Removal of Water: Provide and maintain ample means and devices at all times to remove and dispose of all water entering the trench excavation during the process of pipe laying.

3.2 LAYING

A. Handling Material: Provide and use proper implements, tools, and facilities for the safe and proper prosecution of the work. Lower all pipe, fittings, and appurtenances into the trench, piece by piece, by means of a crane, slings, or other suitable tools or equipment, in such a manner as to prevent damage to the pipeline materials and protective coatings and linings. Do not drop or dump pipeline materials into the trench.

B. Cleaning Pipe and Fittings: Wipe the ends of pipe and fittings clean of all dirt, grease, and foreign matter.

C. Cutting Pipe:

1. General: Cut pipe for inserting valves, fittings, or closure pieces in a neat and workmanlike manner without damaging the pipe or lining and so as to leave a smooth end at right angles to the axis of the pipe.
2. Ductile Iron Pipe: Cut pipe with milling type cutter or saw. Do not flame cut.
3. Dressing Cut Ends: Dress cut ends of push-on joint pipe by beveling, as recommended by the manufacturer.

D. Unsuitable Conditions for Laying Pipe: Do not lay pipe in water or when, in the opinion of the ENGINEER, trench conditions are unsuitable.

3.3 DEFINITION OF PIPE ZONE

A. The pipe zone shall include the full width of the trench from the bottom of the pipe to a point 12 inches above the top of the pipe barrel.

3.4 IMPORTED GRANULAR MATERIAL

A. Import and place imported granular material as hereinbefore specified.

B. Imported granular material shall be used for the full depth of the pipe zone. This material shall be placed, in a manner approved by the ENGINEER, simultaneously on both sides of pipe in lifts not to exceed 6 inches. Each lift shall be compacted with mechanical vibrating or impact tampers as required to prevent subsequent settlement.

3.5 LEAKAGE INSPECTION

A. Exposed piping will be visually inspected during startup of the pump station. All leakage shall be repaired.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 15100
VALVES AND OPERATORS

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American National Standards Institute (ANSI):
   a. B16.1, Cast Iron Pipe Flanges and Flanged Fittings.
   b. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
2. American Water Works Association (AWWA):
   a. C508, Standard for Swing-Check Valves for Waterworks Service, 2 in. Through 24 in. NPS.
   b. C550, Protective Epoxy Interior Coatings for Valves.

1.2 SUBMITTALS

A. Shop Drawings:

1. Product data sheets for make and model.
2. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.

B. Quality Control Submittals: Operation and maintenance manual.

PART 2 PRODUCTS

2.1 GENERAL

A. Valve to include operator, actuator, handwheel, extension stem, worm and gear operator, operating nut, wrench, and accessories for a complete operation.

B. Valve to be suitable for intended service. Renewable parts not to be of a lower quality than specified.

C. Valve same size as adjoining pipe.

D. Valve ends to suit adjacent piping.

E. Size operator to operate valve for the full range of pressures and velocities.

F. Valve to open by turning counterclockwise.

G. Factory mount operator, actuator, and accessories.

2.2 MATERIALS

A. Brass and bronze valve components and accessories that have surfaces in contact with water to be alloys containing less than 16 percent zinc and 2 percent aluminum.

B. Approved alloys are of the following ASTM designations:

1. B61, B62, B98 (Alloy UNS No. C65100, C65500, or C66100), B139 (Alloy UNS No. C51000), B584 (Alloy UNS No. C90300 or C94700), B164, B194, and B127.
2. Stainless steel Alloy 18-8 may be substituted for bronze.

2.3 FACTORY FINISHING

A. Epoxy Lining and Coating:

1. In accordance with AWWA C550 unless otherwise specified.
2. Either two-part liquid material or heat-activated (fusion) material except only heat-activated material if specified as "fusion" or "fusion bonded" epoxy.
3. Minimum 7-mil dry film thickness except where limited by valve operating tolerances.

B. Exposed Valves: Coat valves the same as coating on connecting pipe.

2.4 VALVES

A. Plug Valves:

1. Plug Valves 3 Inches to 12 Inches:
   a. Nonlubricated type rated 175 psig CWP, drip-tight shutoff with pressure from either direction, cast iron body with flanged ends in accordance with AWWA C606 for rigid joints,.
   b. Plug cast iron with round or rectangular port of no less than 80 percent of connecting pipe area and coated with Buna-N or Hycar seats welded nickel, stem bearing self-lubricating stainless steel or bronze, stem seal multiple V-rings, U-cups, or O-rings of nitrile rubber grit seals on steam.
   c. Operators: Totally enclosed, geared, manual operator with handwheel.
   d. Manufacturers and Products:
      1) Pratt; Ballcentric.
      2) DeZurik; Style PEC.

3) Clow; F-5400 Series.
4) Milliken; Millcentric Series 600.

B. Check Valves:

1. Swing Check Valves 2 Inches Through 36 Inches:
   a. AWWA C508, flanged end, cast iron body, bronze mounted valve, solid bronze hinges, stainless steel hinge shaft.
   b. Valve 2 inches through 12 inches rated 175-pound and 14 inches through 36 inches rated 150-pound cold water, nonshock. Valve fitted with adjustable outside lever and spring. Increasing-pattern body valve may be used where increased outlet piping size is shown.
   c. Manufacturers and Products:
      1) M & H Valve; Style 59, 159, or 3259.
      2) American-Darling; No. 50 Line.
2. Reduced Pressure Backflow Preventer: Two check valves, independent relief between the valves; NRS isolation gate valve, testing cock, in accordance with AWWA C511, rated 175-pound CWP, meets requirements of USC Cross Connection Control Laboratory.
   a. Size: 1-inch.
   b. Manufacturers and Products:
      1) FEBCO; Model 825Y, 825YD.
      2) Watts: Model 009MZ.

2.5 OPERATORS

A. Manual Operator:

1. General:
   a. Operator force not to exceed 40 pounds under any operating condition, including initial breakaway. Gear reduction operator when force exceeds 40 pounds.
   b. Operator self-locking type or equipped with self-locking device.
   c. Position indicator on quarter-turn valves.
2. Exposed Operator:
   a. Galvanized and painted handwheels.
   b. Lever operators allowed on quarter-turn valves 8 inches and smaller.
   c. Valve handles to take a padlock.

PART 3 EXECUTION

3.1 INSTALLATION

A. Flange Ends:

1. Flanged valve boltholes shall straddle vertical centerline of pipe.
2. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.

B. Valve Orientation:

1. Install operating stem vertical when valve is installed in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above finished floor, unless otherwise shown.
2. Install operating stem horizontal in horizontal runs of pipe having centerline elevations between 4 feet 6 inches and 6 feet 9 inches above finish floor, unless otherwise shown.

3.2 TESTS AND INSPECTION

A. Valve may be either tested while testing pipelines, or as a separate step.

B. Test that valves open and close smoothly with operating pressure on one side and atmospheric pressure on the other, in both directions for two-way valve and applications.

C. Count and record number of turns to open and close valve; account for any discrepancies with manufacturer's data.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 16005
ELECTRICAL

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. American Society for Testing and Materials (ASTM):
   a. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   b. A240/A240M, Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
   c. A1011/A1011M, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
2. American National Standards Institute (ANSI): C80.1, Rigid Steel Conduit-Zinc Coated.
3. Institute of Electrical and Electronics Engineers, Inc. (IEEE): C62.41, Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
4. National Electrical Contractor's Association, Inc. (NECA): 1, Standard Practices for Good Workmanship in Electrical Contracting.
5. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
   b. CC1, Electrical Power Connectors for Substations.
   c. ICS 1, Industrial Control and Systems: General Requirements.
   d. ICS 2, Industrial Control and Systems - Controllers, Contactors, and Overload Relays Rated Not More Than 2000 Volts AC or 750 Volts DC.
   e. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
   f. TC 2, Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
   g. TC 3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.
   h. WC 70, Standard for Non-Shielded Power Cables Rated 2000 V or Less for the Distribution of Electrical Energy.
6. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
7. Underwriters Laboratories, Inc. (UL):
   a. 6, Electrical Rigid Metal Conduit – Steel.
   b. 13, Power-Limited Circuit Cables.

c. 486A, Wire Connectors and Soldering Lugs for Use with Copper Conductors.
d. 489, Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures.
e. 510, Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
f. 514B, Fittings for Cable and Conduit .
g. 651, Schedule 40 and 80 PVC Conduit.
h. 854, Service-Entrance Cables.
i. 1059, Terminal Blocks.
j. 1277, Electrical Power and Control Tray Cables with Optional Optical-Fibre Members.
k. 1449, Transient Voltage Surge Suppressors.
l. 1561, Dry-Type General Purpose and Power Transformers.

1.2 DEFINITIONS

A. AHJ: Authority Having Jurisdiction.

B. MCOV: Maximum Allowable Continuous Operating Voltage.

C. MOV: Metal Oxide Varistor.

D. SASD: Silicon Avalanche Suppressor Diode.

E. SVR: Surge Voltage Rating.

F. TVSS: Transient Voltage Surge Suppressor.

1.3 SECTION INCLUDES

A. This Section covers the work necessary for complete electrical systems. Furnish materials, labor, and equipment in accordance with these Specifications and the accompanying Drawings.

1.4 INSPECTION OF THE SITE AND EXISTING CONDITIONS

A. Verify all scaled dimensions prior to construction.

B. Before submitting a bid, visit the site and become familiar with all existing conditions which will, in any way or manner, affect the work required under this Contract. No subsequent increase in Contract cost will be allowed for additional work required because of the CONTRACTOR's failure to fulfill this requirement.

1.5 RESPONSIBILITY

A. The CONTRACTOR shall be responsible for:

1. Complete systems in accordance with the intent of these Contract Documents.
2. Furnishing and installing all incidental items not actually shown or specified, but which are required by good practice to provide complete functional systems.
3. Verifying actual locations of all equipment that requires power and control circuit connections as shown on the Drawings.
4. Obtaining and paying for all construction permits and licenses.
5. Paying all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening Bids.

1.6 INTENT OF DRAWINGS

A. Electrical plan drawings are diagrammatic and show only general locations of equipment, devices, and raceway, unless specifically dimensioned. The CONTRACTOR shall be responsible for the complete raceway system. Provide as a minimum what is shown on the Drawings, and provide additional raceway, devices, fittings, boxes, etc., needed to fit the equipment size and/or configuration as supplied subject to the approval of the ENGINEER and at the CONTRACTOR's own expense.

B. In general, the background on electrical Drawings has been screened. Electrical work under this contract is shown heavier by contrast.

C. Details are typical for all locations which apply regardless of whether a callout is shown on the Drawing or not.

1.7 DEPARTURES FROM CONTRACT DOCUMENTS

A. Submit to the ENGINEER in writing details of any necessary, proposed departures from these Contract Documents, and the reasons therefor. Submit such requests as soon as practicable and within 20 days after award of the Contract. Make no such departures without written approval of the ENGINEER.

1.8 SUBSTITUTION OF MATERIALS AND EQUIPMENT

A. Manufacturers' names and catalog numbers stated herein are intended to indicate the type and quality of equipment or materials desired. Unless substitution is specifically forbidden, proposed alternatives may be submitted for approval.

B. Make requests for approval of alternatives in writing to the ENGINEER. Provide sufficient material or data to allow evaluation of the proposed alternative and determination of compliance with these Contract Documents. List any proposed deviations from these Contract Documents.

1.9 SUBMITTALS

A. Provide complete manufacturers' descriptive information and shop drawings for all equipment, material, and devices furnished under this specification Section including arrangement drawings, elementary (schematic) diagrams, interconnection and connection diagrams, etc. Provide five copies for the ENGINEER, CONTRACTOR, and Operation and Maintenance Manuals. On general equipment drawings, clearly indicate those items which are part of the submittal to be reviewed.

B. Submit complete control and interface schematic drawings. These drawings shall contain diagrams, terminal numbers, device names, tag numbers, control cable conductor colors and numbers, etc., to provide complete identification of the circuits and prove coordination between the equipment.

C. Shop Drawings:

1. Portland General Electric (PGE) current transformer cabinet and meter socket and box.
2. Surge arrestor.
3. Mini-power center.
4. Duplex pump controller.
5. Ultrasonic level controller, sensors, and chart recorder.
6. SCADA equipment.
7. Fabricated Control and SCADA Panel, including mounting panel and control and SCADA components layout and wiring diagram.
8. Fabricated wet well power/control disconnect box including mounting panel, power/control receptacles/plugs, and enclosure mounting structure.
9. Luminaires and light pole.
10. Conductors and cables.
11. Conduits.

D. CONTRACTOR shall review, check, and initial all submittals indicating that the submitted items meet the requirements of the Specifications and Drawings.

E. Review of the submittal information by the ENGINEER is for the convenience of the OWNER and the CONTRACTOR to facilitate the satisfactory acceptance of the work required hereunder. This review shall neither relieve the CONTRACTOR from the responsibility for deviations from the Drawings and Specifications, nor from errors and omissions in the

shop drawings or literature. The CONTRACTOR shall obtain ENGINEER's acceptance of submittals before commencing fabrication or installation of any materials or equipment. Equipment found not meeting the requirements of these Specifications and Drawings shall be removed, repaired, or replaced at the CONTRACTOR's own expense. Review by the ENGINEER is limited to one resubmittal per item. Cost of submittal reviews beyond this limit which are required to obtain acceptance shall be reimbursed to the ENGINEER by the CONTRACTOR.

F. Contract Closeout: Signed permits indicating Work is acceptable to regulatory authorities with jurisdiction.

1.10 UL COMPLIANCE

A. Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

1.11 ENERGY SOURCE NAMEPLATES

A. Furnish and install an energy source nameplate on the front of all equipment (mechanical, electrical, instrumentation and control, HVAC, plumbing, etc.) that is connected to one or more electrical sources of power.

B. Electrical equipment on which energy source nameplates are required include mini-power center, power/control receptacles, etc., as applicable.

C. Indicate on the nameplate each power source if equipment is powered from more than one electrical power source. Low voltage power sources include feeder circuit breakers in motor control centers, motor starters in motor control centers, and branch circuit breakers in panelboards.

D. Provide nameplates as specified in Article NAMEPLATES.

1.12 OPERATION AND MAINTENANCE MANUALS

A. Provide three copies of Operation and Maintenance (O&M) Manuals in commercial quality, permanent, three-post binders with durable, cleanable, plastic covers. Each copy shall contain a neatly typewritten table of contents arranged in a systematic order with the CONTRACTOR's name, name of responsible principal, address, and telephone number. The O&M Manuals shall also include:

1. Operation, maintenance, recommended spare parts, and renewal parts information for all equipment furnished under Division 16, ELECTRICAL.
2. Set of complete, final, as-reviewed and accepted information herein required to be submitted for review following Contract award.

3. As-built electric circuit, equipment, and installation drawings showing equipment as it was actually installed and connected (include in the final O&M manual drafts).
4. Index of all equipment suppliers listing current names, addresses, and telephone numbers of those who should be contacted for service, information, and assistance.
5. As-built Contract Drawings marked with red indelible pencil on one set of Contract Drawings to show all departures from original Drawings and all electrical work revisions; prepare by obtaining new, clean sets of Contract Drawings from ENGINEER and pay all costs for same; field marked as-built drawings shall be initialed by the ENGINEER or his representative (include in the final O&M manual drafts).
6. All field and factory test results (include in the final O&M manual final drafts).
7. Complete interconnection diagrams between all control devices showing field wiring from numbered terminal to numbered terminal in block diagram format.
8. Use only clean material. File under dividers with heading in accordance with Specification item title.
9. Submit material to ENGINEER for review prior to delivery of the final Operation and Maintenance Manuals to OWNER. Make additions or changes required by the reviewer.

1.13 INSPECTION

A. Allow materials, equipment, and workmanship to be inspected at any time by the ENGINEER, OWNER, or their representatives. Correct work, materials, or equipment not in accordance with these Contract Documents or found to be deficient or defective in a manner satisfactory to the ENGINEER or OWNER.

1.14 GUARANTEE

A. Guarantee all materials and workmanship furnished to be free from defect for a period of 1 year after final approval. Defective material and workmanship shall be corrected at the CONTRACTOR's own expense.

1.15 QUALIFICATIONS

A. PVC-Coated, Rigid Steel Conduit Installer: Must be certified by the conduit manufacturer as having received minimum 2 hours of training on installation procedures.

B. Testing Firm Qualifications: Professionally independent of manufacturers, suppliers, and installers, or electrical equipment and systems being tested.

PART 2 PRODUCTS

2.1 GENERAL

A. Products shall comply with all applicable provisions of NFPA 70.

B. Like Items of Equipment: End products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's service.

C. Equipment and Devices Installed Outdoors or in Unheated Enclosures: Capable of continuous operation within ambient temperature range of 0 degrees F to104 degrees F.

D. Seismic Zone: Provide materials and equipment suitable for installation and operation under rated conditions in a Seismic Zone 3, Importance Factor 1.0, environment per Uniform Building Code (UBC) requirements.

E. Hazardous Areas: Products shall be acceptable to the regulatory authority having jurisdiction for the class, division, and group of hazardous area indicated.

F. Equipment Finish:

1. Manufacturer's standard finish color, except where specific color is indicated.
2. If manufacturer has no standard color, finish equipment in accordance with ANSI Z55.1, No. 61, light gray.

2.2 SERVICE ENTRANCE EQUIPMENT AND METERING

A. The Portland General Electric meter current transformer cabinet, meter box and meter socket, and their installation and connections shall be per Portland General Electric requirements and approved by Portland General Electric.

2.3 OUTLET AND DEVICE BOXES

A. Cast Metal:

1. Box: Cast ferrous metal.
2. Cover: Gasketed, weatherproof, and cast ferrous metal with stainless steel screws.
3. Hubs: Threaded.
4. Lugs: Cast Mounting.
5. Manufacturers and Products, Nonhazardous Locations:
   a. Crouse-Hinds; Type FS or FD.
   b. Appleton; Type FS or FD.

6. Manufacturers and Products, Hazardous Locations:
   a. Crouse-Hinds; Type GUA or EAJ.
   b. Appleton; Type GR.

B. PVC-Coated Cast Metal:

1. Type: One-piece.
2. Material: Malleable iron, cast ferrous metal, or cast aluminum.
3. Coating:
   a. All Exterior Surfaces; 40 mils PVC.
   b. All Interior Surfaces, 2 mils urethane.
4. Manufacturers:
   a. Robroy Industries.
   b. Ocal.

2.4 JUNCTION BOXES

A. Outlet Boxes Used as Junction Box: As specified under Article OUTLET AND DEVICE BOXES.

B. Conduit Bodies Used as Junction Boxes: As specified under Article CONDUIT AND FITTINGS.

C. Large Sheet Steel Box:

1. NEMA 250, Type 12.
2. Box: Code-gauge, galvanized steel.
3. Cover: Full access, screw type.
4. Machine Screws: Corrosion-resistant.

D. Large Stainless Steel Box:

1. NEMA 250, Type 4X.
2. Box: 14-gauge, ASTM A240, Type 316 stainless steel, with interior mounting panel.
3. Cover: Hinged with clamps.
4. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
5. Manufacturers:
   a. Hoffman Engineering Co.
   b. Robroy Industries.

2.5 WIRING DEVICES

A. Switches:

1. NEMA WD 1 and FS W-S-896F/GEN.

2. Industrial grade, totally enclosed, ac type, with quiet tumbler switches and screw terminals.
3. Rivetless one-piece brass or copper alloy contact arm with silver alloy contacts.
4. Capable of controlling 100 percent tungsten filament and fluorescent lamp loads.
5. Rating: 20 amps, 120/277 volts.
6. Color: Ivory.
7. Switches with Pilot Light: 125 volts, neon light with red jewel, or lighted toggle when switch is ON.
8. Automatic grounding clip and integral grounding terminal on mounting strap.
9. Manufacturers and Products:
   a. Arrow Hart; 1891/1991 Series.
   b. Bryant; 4801/4901 Series.
   c. Hubbell; 1201/1221 Series.

B. Receptacle, Single and Duplex:

1. NEMA WD 1 and FS W-C-596.
2. Specification grade, two-pole, three-wire grounding type with screw type wire terminals suitable for No. 10 AWG.
3. High strength, thermoplastic base color.
4. Color: Ivory.
5. Contact Arrangement: Contact to be made on two sides of each inserted blade without detent.
6. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps.
7. One-piece mounting strap with integral ground contact (rivetless construction).
8. Manufacturers and Products:
   a. Arrow Hart; 5262 Series.
   b. Bryant; 5262 Series.
   c. Hubbell; 5262 Series.

C. Receptacle, Ground Fault Circuit Interrupter:

1. Duplex, listed Class A to UL Standard 943, tripping at 5 mA.
2. Color: Ivory.
3. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps.
4. Size: For 2-inch by 4-inch outlet boxes.
5. Standard Model: NEMA WD 1, with screw terminals and provisions for testing.
6. Impact resistant nylon face.
7. Manufacturers:
   a. Bryant.
   b. Hubbell.

c. Arrow Hart.

D. Switch, Motor Rated:

1. UL listed in category UL 508.
2. Quick-make, quick-break contact design.
3. Silver alloy contacts.
4. Horsepower rated.
5. 2 horsepower (minimum) single-phase, 15 horsepower (minimum) three-phase, 480 volts.
6. Manufacturers:
   a. Arrow Hart.
   b. Bryant.
   c. Hubbell.
   d. Square D Co.

E. Receptacle, Switch Rated Special-Purpose:

1. Rating and number of poles and auxiliary devices as indicated on the Drawings.
2. One matching plug with cord-grip features for each special-purpose receptacle.

2.6 DEVICE PLATES

A. General: Sectional type plates not permitted.

B. Plastic:

1. Material: Specification grade, 0.10-inch minimum thickness, noncombustible, thermosetting.
2. Color: Ivory.
3. Mounting Screw: Oval-head metal, ivory color.

C. Cast Metal:

1. Material: Malleable ferrous metal, with gaskets.
2. Screw: Oval-head stainless steel.

D. Weatherproof:

1. For Receptacles:
   a. Gasketed, cast metal or stainless steel with individual cap over each receptacle opening (single cap over both receptacle openings for GFCI duplex receptacles).
   b. Mounting Screw and Cap Spring: Stainless steel.

c. Manufacturers and Products:
   1) Crouse-Hinds; Type WLRD-1.
   2) Appleton; Type FSK-WRD.

2. For Switches:
   a. Gasketed, cast-metal incorporating external operator for internal switch.
   b. Mounting Screw: Stainless steel.
   c. Manufacturers and Products:
      1) Crouse-Hinds; DS-181 or DS-185.
      2) Appleton; FSK-1VTS or FSK-1VS.

2.7 DUPLEX PUMP CONTROLLER

A. Controller shall be capable of monitoring and controlling two pumps with selectable ON or automatic alternation.

B. Controller shall have provisions for DIN rail or panel mounting with a keypad that can be remotely mounted from the base unit. The keypad shall be mounted on the front of the control panel that contains the base unit.

C. Keypad shall be provided with HAND/OFF/AUTO selection, alarm indication, and alarm reset for each pump, selection of lead pump or alternate pump operation, wet well level alarms and reset, and controller programming functions.

D. High intensity LED's with individual or common test function shall be provided for pump status and alarm and level alarm indications.

1. Pump ON-Red.
2. Pump set to HAND (manual) mode-Amber.
3. Pump set to OFF mode-Amber.
4. Pump set to AUTOMATIC mode-Green.
5. Pump OFF/ready to run-Green.
6. All abnormal, shutdown, and fault conditions-Amber.

E. Controller shall accept a 4 to 20 mA analog level input signal.

F. Controller shall have provisions for RS 485, RS 422, and RS 232 digital outputs and a 4 to 20 mA analog output.

G. Controller shall operate on 120V ac power in a temperature range of minus 10 to 60 degrees C (14 to 140 degrees F).

H. Manufacturer and Product: Flygt; Multitrode "MT2PC."

2.8 LEVEL ELEMENT AND TRANSMITTER, ULTRASONIC

A. General:

1. Function: Provide continuous noncontacting temperature compensated wet well level or overflow flow measurements with outputs proportional to level/flow being sensed.
2. Type: Ultrasonic.
3. Parts: Level and flow element sensors, with integral temperature sensor, and cable for connection from element to transmitter.

B. Service:

1. Medium: Wastewater (sewage).
2. Pressure: Atmospheric.
3. Temperature Range: Level and flow element sensors shall be capable of operating in a range of minus 10 to 120 degrees F. Transmitter shall be capable of operating in a range of 30 to 120 degrees F.

C. Performance:

1. Range: As noted.
2. Zero Reference: Equal to minimum range.
3. Accuracy: Plus or minus 0.25 percent of full scale for analog output signal and alarm set points shall be repeatable within plus or minus 1 percent of full scale.
4. Resolution: 2 mm or 0.1 percent of range, whichever is greater.

D. Features:

1. Unit shall be provided with output indicating meter with four-character LCD display programmable in engineering units of; feet, inches, meters, centimeters, or percent of span; and eight standard tank shape volume conversions.
2. Interconnecting Cable: Cable between level/flow sensors and transmitter shall be supplied with unit, minimum length 100 feet. Provide lengths as required to accommodate device locations as shown.
3. Discrete Outputs: Transmitter shall be capable of operating up to five multipurpose relays with one Form 'C' contact per relay, each adjustable over entire scale range by screwdriver or programming module.
4. Analog Output: Two 4 to 20 mA signals.
5. Alarm Messages: Loss of echo and cable circuit open or shorted.

E. Programmable Signal Interface:

1. Transmitter Outputs: 4 to 20 mA dc outputs each for load impedance of 0 to 700 ohms. Outputs shall also be reversible, 4 to 20 mA over range selection.
2. Power Supply: Unit shall operate on 120-volt, 60-Hz power, unless otherwise noted.
3. Discrete Outputs: Unit shall operate up to five SPDT contacts rated at 5 amperes, noninductive, continuous, at 120V ac. Set points shall be individually adjustable over entire scale range. Provide quantity as shown.

F. Sensor Elements:

1. Type: Shall be of a waterproof/weatherproof design suitable for installation in a NEC Class 1, Division 1, Groups C and D hazardous area.
2. Process Connection: As noted.
3. Built-in temperature sensor.

G. Transmitter:

1. Transmitter shall be mounted in a NEMA 4X enclosure suitable for mounting as noted or shown.
2. Mounting: Mounting panel inside control panel.

H. Manufacturer and Product: Siemens-Milltronics; Multiranger 200 with Model XPS-15 wet well level sensor and XRS-5 overflow flow sensor.

2.9 PAPERLESS RECORDING SYSTEM

A. UL listed.

B. Features shall include data display, storage, and transfer capabilities.

C. Two channel analog (4 to 20 mA) input.

D. 5-inch monochrome display with touch screen control.

E. 90 to 127V ac operation.

F. Manufacturer: Monarch Instrument "Data-Chart 2000" Series.

2.10 SCADA EQUIPMENT

A. Supervisory control and data acquisition (SCADA) equipment shall be UL listed and 100 percent compatible with the existing City of Newberg SCADA system.

B. SCADA equipment shall provide adequate analog and digital channels to monitor all required data points shown on the Drawings and shall be capable of real time communications through a standard leased telephone line network. All required SCADA component interconnecting cables shall be provided for a complete and operational SCADA system.

C. SCADA equipment shall normally operate on 120V ac power with the capability of operating for 24 hours on 12V dc backup power. Backup power shall be provided by a 12-volt, sealed, lead-acid, gel-cell, rechargeable battery with automatic charging and battery undervoltage protection.

D. SCADA equipment shall operate in a temperature range of minus 40 to 70 degrees C and be DIN-rail mountable.

E. Line protection shall be provided where SCADA equipment is connected to the telephone line. Protection shall protect the equipment from transient and electrical surges on the telephone line. Protection shall include line fuses and clamps for overvoltage protection.

F. SCADA equipment shall be Control Microsystems "SCADAPack" Series equipment as listed in the Control and SCADA Panel Equipment List on the Drawings.

2.11 CONTROL AND SCADA PANEL

A. Enclosure:

1. NEMA 250, Type 12, or as shown.
2. Minimum Metal Thickness: 14 gauge.
3. Doors: Rubber gasketed with continuous hinge.
4. Finish: Gray.
5. Size panel to adequately dissipate heat generated by equipment mounted in or on panel.
6. Mount internal and door-mounted devices as shown.
7. Manufacturer:
   a. Hoffman.
   b. H. F. Cox.

B. Functions: As shown on schematic diagram(s).

C. Wiring:

1. Power and Control Wiring:
   a. 600-volt class, insulated, stranded copper.
   b. Size: Minimum 14 AWG enclosed in either sheet metal raceway or plastic wiring duct.

2. Device Identification: Provide engraved plastic nameplates, adhesive attachment, black letters on white background.

2.12 MINI-POWER CENTER (MPC)

A. General: Transformer, primary and secondary main circuit breakers, and secondary panelboard section enclosed in NEMA 250, Type 3R enclosure.

B. Transformer:

1. Type: Dry, self-cooled, encapsulated.
2. Insulation: Manufacturer's standard, with UL 1561 temperature rise.
3. Full capacity, 2-1/2 percent voltage taps, two above and two below normal voltage.
4. Primary Voltage: 480 volts, single-phase.
5. Secondary Voltage: 120/240 volts, single-phase, three-wire.

C. Panelboard: UL 489, fully-rated.

1. Type: Thermal-magnetic, quick-make, quick-break, indicating, with noninterchangeable molded case circuit breakers.
2. Number and Breaker Ampere Ratings: Refer to Panelboard Schedule.
3. Locking: Provisions for handle padlocking ALL MPC circuit breakers (main and branch) in the OPEN position with at least a 1/4-inch padlock.

D. Manufacturers:

1. Cutler-Hammer.
2. General Electric Co.
3. Square D Co.

2.13 ELECTRIC HEATERS

A. Electric Building:

1. Rating: 1.5 kW, 240 volts, single-phase with fan and overtemperature protection.
2. Mounting brackets for permanent surface mounting on wall.
3. Internal baffling.
4. Heavy gauge steel enclosure with ivory finish.
5. UL listed.
6. Thermostat: Integral, adjustable (45 to 85 degrees F), fully rated.
7. Disconnect switch.
8. Manufacturer and Product:
   a. Chromalox; Model RFI-1524B31.
   b. Or equal.

B. Backflow Preventer Shelter:

1. Rating: 0.5 kW, 240 volts, single-phase convection heater.
2. Mounting brackets for permanent surface mounting to channel mounted to top of concrete slab.
3. Control Enclosure: Heavy gauge formed steel, corrosion treated and painted with a hybrid polyester epoxy coating.
4. Heating Element: Cast aluminum heating grid.
5. UL listed.
6. Thermostat: Integral, adjustable (40 to 80 degrees F), fully rated.
7. Manufacturer and Product:
   a. Chromalox; Model CPHH-50031.
   b. Or equal.

2.14 THERMOSTAT

A. Rating: 7.4 amps continuous, 44 amps locked rotor current at 120 volts and 3.7 amps continuous, 22 amps locked rotor current at 240 volts.

B. Line voltage, single-stage, treated to resist corrosion, dust, dirt, and humidity with sealed SPDT contacts.

C. Cooling or Ventilating Adjustment Range: 70 to 140 degrees F.

D. Manufacturer:

1. Honeywell; Type T631F1084.
2. Or equal.

2.15 PUSHBUTTONS, INDICATING LIGHTS, AND SELECTOR SWITCHES

A. Type: Heavy-duty, oiltight, 30 mm. Provide contact arrangements, colors, inscriptions, and functions as shown.

B. Contact Rating: NEMA ICS 2, Type A600.

C. Unless otherwise shown, provide the following features:

1. Selector Switch Operating Lever: Standard.
2. Indicating Lights: Push-to-test, LED-type.
3. Pushbutton Color:
   a. ON or START: Black.
   b. OFF or STOP: Red.

D. Legend Plate:

1. Material: Aluminum.
2. Engraving: Indicating specific function, or as shown.

3. Letter Height: 7/64 inch.

E. Manufacturers and Products:

1. General Electric Co.; Type CR 104P.
2. Square D Co.; Type T.
3. Cutler-Hammer; Type 10250T.

2.16 MAGNETIC CONTROL RELAYS

A. NEMA ICS 2, Class A600 (600 volts, 10 amperes continuous, 7,200VA make, 720VA break), machine tool type with field convertible contacts.

B. Manufacturer and Model:

1. Cutler-Hammer; Type M-600.
2. General Electric; Type CR120B.

2.17 TIME DELAY RELAY

A. Industrial Relay Rated: 150 volts, 5 amps continuous, (3600 VA make, 360 VA break).

B. Solid-state electronic, field convertible ON/OFF delay, circular pin base.

C. Two Form-C contacts (minimum).

D. Repeat accuracy plus or minus 2 percent.

E. Timer Adjustment: Multiple adjustable ranges, including 1 to 60 seconds, unless otherwise shown.

F. Manufacturers:

1. Omron.
2. Cutler-Hammer.
3. General Electric Co.

2.18 INTRINSICALLY SAFE RELAY

A. UL and FM listed.

B. Operating and Load Voltage Range: 100 to 135V ac.

C. Maximum and Load Current: 5 amps.

D. Operating Temperature Range: Minus 17.8 to 48.9 degrees C (0 to 120 degrees F).

E. Switching Operation: Single-pole single-throw (SPST) normally closed (NC).

F. Manufacturer and Product: Gems; SAFE-PAK Part Number 25872.

2.19 ELAPSED TIME METERS

A. Type: Synchronous motor driven, 0 to 99,999.9 hours range, nonreset, suitable for semiflush, panel mounting.

B. Manufacturers:

1. General Electric Co.
2. Veeder-Root.

2.20 SUPPORT AND FRAMING CHANNELS

A. Carbon Steel Framing Channel:

1. Material: Rolled, mild strip steel, 12-gauge, ASTM A1011/A1011M, Grade 33.
2. Finish: Hot-dip galvanized after fabrication.

B. Stainless Steel Framing Channel: Rolled, ASTM A167, Type 316 stainless steel, 12 gauge.

C. Manufacturers:

1. B-Line Systems, Inc.
2. Unistrut Corp.

2.21 NAMEPLATES

A. Material: Laminated plastic.

B. Attachment Screws: Stainless steel.

C. Color: White, engraved to a black core.

D. Engraving:

1. Devices and Equipment: Generic name and tag number given on the Drawings.
2. Panelboards:
   a. Designation.
   b. Service voltage.
   c. Phases.

3. Minimum Requirement: Label metering and power distribution equipment, local control panels, junction boxes, motor controls, and transformers.

E. Letter Height:

1. Pushbuttons, Selector Switches, and Other Component Devices: 1/8 inch.
2. MCC Compartments: 1/4 inch.
3. Equipment and Panelboards: 3/8 inch.

2.22 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS) EQUIPMENT

A. General:

1. Units shall be suitable for the service voltage and configuration (phases and wires) shown.
2. Protection Modes:
   a. Normal, differential, and common.
   b. Bipolar or bi-directional.
3. Ratings: Short-circuit current rating shall equal or exceed that of protected distribution equipment. Surge Voltage Rating (SVR) shall not exceed those specified under UL 1449 for the associated nominal system voltage. Maximum Allowable Continuous Operating Voltage (MCOV) shall be at least 115 percent of the nominal system voltage.
4. Unit shall be UL-listed.
5. Provide status indicators for unit ON-LINE and unit operation NORMAL.
6. Provide common alarm contact output.
7. Provide fusible disconnect switch (integral with TVSS unit, where available) where not shown connected via branch circuit device of protected distribution equipment.
8. Minimum Enclosure Rating: NEMA 250 ,Type 2. Provide Type 4/4X for outdoor or wet locations.

B. Type 2 TVSS:

1. Requirements: Designed for critical loads at service equipment (Category C3/B3 per IEEE C62.41) locations. Unit shall utilize voltage-matched Silicon Avalanche Suppressor Diode (SASD) technology. Unit shall utilize modular, plug-in suppressor design.
2. Manufacturer and Product: Transtector; Model Apex III (nonservice entrance distribution panelboard) or Apex IV (service equipment).

2.23 CONDUIT AND FITTINGS

A. Rigid Galvanized Steel Conduit (RGS):

1. Meet requirements of ANSI C80.1 and UL 6.
2. Material: Hot-dip galvanized, with chromated protective layer.

B. PVC Schedule 40 Conduit:

1. Meet requirements of NEMA TC 2 and UL 651.
2. UL listed for concrete encasement, underground direct burial, concealed or direct sunlight exposure, and 90 degrees C insulated conductors.

C. PVC-Coated Rigid Galvanized Steel Conduit:

1. Meet requirements of NEMA RN 1.
2. Material:
   a. Meet requirements of ANSI C80.1 and UL 6.
   b. Exterior finish : PVC coating, 40 mils nominal thickness, bond to metal shall have tensile strength greater than PVC.
   c. Interior finish: Urethane coating, 2 mils nominal thickness.
3. Threads: Hot-dipped galvanized and factory coated with urethane.
4. Bendable without damage to either interior or exterior coating.

D. Flexible Nonmetallic, Liquid-Tight Conduit:

1. Material: PVC core with fused flexible PVC jacket.
2. UL 1660 listed for:
   a. Dry Conditions: 80 degrees C insulated conductors.
   b. Wet Conditions: 60 degrees C insulated conductors.
3. Manufacturers and Products:
   a. Carlon; Carflex or X-Flex.
   b. T & B; Xtraflex LTC or EFC.

E. Fittings:

1. Provide bushings, grounding bushings, conduit hubs, conduit bodies, couplings, unions, conduit sealing fittings, drain seals, drain/breather fittings, expansion fittings, and cable sealing fittings, as applicable.
2. Rigid Galvanized Steel Conduit:
   a. Meet requirements of UL 514B.
   b. Type: Threaded, galvanized.
3. PVC Conduit:
   a. Meet requirements of NEMA TC 3.
   b. Type: PVC, slip-on.

4. PVC-Coated Rigid Galvanized Steel Conduit:
   a. Meet requirements of UL 514B.
   b. Fittings: Rigid galvanized steel type, PVC-coated by conduit manufacturer.
   c. Conduit Bodies: Cast metal hot-dipped galvanized or urethane finish. Cover shall be of same material as conduit body. PVC-coated by conduit manufacturer.
   d. Finish: 40-mil PVC exterior, 2-mil urethane interior.
   e. Overlapping pressure sealing sleeves.
   f. Conduit Hangers, Attachments, and Accessories: PVC-coated.
   g. Manufacturers:
      1) Robroy Industries.
      2) Ocal.
   h. Expansion Fitting Manufacturer and Product: Ocal; Ocal-Blue XJG.
5. Flexible Nonmetallic, Liquid-Tight Conduit:
   a. Meet requirements of UL 514B.
   b. Type: High strength plastic body, complete with lock nut, O-ring, threaded ferrule, sealing ring, and compression nut.
   c. Body/compression nut (gland) design to assure high mechanical pullout strength and watertight seal.
   d. Manufacturers and Products:
      1) Carlon; Type LT.
      2) O.Z. Gedney; Type 4Q-P.
      3) Thomas & Betts; Series 6300.

2.24 CONDUIT ACCESSORIES

A. Duct Bank Spacers:

1. Type: Nonmetallic, interlocking, for multiple conduit sizes.
2. Suitable for all types of conduit.
3. Manufacturers:
   a. Underground Device, Inc.
   b. Carlon.

B. Identification Devices:

1. Warning Tape:
   a. Material: Polyethylene, 4-mil gauge with detectable magnetic strip.
   b. Color: Red.
   c. Width: Minimum 3 inches.
   d. Designation: Warning on tape that electric circuit is located below tape.

e. Identifying Letters: Minimum 1-inch high permanent black lettering imprinted continuously over entire length.

2.25 CONDUCTORS AND CABLES

A. Conductors 600 Volts and Below:

1. Conform to applicable requirements of NEMA WC 70.
2. Conductor Type: 600-volt class, stranded copper.
3. Insulation:
   a. No. 8 AWG and Smaller; Type THHN/THWN.
   b. No. 6 AWG and Larger: Type XHHW-2.
4. Unless noted otherwise, conductor sizes indicated are based on copper conductors at NEC 75 degrees C ampacity. Do not provide conductors smaller than those indicated.
5. Grounding Conductors:
   a. Equipment:
      1) Provide stranded copper conductors, as indicated on the Drawings or as required by NEC, for equipment grounding.
      2) Provide conductors with green Type THHN/THWN insulation.
   b. Direct Buried: Bare stranded copper.

B. 600-Volt Rated Cable:

1. General:
   a. Type TC, meeting requirements of UL 1277, including Vertical Tray Flame Test at 20,000 Btu per hour, and NFPA 70, Article 340, or UL 13 meeting requirements of NFPA 70, Article 725.
   b. Permanently and legibly marked with manufacturer's name, maximum working voltage for which cable was tested, type of cable, and UL listing mark.
   c. Suitable for installation in open air, in cable trays, or conduit.
   d. Minimum Temperature Rating: 90 degrees C dry locations, 75 degrees C wet locations.
   e. Overall Outer Jacket: PVC, flame-retardant, sunlight- and oil-resistant.

C. Type 1, Multiconductor Control Cable:

1. Conductors:
   a. No. 14 AWG, seven-strand copper.
   b. Insulation: 15-mil PVC with 4-mil nylon.
   c. UL 1581 listed as Type THHN/THWN rated VW-1.
   d. Conductor group bound with spiral wrap of barrier tape.

e. Color Code: In accordance with NEMA WC 5, Method 1, Sequence K-2.

2. Cable: Passes the ICEA T-29-520 210,000 Btu/hr Vertical Tray Flame Test.
3. Cable Sizes:

No. of Conductors	Max. Outside Diameter (Inches)	Jacket Thickness (Mils)
3	0.41	45
5	0.48	45
7	0.52	45
12	0.72	45

4. Manufacturers:
   a. Okonite Co.
   b. Rome Cable.

D. Type 2-No. 16 AWG, Twisted, Shielded Pair, Instrumentation Cable: Single pair, designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 55 requirements.

1. Outer Jacket: 45-mil nominal thickness.
2. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer overlapped to provide 100 percent coverage.
3. Dimensions: 0.31-inch nominal OD; Area = 0.0755 in^2.
4. Conductors:
   a. Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8.
   b. 20 AWG, seven-strand tinned copper drain wire.
   c. Insulation: 15-mil nominal PVC.
   d. Jacket: 4-mil nominal nylon.
   e. Color Code: Pair conductors black and red.
5. Manufacturers:
   a. Okonite Co.
   b. Alpha Wire Corp.

E. Accessories:

1. Tape:
   a. General Purpose, Flame Retardant: 7 mils, vinyl plastic, Scotch Brand 33, rated for 90 degrees C minimum, meeting requirements of UL 510.

b. Flame Retardant, Cold and Weather Resistant: 8.5 mils, vinyl plastic, Scotch Brand 88.
c. Arc and Fireproofing:
1) 30 mils, elastomer.
2) Manufacturers and Products:
a) 3M; Scotch Brand 77, with Scotch Brand 69 glass cloth tapebinder.
b) Plymount; Plyarc 53, with Plyglas 77 glass cloth tapebinder.

2. Identification Devices:
a. Sleeve-type, permanent, PVC, yellow or white, with legible machine-printed black markings.
b. Manufacturer and Products: Raychem; Type D-SCE or ZH-SCE.

3. Connectors and Terminations:
a. Nylon, Self-Insulated Crimp Connectors:
1) Manufacturers and Products:
a) Thomas & Betts; Sta-Kon.
b) Burndy; Insulug.
c) ILSCO.

4. Cable Lugs:
a. In accordance with NEMA CC 1.
b. Rated 600 volts of same material as conductor metal.
c. Uninsulated Crimp Connectors and Terminators:
1) Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
2) Manufacturers and Products:
a) Thomas & Betts; Color-Keyed.
b) Burndy; Hydent.
c) ILSCO.
d. Uninsulated, Bolted, Two-Way Connectors and Terminators:
1) Manufacturers and Products:
a) Thomas & Betts; Locktite.
b) Burndy; Quiklug.
c) ILSCO.

5. Cable Ties:
a. Nylon, adjustable, self-locking, and reusable.
b. Manufacturer and Product: Thomas & Betts; TY-RAP.

6. Heat Shrinkable Insulation:
a. Thermally stabilized, crosslinked polyolefin.
b. Manufacturer and Product: Thomas & Betts; SHRINK-KON.

2.26 TELEPHONE CABLE

A. Unshielded, nonpaired, four conductors.

B. 22 AWG solid bare copper conductor.

C. HDPE (high density polyethylene) conductor insulation.

D. PVC cable jacket.

E. Dimension: 0.1540-inch nominal OD.

F. Manufacturer and Product:

1. Belden Trade; No. 1242A.
2. Or equal.

2.27 GROUNDING

A. Ground Rods: Provide copper-clad steel with minimum diameter of 3/4-inch, and length of 10 feet.

B. Ground Conductors: As specified in Article CONDUCTORS AND CABLE.

C. Connectors:

1. Exothermic Weld Type:
   a. Outdoor Weld: Suitable for exposure to elements or direct burial.
   b. Indoor Weld: Utilize low-smoke, low-emission process.
   c. Manufacturers:
      1) Erico Products, Inc.; Cadweld and Cadweld Exolon.
      2) Thermoweld.

2.28 LUMINAIRES AND ACCESSORIES

A. Specific requirements relating to fixture type, lamp type, and mounting hardware are provided on Drawings

B. Poles:

1. Rating (With Luminaire): 100 mph steady winds, without incurred damage.
2. Material: Extruded aluminum as specified on Drawings.

PART 3 EXECUTION

3.1 GENERAL

A. Install all materials and equipment in accordance with the manufacturer's instructions and recommendations.

B. Work shall comply with all applicable provisions of NECA 1.

C. Install materials and equipment in hazardous areas in a manner acceptable to regulatory authority having jurisdiction for the class, division, and group of hazardous areas shown.

D. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

3.2 PROTECTION FOLLOWING INSTALLATION

A. Protect materials and equipment from corrosion, physical damage, and effects of moisture on insulation.

B. Cap conduit runs during construction with manufactured seals.

C. Close openings in boxes or equipment during construction.

D. Energize space heaters furnished with equipment.

3.3 SERVICE ENTRANCE EQUIPMENT AND METERING

A. Unless otherwise specified or shown, schedule and coordinate work of serving utility as required to provide electric service to the site

3.4 OUTLET AND DEVICE BOXES

A. Install suitable for conditions encountered at each outlet or device in wiring or raceway system, sized to meet NFPA 70 requirements.

B. Size:

1. Depth: Minimum 2 inches, unless otherwise required by structural conditions. Box extensions not permitted.
   a. Hollow Masonry Construction: Install with sufficient depth such that conduit knockouts or hubs are in masonry void space.
2. Ceiling Outlet: Minimum 4-inch device box, unless otherwise required for installed fixture.
3. Switch and Receptacle: Minimum 2-inch by 4-inch device box.

C. Locations:

1. Drawing locations are approximate.
2. To avoid interference with mechanical equipment or structural features, relocate outlets as directed by ENGINEER.
3. Light Switch: Install on lock side of doors.

D. Mounting Height:

1. General:
   a. Dimensions given to centerline of box.
   b. Where specified heights do not suit building construction or finish, mount as directed by ENGINEER.
2. Light Switch: 48 inches above floor.
3. Convenience Receptacle:
   a. General Interior Areas: 15 inches above floor.
   b. Industrial Areas: 24 inches above floor.
   c. Outdoor, All Areas: 24 inches above finished grade.
4. Switch, Motor Starting: 48 inches above floor, unless otherwise indicated on Drawings.
5. Thermostat: 60 inches above finished floor.

E. Install plumb and level.

F. Support boxes independently of conduit by attachment to building structure or structural member.

G. Install bar hangers in frame construction or fasten boxes directly as follows:

1. Wood: Wood screws.
2. Concrete or Brick: Bolts and expansion shields.
3. Hollow Masonry Units: Toggle bolts.
4. Steelwork: Machine screws.

H. Threaded studs driven in by powder charge and provided with lock washers and nuts are acceptable in lieu of expansion shields.

I. Mounting Hardware: Type 316 stainless steel.

J. Boxes Supporting Fixtures: Provide means of attachment with adequate strength to support fixture.

K. Open no more knockouts in sheet steel device boxes than are required; seal unused openings.

L. Box Type (Steel Raceway System): Cast metal.

M. Box Type, Corrosive Locations (PVC-Coated Rigid Galvanized Steel Raceway System): PVC-coated cast metal.

3.5 JUNCTION BOXES

A. Install junction boxes where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs.

B. Use outlet boxes as junction boxes wherever possible and allowed by applicable codes.

C. Use conduit bodies as junction boxes where no splices are required and their use is allowed by applicable codes.

D. Installed boxes shall be accessible.

E. Install plumb and level.

F. Support boxes independently of conduit by attachment to building structure or structural member.

G. Install bar hangers in frame construction or fasten boxes directly as follows:

1. Wood: Wood screws.
2. Concrete or Brick: Bolts and expansion shields.
3. Hollow Masonry Units: Toggle bolts.
4. Steelwork: Machine screws.

H. Threaded studs driven in by powder charge and provided with lock washers and nuts are acceptable in lieu of expansion shields.

I. At Grade: Mount box on structure surface just above finished grade in accessible but unobstrusive location.

J. Mounting Hardware: Type 316 stainless steel.

K. Location/Type:

1. Unfinished, Indoor: NEMA 250, Type 12, cast metal.
2. Unfinished, Indoor and Outdoor: NEMA 250, Type 4X, stainless steel.

3.6 WIRING DEVICES

A. Switches:

1. Mounting Height: See Article OUTLET AND DEVICE BOXES.
2. Install with switch operation in vertical position.
3. Install single-pole, two-way switches such that toggle is in up position when switch is on.

B. Receptacles:

1. Install with grounding slot down, except where horizontal mounting is shown, in which case install with neutral slot down.
2. Ground receptacles to boxes with grounding wire only.

3. Weatherproof Receptacles:
   a. Install in cast metal box.
   b. Install such that hinge for protective cover is above receptacle opening.
4. Special-Purpose Receptacles: Install in accordance with manufacturer's instructions.

C. Switch, Motor Rated:

1. Install with switch operation in vertical position such that toggle is in up position when ON.
2. Install within sight of motor when used as a disconnect switch.
3. Mounting Height: See Article OUTLET AND DEVICE BOXES.
4. Enclosure Type: See Article OUTLET AND DEVICE BOXES.

3.7 DEVICE PLATES

A. Securely fasten to wiring device; ensure a tight fit to box.

B. Surface Mounted: Plate shall not extend beyond sides of box, unless plates have no sharp corners or edges.

C. Install with alignment tolerance to box of 1/16-inch.

D. Types (Unless Otherwise Shown):

1. Exterior: Weatherproof.
2. Interior:
   a. Surface Mounted, Cast Metal Boxes: Plastic.

3.8 PUSHBUTTON, INDICATING LIGHT, AND SELECTOR SWITCH

A. Heavy-Duty, Oil-Tight Type: Locations (Unless Otherwise Shown): Nonhazardous, indoor, dry locations, including motor control centers, control panels, and individual stations.

B. Heavy-Duty, Watertight, and Corrosion-Resistant Type:

1. Locations (Unless Otherwise Shown): Nonhazardous, outdoor, or normally wet areas.
2. Mounting: NEMA 250, Type 4X enclosure.

3.9 POWER/CONTROL DISCONNECT BOX

A. Install in accordance with Article JUNCTION BOXES and as shown on the Drawings.

B. Label each receptacle with permanently attached nameplate inscribed as shown on the Drawings.

C. Type: Stainless steel.

3.10 CONTROL AND SCADA PANEL

A. Install in accordance with Article JUNCTION BOXES and as shown on the Drawings.

B. Provide a nameplate on or adjacent to each device mounted in the panel that does not have a manufacturer's label that corresponds with the device listing in the Equipment List on the Drawings.

C. Tag all conductors and cables between devices with numbers that are consistent with submitted wiring diagram. Tags shall be installed on conductors and cables at each device.

3.11 MINI-POWER CENTER

A. Install securely, plumb, in-line and square with walls.

B. Install with top of distribution panel section 6 feet above floor.

C. Provide typewritten circuit directory.

3.12 SUPPORT AND FRAMING CHANNELS

A. Install where required for mounting and supporting electrical equipment.

B. Channel Type:

1. Interior, Wet or Dry Noncorrosive Locations: Carbon steel.
2. Interior, Wet or Dry Corrosive Locations: Type 316 stainless steel.
3. Outdoor Locations: Type 316 stainless steel.

C. Paint carbon steel channel cut ends prior to installation with zinc-rich primer.

3.13 NAMEPLATES

A. Provide identifying nameplate on all equipment.

3.14 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS) EQUIPMENT

A. Install in accordance with manufacturer's instructions, including lead length, overcurrent protection, and grounding.

3.15 CONDUIT AND FITTINGS

A. General:

1. Crushed or deformed raceways not permitted.
2. Maintain raceway entirely free of obstructions and moisture.
3. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.
4. Sealing Fittings: Provide drain seal in vertical raceways where condensate may collect above sealing fitting.
5. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.
6. Group raceways installed in same area.
7. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.
8. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes.
9. Install watertight fittings in outdoor, underground, or wet locations.
10. Paint threads and cut ends, before assembly of fittings, of galvanized steel and PVC-coated galvanized steel conduit with zinc-rich paint or liquid galvanizing compound.
11. Metal conduit to be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.
12. Do not install raceways in concrete equipment pads, foundations, or beams.
13. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed.

B. Conduit Application:

1. Diameter:
   a. Exposed Minimum: 3/4 inch.
   b. Underground Minimum: 1 inch.
2. Outdoor, Exposed: PVC-coated rigid galvanized steel.
3. Indoor, Exposed: Rigid galvanized steel.
4. Direct Earth Burial:
   a. PVC Schedule 40.
   b. PVC-coated rigid galvanized steel.
5. Under Slabs-On-Grade: Rigid galvanized steel.
6. Corrosive Areas: PVC-coated rigid galvanized steel.
7. Classified Areas: PVC-coated rigid galvanized steel.

C. Connections:

1. For instrumentation and other equipment where flexible connection is required to minimize vibration:
   a. General: Flexible, nonmetallic, liquid-tight conduit.
   b. Wet or Corrosive Areas: Flexible, nonmetallic, liquid-tight conduit.
   c. Length: 18 inches minimum, 60 inches maximum, sufficient to allow movement or adjustment of equipment.
2. Transition From Underground or Under Equipment Mounting Pad to Exposed: PVC-coated rigid steel conduit from 6 inches above to 12 or more inches below top of grade or slab.
3. Under Equipment Mounting Pads: Rigid galvanized steel conduit.
4. Exterior Light Pole Foundations: PVC Schedule 40 conduit.

D. Penetrations:

1. Make at right angles, unless otherwise shown.
2. Notching or penetration of structural members, including footings and beams, not permitted.
3. Concrete Walls or Floors (Aboveground): Provide nonshrink grout dry-pack.

E. Bends:

1. Install concealed raceways with a minimum of bends in the shortest practical distance.
2. Install with symmetrical bends or cast metal fittings.
3. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.
4. PVC Conduit:
   a. Bends 30 Degrees and Larger: Provide factory-made elbows.
   b. 90-Degree Bends: Provide rigid steel elbows, PVC coated where direct buried.
   c. Use manufacturer's recommended method for forming smaller bends.
5. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

F. PVC Conduit:

1. Solvent Welding:
   a. Provide manufacturer recommended solvent; apply to all joints.
   b. Install such that joint is watertight.

2. Adapters:
   a. PVC to Metallic Fittings: PVC terminal type.
   b. PVC to Rigid Metal Conduit: PVC female adapter.
3. Belled-End Conduit: Bevel the unbelled end of the joint prior to joining.

G. PVC-Coated Rigid Steel Conduit:

1. Install in accordance with manufacturer's instructions.
2. All tools and equipment used in the cutting, bending, threading, and installation of PVC-coated rigid steel conduit shall be designed to limit damage to the PVC coating.
3. Provide PVC boot to cover all exposed threading.

H. Termination at Enclosures:

1. Cast Metal Enclosure: Provide manufacturer's premolded insulating sleeve inside metallic conduit terminating in threaded hubs.
2. Sheet Metal Boxes, Cabinets, and Enclosures:
   a. Rigid Galvanized Steel Conduit:
      1) Provide one lock nut each on inside and outside of enclosure.
      2) Install grounding bushing.
      3) Provide bonding jumper from grounding bushing to equipment ground bus or ground pad; if neither ground bus nor pad exists, connect jumper to lag bolt attached to metal enclosure.
      4) Install insulated bushing on ends of conduit where grounding is not required.
      5) Provide insulated throat when conduit terminates in sheet metal boxes having threaded hubs.
      6) Utilize sealing locknuts or threaded hubs on outside of NEMA 3R and NEMA 12 enclosures.
      7) Terminate conduits with threaded conduit hubs at NEMA 4 and 4X boxes and enclosures.
   b. PVC-Coated Rigid Galvanized Steel Conduit: Provide PVC-coated, liquid-tight, metallic connector.
3. Free-Standing Enclosures:
   a. Terminate metal conduit entering bottom with grounding bushing; provide a grounding jumper extending to equipment ground bus or grounding pad.
   b. Terminate PVC conduit entering bottom with bell end fittings.

I. Underground Raceways:

1. Cover: Maintain minimum 2-foot cover above conduit, unless otherwise shown.

2. Make routing changes as necessary to avoid obstructions or conflicts.
3. Couplings: In multiple conduit runs, stagger so couplings in adjacent runs are not in same transverse line.
4. Union type fittings not permitted.
5. Spacers:
   a. Provide preformed, nonmetallic spacers, designed for such purpose, to secure and separate parallel conduit runs in a trench.
   b. Install at intervals not greater than that specified in NFPA 70 for support of the type conduit used, but in no case greater than 10 feet.
6. Support conduit so as to prevent bending or displacement during backfilling.
7. Installation with Other Piping Systems:
   a. Crossings: Maintain minimum 12-inch vertical separation.
   b. Parallel Runs: Maintain minimum 12-inch separation.
   c. Installation over valves or couplings not permitted.
8. Backfill: Do not backfill until inspected by ENGINEER.

J. Empty Raceways:

1. Provide permanent, removable cap over each end.
2. Provide PVC plug with pull tab for underground raceways with end bells.
3. Provide nylon pull cord.

3.16 CONDUCTORS AND CABLES

A. Conductor storage, handling, and installation shall be in accordance with manufacturer's recommendations.

B. Do not exceed manufacturer's recommendations for maximum pulling tensions and minimum bending radii.

C. Conduit system shall be complete prior to drawing conductors. Lubricate prior to pulling into conduit. Lubrication type shall be as approved by conductor manufacturer.

D. Terminate all conductors and cables, unless otherwise shown.

E. Do not splice conductors, unless specifically indicated or approved by ENGINEER.

F. Wiring within Equipment and Local Control Panels: Remove surplus wire, dress, bundle, and secure.

G. Power Conductor Color Coding:

1. No. 6 AWG and Larger: Apply general purpose, flame retardant tape at each end, and at accessible locations wrapped at least six full overlapping turns, covering an area 1-1/2 to 2 inches wide.
2. No. 8 AWG and Smaller: Provide colored conductors.
3. Colors:
   a. Neutral Wire: White.
   b. Live Wires, 120/240-Volt, Single-Phase System: Black and red.
   c. Live Wires, 480-Volt, Three-Phase System: Brown, orange, and yellow.
   d. Ground Wire: Green.

H. Connections and Terminations:

1. Install nylon self-insulated crimp connectors and terminators for instrumentation and control circuit conductors.
2. Tape insulate all uninsulated connections.
3. Install crimp connectors and compression lugs with tools approved by connector manufacturer.

3.17 GROUNDING

A. Grounding shall be in compliance with NFPA 70 and as shown.

B. Ground electrical service neutral at service entrance equipment to supplementary grounding electrodes.

C. Ground each separately derived system neutral to nearest effectively grounded building structural steel member or separate grounding electrode.

D. Bond together system neutrals, service equipment enclosures, exposed noncurrent-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.

E. Shielded Instrumentation Cables:

1. Ground shield to ground bus at power supply for analog signal.
2. Expose shield minimum 1 inch at termination to field instrument and apply heat shrink tube.
3. Do not ground instrumentation cable shield at more than one point.

F. Equipment Grounding Conductors: Provide in all conduits containing power conductors and control circuits above 50 volts.

G. Ground Rods: Install full length with conductor connection at upper end.

3.18 LUMINAIRES AND ACCESSORIES

A. Install in accordance with manufacturer's recommendations.

B. Pole Mounted Fixture: Provide cast-in-place concrete base as shown.

3.19 FIELD QUALITY CONTROL

A. Voltage Testing:

1. When installation is complete and facility is in operation, check and record voltage at point of termination of the electric supply system (Main Circuit Breaker in MCC).
2. Check voltage amplitude and balance between phases for loaded and unloaded conditions and submit a report of the recorded values.

B. Conductors:

1. Perform insulation resistance testing on all power circuits with a 1,000-volt megger. See Section 16080, ELECTRICAL TESTING.
2. Prepare a written test report of the results and submit to the ENGINEER prior to final inspection.
3. Minimum acceptable value for insulation resistance is 1 megohm.
4. Disconnect equipment that might be damaged by this test. Perform tests with all other equipment connected to the circuit.

C. Equipment Line Current: Check and record line current in each phase for each piece of equipment.

D. Functional Tests: Functionally test for proper operation all local and remote controls, indicating lights, protective devices and features, alarms and shut down of all equipment.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 16080
ELECTRICAL TESTING

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. American National Standards Institute (ANSI):
   a. 450, Recommended Practice for Maintenance, Testing, and Replacement of Large lead Storage Batteries for Generator Stations and Substations.
   b. C2, National Electrical Safety Code.
   c. C37.20.1, Metal-Enclosed Low Voltage Power Circuit Breaker Switchgear.
   d. C37.20.2, Metal-Clad and Station-Type Cubicle Switchgear.
   e. C37.20.3, Metal-Enclosed Interrupter Switchgear.
   f. C62.33, Standard Test Specifications for Varistor Surge-Protective Devices.
2. American Society for Testing and Materials (ASTM):
   a. D665, Standard Test Method for Rust Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water.
   b. D877, Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes.
   c. D923, Standard Test Method for Sampling Electrical Insulating Liquids.
   d. D924, Standard Test Methods for A-Class Characteristics and Relative Permittivity (Dielectric Constant) of Electrical Insulating Liquids.
   e. D971, Standard Test Method for Interfacial Tension of 0.1 Against Water by the Ring Method.
   f. D974, Standard Test Method for Acid and Base Number by Color-Indicator Titration.
   g. D1298, Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.
   h. D1500, Standard Test Method for ASTM Color of Petroleum Products.
   i. D1524, Standard Test Method for Visual Examination of Used Electrical Insulating Oils of Petroleum Origin in the Field.
   j. D1533, Standard Test Methods for Water in Insulating Liquids.
   k. D1816, Standard Test Method for Dielectric Breakdown Voltage of Insulating Oils of Petroleum Origin Using VDE Electrodes.

l. D2285, Standard Test Method for Interfacial Tension of Electrical Insulating Oils of Petroleum Origin Against Water by the Drop-Weight Method.

3. Institute of Electrical and Electronics Engineers (IEEE):
   a. 43, Recommended Practice for Testing Insulating Resistance of Rotating Machinery.
   b. 48, Standard Test Procedures and Requirements for High-Voltage Alternating-Current Cable Terminators.
   c. 81, Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.
   d. 95, Recommended Practice for Insulation Testing of Large AC Rotating Machinery with High Direct Voltage.
   e. 118, Standard Test Code for Resistance Measurement.
   f. 400, Guide for Making High-Direct-Voltage Tests on Power Cable Systems in the Field.
4. National Electrical Manufacturers Association (NEMA):
   a. AB 4, Guideline for Inspection and Preventive Maintenance of Molded Case Circuit Breakers Used in Commercial and Industrial Applications.
   b. PB 2, Deadfront Distribution Switchboards.
   c. WC 7, Cross-Linked-Thermosetting-Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
   d. WC 8, Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
5. International Electrical Testing Association (NETA): ATS, Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
6. National Fire Protection Association (NFPA):
   a. 70, National Electrical Code (NEC).
   b. 70E, Standard for Electrical Safety Requirements for Employee Workplaces.
7. National Institute for Certification in Engineering Technologies (NICET).
8. Occupational Safety and Health Administration (OSHA).

1.2 SUBMITTALS

A. Submittals shall be made in accordance with Section 16005, ELECTRICAL.

B. Information Submittals:

1. Submit 30 days prior to performing inspections or tests:
   a. Schedule for performing inspection and tests.
   b. List of references to be used for each test.

c. Sample copy of equipment and materials inspection form(s).
d. Sample copy of individual device test form.
e. Sample copy of individual system test form.

2. Submit within 30 days after completion of test:
3. Test or inspection reports and certificates for each electrical item tested.
4. Operation and Maintenance Data: After test or inspection reports and certificates have been reviewed by ENGINEER and returned, insert a copy of each in operation and maintenance manual.

1.3 QUALITY ASSURANCE

A. Test equipment shall have an operating accuracy equal to, or greater than, requirements established by NETA ATS.

B. Test instrument calibration shall be in accordance with NETA ATS.

1.4 SEQUENCING AND SCHEDULING

A. Perform inspection and electrical tests after equipment has been installed.

B. Perform tests with apparatus de-energized whenever feasible.

C. Inspection and electrical tests on energized equipment are to be:

1. Scheduled with ENGINEER prior to de-energization.
2. Minimized to avoid extended period of interruption to the operating plant equipment.

D. Notify ENGINEER at least 24 hours prior to performing tests on energized electrical equipment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

A. Tests specified in this Section apply to all sections in Division 16, ELECTRICAL. Applicable work specified herein shall be performed as if specified in the individual sections.

B. Tests and inspection shall establish that:

1. Electrical equipment is operational within industry and manufacturer's tolerances.
2. Installation operates properly.
3. Equipment is suitable for energization.

4. Installation conforms to requirements of Contract Documents and NFPA 70, NFPA 70E, and ANSI C2.

C. Perform inspection and testing in accordance with NETA ATS, industry standards, and manufacturer's recommendations.

D. Adjust mechanisms and moving parts for free mechanical movement.

E. Adjust adjustable relays and sensors to correspond to operating conditions, or as recommended by manufacturer.

F. Verify nameplate data for conformance to Contract Documents.

G. Realign equipment not properly aligned and correct unlevelness.

H. Properly anchor electrical equipment found to be inadequately anchored.

I. Tighten accessible bolted connections, including wiring connections, with calibrated torque wrench to manufacturer's recommendations, or as otherwise specified.

J. Clean contaminated surfaces with cleaning solvents as recommended by manufacturer.

K. Provide proper lubrication of applicable moving parts.

L. Inform ENGINEER of working clearances not in accordance with NFPA 70.

M. Investigate and repair or replace:

1. Electrical items that fail tests.
2. Active components not operating in accordance with manufacturer's instructions.
3. Damaged electrical equipment.

N. Electrical Enclosures:

1. Remove foreign material and moisture from enclosure interior.
2. Vacuum and wipe clean enclosure interior.
3. Remove corrosion found on metal surfaces.
4. Repair or replace, as determined by ENGINEER, door and panel sections having dented surfaces.
5. Repair or replace, as determined by ENGINEER, poor fitting doors and panel sections.
6. Repair or replace improperly operating latching, locking, or interlocking devices.

7. Replace missing or damaged hardware.
8. Finish:
   a. Provide matching paint and touch up scratches and mars.
   b. If required due to extensive damage, as determined by ENGINEER, refinish the entire assembly.

O. Replace fuses and circuit breakers that do not conform to size and type required by the Contract Documents.

3.2 LOW VOLTAGE CABLES, 600 VOLTS MAXIMUM

A. Visual and Mechanical Inspection:

1. Inspect Each Individual Exposed Power Cable No. 6 and Larger for:
   a. Physical damage.
   b. Proper connections in accordance with single-line diagram.
   c. Cable bends not in conformance with manufacturer's minimum allowable bending radius where applicable.
   d. Color coding conformance with specifications.
   e. Proper circuit identification.
2. Mechanical Connections For:
   a. Proper lug type for conductor material.
   b. Proper lug installation.
   c. Bolt torque level in accordance with NETA ATS, Table 10.1, unless otherwise specified by manufacturer.
3. Shielded Instrumentation Cables For:
   a. Proper shield grounding.
   b. Proper terminations.
   c. Proper circuit identification.
4. Control Cables For:
   a. Proper termination.
   b. Proper circuit identification.
5. Cables Terminated Through Window Type CTs: Verify that neutrals and grounds are terminated for correct operation of protective devices.

B. Electrical Tests for Conductors No. 6 and Larger:

1. Insulation Resistance Tests:
   a. Utilize 1,000-volt dc megohmmeter for 600-volt insulated conductors.
   b. Test each conductor with respect to ground and to adjacent conductors per IEEE 118 procedures for 1 minute.
   c. Evaluate ohmic values by comparison with conductors of same length and type.
   d. Investigate values less than 50 megohms.

2. Continuity test by ohmmeter method to ensure proper cable connections.

3.3 MOLDED CASE CIRCUIT BREAKERS

A. General: Inspection and testing limited to circuit breakers rated 70 amperes and larger.

B. Visual and Mechanical Inspection:

1. Proper mounting.
2. Proper conductor size.
3. Feeder designation according to nameplate and one-line diagram.
4. Cracked casings.
5. Connection bolt torque level in accordance with NETA ATS, Table 10.1.
6. Operate breaker to verify smooth operation.
7. Compare frame size and trip setting with circuit breaker schedules or one-line diagram.
8. Verify that terminals are suitable for 75 degrees C rated insulated conductors.

C. Electrical Tests:

1. Insulation Resistance Tests:
   a. Utilize 1,000-volt dc megohmmeter for 480- and 600-volt circuit breakers.
   b. Pole-to-pole and pole-to-ground with breaker contacts opened for 1 minute
   c. Pole-to-pole and pole-to-ground with breaker contacts closed for 1 minute.
   d. Test values to comply with NETA ATS, Table 10.2.
2. Contact Resistance Tests:
   a. Contact resistance in microhms across each pole.
   b. Investigate deviation of 50 percent or more from adjacent poles and similar breakers.

3.4 METERING

A. Visual and Mechanical Inspection:

1. Verify meter connections in accordance with appropriate diagrams.
2. Verify meter multipliers.
3. Verify that meter types and scales conform to Contract Documents.
4. Check calibration of meters at cardinal points.

3.5 GROUNDING SYSTEMS

A. Visual and Mechanical Inspection:

1. Equipment and circuit grounds in motor control center and mini power center assemblies for proper connection and tightness.
2. Ground bus connections in motor control center and mini power center assemblies for proper termination and tightness.
3. Effective transformer core and equipment grounding.
4. Accessible connections to grounding electrodes for proper fit and tightness.
5. Accessible exothermic-weld grounding connections to verify that molds were fully filled and proper bonding was obtained.

B. Electrical Tests:

1. Fall-Of-Potential Test:
   a. In accordance with IEEE 81, Section 8.2.1.5 for measurement of main ground system's resistance.
   b. Main ground electrode system resistance to ground to be no greater than 1 ohm.
2. Two-Point Direct Method Test:
   a. In accordance with IEEE 81, Section 8.2.1.1 for measurement of ground resistance between main ground system, equipment frames, and system neutral and derived neutral points.
   b. Equipment ground resistance shall not exceed main ground system resistance by 0.25 ohm.

3.6 AC INDUCTION MOTORS

A. General: Inspection and testing limited to motors rated 5 hp and larger.

B. Visual and Mechanical Inspection:

1. Proper electrical and grounding connections.
2. Shaft alignment.
3. Blockage of ventilating air passageways.
4. Operate Motor and Check For:
   a. Excessive mechanical and electrical noise.
   b. Overheating.
   c. Correct rotation.
   d. Check motor inherent protectors for functionability and proper operation.
   e. Excessive vibration.

C. Electrical Tests:

1. Insulation Resistance Tests:
   a. In accordance with IEEE 43 at test voltages established by NETA ATS, Table 10.2 for 1-minute duration with resistances tabulated at 30 and 60 seconds.
   b. Insulation resistance values equal to, or greater than, ohmic values established by manufacturers.
2. Measure running current and voltage, and evaluate relative to load conditions and nameplate full-load amperes.

3.7 LOW VOLTAGE MOTOR CONTROL

A. Visual and Mechanical Inspection:

1. Proper barrier and shutter installation and operation.
2. Proper operation of indicating and monitoring devices.
3. Proper overload protection for each motor.
4. Improper blockage of air cooling passages.
5. Proper operation of drawout elements.
6. Integrity and contamination of bus insulation system.
7. Check Door and Device Interlocking System By:
   a. Closure attempt of device when door is in OFF or OPEN position.
   b. Opening attempt of door when device is in ON or CLOSED position.
8. Check Nameplates for Proper Identification of:
   a. Equipment title with latest one-line diagram.
   b. Pushbuttons.
   c. Control switches.
   d. Pilot lights.
   e. Control relays.
   f. Circuit breakers.
9. Verify that fuse and circuit breaker sizes and types conform to Contract Documents.
10. Verify that current and potential transformer ratios conform to Contract Documents.
11. Check Bus Connections for High Resistance by Low Resistance Ohmmeter and Calibrated Torque Wrench Applied to Bolted Joints:
    a. Ohmic value to be zero.
    b. Bolt torque level in accordance with NETA ATS, Table 10.1, unless otherwise specified by manufacturer.
12. Check Operation and Sequencing of Electrical and Mechanical Interlock Systems By:
    a. Closure attempt for locked open devices.
    b. Opening attempt for locked closed devices.

13. Verify performance of each control device and feature furnished as part of the motor control center.
14. Control Wiring:
    a. Compare wiring to local and remote control, and protective devices with elementary diagrams.
    b. Check for proper conductor lacing and bundling.
    c. Check for proper conductor identification.
    d. Check for proper conductor lugs and connections.
15. Exercise active components.
16. Inspect Contactors For:
    a. Correct mechanical operations.
    b. Correct contact gap, wipe, alignment, and pressure.
    c. Correct torque of all connections.
17. Compare overload heater rating with full-load current for proper size.
18. Compare circuit breaker with motor characteristics and power factor correction capacitors for proper size.
19. Perform phasing check on double-ended motor control centers to ensure proper bus phasing from each source.

B. Electrical Tests:

1. Insulation Resistance Tests:
    a. Applied megohmmeter dc voltage in accordance with NETA ATS, Table 10.2.
    b. Bus section phase-to-phase and phase-to-ground for 1 minute on each phase.
    c. Contactor phase-to-ground and across open contacts for 1 minute on each phase.
    d. Starter section phase-to-phase and phase-to-ground on each phase with starter contacts closed and protective devices open.
    e. Test values to comply with NETA ATS, Table 10.2.
2. Overpotential Tests:
    a. Maximum applied ac voltage in accordance with NETA ATS, Table 7.1.2.
    b. Phase-to-phase and phase-to-ground for 1 minute for each phase of each bus section.
    c. Test results evaluated on pass/fail basis.
3. Current Injection Through Overload Unit at 300 Percent of Motor Full-Load Current and Monitor Trip Time:
    a. Trip time in accordance with manufacturer's published data.
    b. Investigate values in excess of 120 seconds.
4. Control Wiring Tests:
    a. Apply secondary voltage to control power and potential circuits.
    b. Check voltage levels at each point on terminal boards and each device terminal.

c. Insulation resistance test at 1,000 volts dc on control wiring except that connected to solid state components.
   1) Insulation resistance to be 1 megohm minimum.

5. Operational test by initiating control devices to affect proper operation.

3.8 AUTOMATIC TRANSFER SWITCH

A. Visual and Mechanical Inspection:

1. Check doors and panels for proper interlocking.
2. Check connections for high resistance by low resistance ohmmeter and calibrated torque wrench applied to bolted joints.
3. Check positive mechanical and electrical interlock between normal and alternate sources.
4. Check for Proper Operation:
   a. Manual transfer function switch.
   b. Generator under load and nonload conditions.
   c. Auto-exerciser of generator under load and no-load conditions.
5. Verify settings and operation of control devices.

B. Electrical Tests:

1. Insulation Resistance Tests:
   a. Applied megohmmeter dc voltage in accordance with NETA ATS, Table 10.2 for each phase with switch CLOSED in both source positions.
   b. Phase-to-phase and phase-to-ground for 1 minute.
   c. Test values in accordance with manufacturer's published data.
2. Contact Resistance Test:
   a. Contact resistance in microhms across each switch blade for both source positions.
   b. Investigate values exceeding 500 micro-ohms.
   c. Investigate values deviating from adjacent pole by more than 50 percent.
3. Set and Calibrate in Accordance with Specifications:
   a. Voltage and frequency sensing relays.
   b. Time delay relays.
   c. Engine start and shutdown relays.
4. Perform Automatic Transfer Tests By:
   a. Simulating loss of normal power.
   b. Return to normal power.
   c. Simulating loss of alternate power.
   d. Simulating single-phase conditions for normal and alternate sources.

5. Monitor and Verify Operation and Timing of:
   a. Normal and alternate voltage sensing relays.
   b. Engine start sequence.
   c. Timing delay upon transfer and retransfer.
   d. Engine cool down and shutdown.
   e. Interlocks and limit switch functions.

3.9 BATTERY SYSTEM

A. Visual and Mechanical Inspection:

1. Physical damage and electrolyte leakage.
2. Evidence of corrosion.
3. Intercell bus link integrity.
4. Battery cable insulation damage and contaminated surfaces.
5. Operating conditions of ventilating equipment.
6. Visual check of electrolyte level.

B. Electrical Tests:

1. Measure:
   a. Bank charging voltage.
   b. Individual cell voltage.
   c. Electrolyte specific gravity in each cell.
   d. Measured test values to be in accordance with manufacturer's published data.
2. Verify During Recharge Mode:
   a. Charging rates from charger.
   b. Individual cell acceptance of charge.
3. Load tests for integrity and capacity; test values in accordance with ANSI 450.

3.10 LOW VOLTAGE SURGE ARRESTOR

A. Visual and Mechanical Inspection:

1. Adequate clearances between arrestors and enclosures.
2. Ground connections to ground electrode.

B. Electrical Tests:

1. Varistor Type Arrestors:
   a. Clamping voltage test.
   b. Rated RMS voltage test.
   c. Rated dc voltage test.

d. Varistor arrestor test values in accordance with ANSI C62.33, Sections 4.4 and 4.7.

3.11 STANDBY GENERATOR SYSTEM

A. Visual and Mechanical Inspection:

1. Proper grounding.
2. Blockage of ventilating passageways.
3. Proper operation of jack water heaters.
4. Integrity of engine cooling and fuel supply systems.
5. Excessive mechanical and electrical noise.
6. Overheating of engine or generator.
7. Proper installation of vibration isolators.
8. Proper cooling liquid type and level.
9. Operate Engine-Generator and Check For:
   a. Excessive mechanical and electrical noise.
   b. Overheating.
   c. Correct rotation.
   d. Check resistance temperature detectors or generator inherent thermal protectors for functionability and proper operation.
   e. Excessive vibration.
10. Verify that voltage regulator and governor operation will cause unit speed and output voltage to stabilize at proper values within reasonable length of time.
11. Proper operation of meters and instruments.
12. Compare generator nameplate rating and connection with one-line diagram.

B. Electrical and Mechanical Tests:

1. Cold start test by interrupting normal power source with test load consisting of connected building load to verify:
   a. Transfer switch operation.
   b. Automatic starting operation.
   c. Operating ability of engine-generator.
   d. Overcurrent devices capability to withstand inrush currents.
2. Phase rotation tests.
3. Test Engine Protective Shutdown Features For:
   a. Low oil pressure.
   b. Overtemperature.
   c. Overspeed.
4. Vibration base-line test levels in accordance with manufacturer's recommendations.

5. One-Step Rated kW Load Pickup Test:
   a. Apply rated load, minus largest rated hp motor, to generator.
   b. Start largest rated hp motor and record voltage drop for 20 cycles minimum with high-speed chart recorder or digital storage oscilloscope.
   c. Compare voltage drop with maximum allowable voltage dip for specified starting situation.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this Section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 16230
DIESEL ENGINE GENERATOR SET

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. American Society for Testing and Materials (ASTM): A335/A335M, Standard Specification for Seamless Ferritic Alloy-Steel Pipe for High-Temperature Service.
2. Diesel Engine Manufacturer's Association (DEMA): Standard Practices for Stationary and Gas Engines.
3. National Electric Manufacturer's Association (NEMA):
   a. MG 1, Motors and Generators.
   b. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
4. National Fire Protection Association (NFPA): 110, Emergency and Standby Power Systems.
5. Institute of Electrical and Electronics Engineers (IEEE): 519, Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.
6. Underwriters Laboratories, Inc. (UL): 2200, Stationary Engine Generator Assemblies.
7. Uniform Building Code (UBC): Section 2312, Earthquake Requirements.
8. Military Specifications (MIL): E-4970A, General Specification for Environmental Testing, Ground Support Equipment.

1.2 SUBMITTALS

A. Submittals shall be made in accordance with Section 16005, ELECTRICAL.

B. Action Submittals: Shop Drawings:

1. Dimensioned outline drawing showing plan and elevations of the proposed engine generator set and drive system, including locations of all accessories and anchoring requirements.
2. Engine and generator weights.
3. Catalog information and technical description of the proposed engine generator set. Include proposed materials and dimensions for the block, heads, valves, rings, cylinders, pistons, crankshaft, and major bearings and wear surfaces.

4. Complete list of accessories provided.
   a. Engine and generator manufacturer's names.
   b. Number of cylinders, in-line or vee.
   c. Bore and stroke/piston at rated rpm.
   d. Displacement in cubic inches.
   e. Brake Mean Effective Pressure (BMEP) at rated capacity (kW).
   f. Generator capacity in kW, kVA, and power factor.
   g. NEMA MG 1-22.40 temperature rise rating of generator stator and rotor insulation.
   h. Automatic voltage regulator manufacturer performance criteria.
   i. Number and type of bearings.
   j. Type of generator exciter.
   k. Certified engine horsepower at the ambient and elevation specified.
5. Performance curves showing engine efficiency (fuel consumed per kWh output), gross fuel consumption rate, and kW output at design rated output, one-half load, and one-quarter load. Account for design altitude and temperature corrections and for engine parasitic loads.
6. Generator transient and subtransient reactances in per unit.
7. Generator output waveform and telephone interference factor (TIF).
8. Electrical schematic and wiring diagrams:
   a. Generator control panel.
   b. Main generator.
   c. Voltage regulator.
   d. Battery charging system.
   e. Governing system.
   f. Interconnection wiring diagram for automatic transfer switch specified in Section 16410, AUTOMATIC TRANSFER SWITCH.
9. Control panel instrument identification inscriptions.
10. Engine generator set motor starting capability and percent voltage dip curve.
11. Block heater size and voltage.

C. Informational Submittals:

1. Operation and maintenance data.
2. Description of parts and service availability.
3. Certification, copies of analyses, or test reports demonstrating appropriate vibration analysis and design in all modes.
4. Certified Factory Test Report.
5. Manufacturer's Certificate of Performance.
6. Manufacturer's Certificate of Proper Installation.
7. Special guarantee.

1.3 QUALITY ASSURANCE

A. Authority Having Jurisdiction (AHJ):

1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

1.4 SPECIAL GUARANTEE

A. Provide manufacturer's extended guarantee or warranty, with OWNER named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of the OWNER, removal and replacement of Work specified in this Specification section found defective during a period of 2 years after the date of Substantial Completion.

1.5 EXTRA MATERIALS

A. Furnish, tag, and box for shipment and storage the following spare parts and special tools:

Item	Quantity
Diesel fuel line filter elements	3 complete sets
Lubricating oil filter elements with gasket	3 complete sets
Air cleaner filter element	1 complete set
Auxiliary fuel and jacket water pump packing/seals	1 complete set
Cooling fan drive belt (if applicable)	2 complete sets
Hydrometer	1 each
Two-pronged battery voltmeter	1 each
Special tools required to maintain or dismantle engine generator set	1 complete set
Spare fuses, if used in the control panel	1 complete set
Spare indicating lamps	4 each type used

B. Provide a spare parts and cost list which includes, but is not limited to the following:

1. Fuel oil filter element and gasket.
2. Lubricating oil filter element and gasket.
3. Air cleaner filter element.
4. Packing set for each auxiliary pump.
5. V-belts for fan and pump drives.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Materials and equipment specified in this Section shall be products of:

1. Onan; Model 125DGDK.
2. Caterpillar.
3. Waukesha.
4. Kohler Power Series.
5. Detroit Diesel.

2.2 SERVICE CONDITIONS

A. Altitude: 1,000 feet above sea level.

B. Ambient Temperature at Air Intake: 104 degrees F maximum.

C. Ambient Temperature Range at Engine Generator Set: 0 to 104 degrees F.

D. Humidity: 0 to 95 percent relative (noncondensing).

E. Seismic: Uniform Building Code (UBC) Seismic Zone 3, Importance Factor 1.0.

2.3 ENGINE GENERATOR SET VIBRATION DESIGN

A. Meet applicable Diesel Engine Manufacturer's Association (DEMA) vibration standards.

B. Use vibration analytical techniques to determine the shaft critical speeds, and to develop bearing design and shaft balancing to mitigate vibration.

C. Apply torsional analysis and design to mitigate torsional vibration.

D. The engine and generator, individually, shall not exhibit vibration in any plane exceeding 10 mils at continuous rating point, when measured at the attachment points to the common steel subbase.

2.4 ENGINE

A. General:

1. Manufacturer's standard design, unless otherwise specified.
2. Engine parts designed with adequate strength for specified duty.
3. Meet requirements of the DEMA Standard Practices for Stationary and Gas Engines.

B. Type and Rating: Diesel Cycle, 4-stroke type suitable for a standby output of 125 kW when driving a synchronous generator at a speed not exceeding 1,800 rpm.

C. Starting System:

1. Type: Automatic, using a 12-volt or 24-volt battery-driven starter acting in response to the control panel.
2. Starting motor shall be the positive engagement type with sufficient capacity to crank the engine at starting speed for 1 minute without overheating.
3. Batteries:
   a. Lead-acid, heavy-duty type.
   b. 200 amp-hour capacity at 12-volts, minimum.
   c. Capable of providing cranking current at 0 degrees F.
   d. Housed in an acid-resistant frame for mounting on a concrete pad adjacent to the engine inside the overall weatherproof enclosure.
   e. Located such that maintenance and inspection of the engine is not hindered.
4. Battery Charger:
   a. Float type, with taper charging capability, a float range of 2.17 volts/cell, and an equalization range of 2.33 volts/cell, minimum.
   b. Include ammeter, voltmeter, fused ac input and dc output, pilot light, current failure relay, low/high dc voltage alarm relay, and surge suppressors.
   c. Alarm relay dry contacts rated 5 amps at 120V ac.
   d. Input: 120V ac.
   e. Provide battery starting cables of adequate size and length.

D. Fuel and Governing System:

1. Transfer Pump:
   a. Engine-driven.
   b. Capable of pumping fuel from base-mounted fuel storage tank to the engine.

2. Fuel Tank:
   a. Base-mounted tank with integral secondary containment in accordance with UL requirements.
   b. Sufficient capacity for a minimum 18 hours of operation at the rated load of 125 kW.
   c. Fuel tank capacity (e.g., "180 gallons") shall be painted on a visible section of the tank with black letters (white letters if tank is black) 2 inches high, minimum.
   d. Fuel tank shall include a drain, 1-1/4-inch fuel gauge, 2-inch vent, and 4-inch fill line with dry break connection with dust cap and chain accessible from outside the weather-proof enclosure without opening the enclosure.
   e. Fuel tank shall include leak detection in the interstitial space between the inner and outer tank shells and low fuel level detection.
   f. Fuel tank leak and low level alarms shall be provided with local indication at the engine generator control panel.
   g. Fuel tank shall be configured for full coverage of unit base area with unit conduit riser located outside plan area of unit.
   h. Fuel tank shall be configured such that the top of the Control Panel is 6 feet 7 inches or less above finished grade.
3. Fuel Oil Filter:
   a. Primary and secondary fuel oil filters.
   b. Replaceable element type.
4. Fuel Connections to Engine: Flexible hose, suitable for application.
5. Governor:
   a. Precision electronic governor of the constant speed type.
   b. Capable of maintaining a steady state band width of not more than plus or minus 0.25 percent at any constant load from no-load to full-load.
   c. Capable of maintaining isochronous governed speed at 60 Hz at any load from no-load to full-load.
   d. Accessories:
      1) Manual speed control device.
      2) Positive overspeed trip switch.

E. Jacket Water Cooling System:

1. Engine-mounted radiator with jacket water pump, fan assembly, fan guard, and duct flange outlet.
2. Engine thermostat to regulate engine water temperature as recommended by the manufacturer.
3. Jacket Water Heaters:
   a. Suitable for operation on 120-volt, 60-Hz current (1,000 W, maximum).

b. Maintain engine water temperature at 120 degrees F with an ambient temperature of 50 degrees F.
c. Thermostatically controlled.

4. Engine Cooling Liquid: Mixture of water and permanent type antifreeze to protect the system to a temperature of minus 30 degrees F.

F. Lubrication System:

1. Type: Full-pressure.
2. Accessories:
   a. Pressure switch to initiate shutdown on low oil pressure.
   b. Oil filter with replaceable element.
   c. Bayonet type oil level stick.
   d. Valved oil drain extension.
3. Oil Cooling System: Water-cooled heat exchanger utilizing jacket water.

G. Exhaust System:

1. Muffler: Rated for residential critical silencing.
2. Exhaust Pipe: ASTM A335, Grade P11, standard wall, with fittings selected to match piping materials.
3. Pipe Connections: Welded.
4. Engine Connection:
   a. Flanged, flexible, corrugated, stainless steel expansion fitting, specifically suited for diesel exhaust service.
   b. Length as required for flexibility and expansion in the piping arrangement shown.

H. Air Intake System: Equipped with a dry type air cleaner with filter service indicator.

2.5 GENERATOR

A. General:

1. Meet requirements of NEMA MG 1.
2. Synchronous salient-pole type with amortisseur winding in rotor.
3. Stator Windings:
   a. Skewed for smooth voltage waveform.
   b. Reconnectable, 12 lead.

B. Ratings:

1. Standby: 125 kW, 156 kVA at 0.8 power factor
2. Voltage: 480Y/277 volts, three-phase, 4-wire, 60-Hz.
3. Overspeed Capability: 150 percent.

4. Waveform Deviation from Sine Wave: 5 percent maximum.
5. Telephone Interference Factor: 50 maximum.
6. Total Harmonic Factor: 5 percent maximum.
7. Subtransient Reactance: Not more than 12 percent.

C. Insulation System:

1. Class H in accordance with NEMA MG 1; 150 degrees C temperature rise at full rated load.
2. Vacuum impregnated, epoxy varnish.
3. Fungus resistant in accordance with MIL Spec E-4970A.

D. Voltage Regulation:

1. Solid state, permanent magnet generator (PMG), automatic, three-phase sensing type with over-and under-voltage protection.
2. Adjustable output voltage level to plus or minus 5 percent.

E. Voltage and Frequency Regulation Performance:

1. Steady State Voltage Regulation: Less than plus or minus 1 percent from no-load to continuous rating point.
2. NEMA MG 1 Defined Transient Voltage Dip:
   a. Less than 20 percent at rapid application of rated load.
   b. Recovery to rated voltage and frequency within 2 seconds following initial load application.
3. Steady State Frequency Regulation: Plus or minus 1.5-Hz overload range.

F. Motor Starting Capability:

1. Two step load application.
2. Steady State Load: 10 kVA at 0.8 power factor; Step 1.
3. 88 hp Motor Load: Solid-state, soft-start, reduced voltage motor starter; Step 2.

G. Short Circuit Capabilities: Sustain 250 percent of rated current for 10 seconds for an external three-phase bolted fault without exceeding rated temperatures.

H. Enclosure: Dripproof.

I. Main Circuit Breaker:

1. Type: Molded case.
2. Current Rating: 225 amps.
3. Interrupt Rating: 25,000 amps RMS symmetrical at 480 volts.

4. Short Time Rating: 25,000 amps RMS symmetrical.
5. Trips: Thermal-magnetic with inverse time characteristics and adjustable magnetic pickup.
6. Enclosure:
   a. Rating: NEMA 250, Type 12.
   b. Mounted with vibration isolation from engine generator set.
7. Surge Protective Devices: Three-phase capacitors and arrestors mounted in terminal compartment.

2.6 BASEPLATE

A. Mount engine generator set on a rigid common steel base frame.

B. Base frame shall be stiffened to minimize deflections.

2.7 VIBRATION ISOLATORS

A. Performance: Limit vibration transmissibility to 10 percent at each frequency.

B. Manufacturer: Korfund rated for specified seismic zone.

2.8 FACTORY FINISHING

A. Engine Generator Set and Instrument Panel: Factory-applied primer and two finish coats of the manufacturer's standard heat-resistant engine paint.

2.9 AUTOMATIC LOAD TRANSFER CONTROL

A. Automatic run controls shall be suitable for remote interface and control by an automatic transfer switch. engine generator set shall start and run upon closure of a remote dry contact in accordance with Section 16410, AUTOMATIC TRANSFER SWITCH.

2.10 CONTROL SYSTEM

A. Control Panel:

1. Rating: NEMA 250, Type 12.
2. Material: Steel.
3. Instrument Identification: Face label or engraved, black, laminated plastic nameplate with white 1/4-inch high letters, attached with Type 422 stainless steel screws.

B. Instrumentation:

1. Type: Suitable for engine-mounted vibration environment.
2. Mounting: Non-shock mounted.

3. Alarm and Signal Contacts: Rated 5 amps at 120V ac, dry.
4. Fault Indication Lamps: Push-to-test LED type.
5. Meters: 3.5-inch, 240-degree scale, plus or minus 2 percent accuracy.

C. Operator Controls and Indicators:

1. RUN/OFF/AUTO selector switch.
2. Generator voltage adjustment.
3. Voltmeter PHASE SELECTOR switch.
4. Ammeter PHASE SELECTOR switch.
5. Voltmeter.
6. Ammeter.
7. FREQUENCY meter.
8. Engine OIL PRESSURE indicator.
9. Engine jacket WATER TEMPERATURE indicator.
10. Engine SPEED indicator.
11. Fuel PRESSURE indicator.
12. RUNNING TIME indicator.
13. DC battery voltage.

D. Alarm Indicators With Manual Pushbutton RESET:

1. Low oil pressure.
2. High jacket water temperature.
3. Engine overspeed.
4. Engine overcrank.
5. Low/High dc voltage.
6. Fuel tank leak.
7. Fuel tank low level.

E. External Interfaces:

1. Furnish a single, common DPDT relay output when an alarm (trouble) condition occurs.
2. Furnish a single, common DPDT relay output when an engine shutdown (FAIL) condition occurs.
3. Furnish a single, common DPDT relay output when the "engine is running" (ON).
4. Output: Dry contact rated 5 amps at 120V ac.
5. Accept remote dry start contact closure from Automatic Transfer Switch, rated 10 amps at 32V dc.

F. Functional Requirements:

1. Recranking Lockout: When engine fires, starting control shall automatically disconnect cranking control to prevent recranking for a preset period of time after engine stop.
2. Overcranking Lockout: Initiate after four cranking cycles of 10 seconds on and 10 seconds off or after manufacturer's recommended cranking cycles.
3. Engine shutdown upon any of the following conditions:
   a. Engine overspeed.
   b. High jacket water temperature.
   c. Low oil pressure.
   d. Overcrank.
4. Air Inlet Damper Opening: Upon engine start sequence initiation, a normally open, dry contact, rated 5 amps at 120V ac, from the engine start circuit shall open to provide a signal to keep air inlet dampers open during engine operation (inlet dampers: energized closed, spring open when deenergized).

G. Special Requirements:

1. Mount battery charger in control panel.
2. Mount battery charger instrumentation on face of control panel and match generator instrumentation.

H. Power Requirements: 120-volt, single-phase.

2.11 WEATHERPROOF ENCLOSURE

A. Provide a weatherproof, sound attenuated, steel enclosure (14-gauge minimum) to house the engine-generator equipment with air intake louvers with bird screens, gravity-operated air discharge louvers, and gasketed access doors with keylock latches and piano-type continuous hinges.

1. Access doors shall have no more than a 6-inch high threshold at the bottom of the doors and a 6-inch high header below the roof at the top of the doors.
2. National Electrical Code (NEC) working clearances shall be provided for the engine-generator and load bank control panels mounted inside the engine-generator weatherproof enclosure.

B. Provide necessary soundproofing materials and components such that measured noise from the engine-generator at any load, does not exceed 75 dBA at a distance of 23 feet from the enclosure (Onan "Quiet Site II", or equal).

C. Provide a 12 or 24V dc, 2-pole (positive, negative ground), automotive receptacle with weatherproof cover. Mount the receptacle in a stationary part of the weatherproof enclosure (accessible from outside the enclosure without opening the enclosure) near the starting control panel. Wire the receptacle directly to the battery. Provide two plugs that match the receptacle for use on portable light cords provided by others.

2.12 FACTORY TESTS

A. General: Conform to NFPA 110.

B. Steady Load Test: Test engine generator set at steady load run of 60 minutes minimum duration at 100 percent full-rated load.

C. Transient Load Test: Conduct transient load test to demonstrate ability to meet the load pickup and load release requirements specified.

D. Harmonic Test: Conduct at full load conditions.

E. Record and Report:

1. Strip chart recording and full harmonic analysis measuring up to the 50th harmonic for both voltage and current and three phases simultaneously.
2. Transient response.
3. Load/speed stability.
4. Engine fuel consumption.
5. Power output.
6. Harmonic analysis.

PART 3 EXECUTION

3.1 INSTALLATION

A. Level and securely mount engine generator set in accordance with the manufacturer's recommendations.

B. Where applicable, mount engine generator set on vibration isolators in accordance with isolator manufacturer's recommendations.

3.2 FIELD FINISHING

A. Touch up damaged coating with paint system compatible to existing.

3.3 FIELD TESTS

A. In conjunction with Section 16080, ELECTRICAL TESTING.

B. General: Conform to NFPA 110.

C. Performance Test:

1. Perform upon completion of installation.
2. Operate 2 hours minimum.
3. Manufacturer's representative shall make necessary adjustments.
4. Demonstrate ability of engine generator set to carry specified loads.
5. Demonstrate engine generator set safety shutdowns.

D. Test Report: Record and report the following:

1. Electric load on generator.
2. Fuel consumption.
3. Exhaust temperature.
4. Ambient air temperature.
5. Safety shutdown performance results.

E. Post-Test Requirements:

1. Make final adjustments.
2. Replace fuel and oil filters.
3. Check belt drive tensions.
4. Demonstrate proper operation of equipment, including automatic operation with control from automatic transfer switch, to ENGINEER and OWNER.

3.4 MANUFACTURER'S FIELD SERVICES

A. Manufacturer's Representative: Present at site or classroom designated by OWNER, for minimum person-days listed below, travel time excluded:

1. 1 person-day for installation assistance and inspection.
2. 1 person-day for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
3. 1/2 person-day for facility startup.
4. 1/2 person-day for training of OWNER's personnel. Training shall not commence until an accepted detailed lesson plan for training activity has been reviewed by OWNER and ENGINEER.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 16410
AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. American National Standards Institute (ANSI): C37.90.1, Surge Withstand Capacity (SWC) Tests for Protective Relays and Relay Systems.
2. National Electrical Manufacturers Association (NEMA):
   a. ICS 1, General Standards for Industrial Control and Systems: General Requirements.
   b. ICS 2, Industrial Control and Systems Controllers, Contactors, and Overload Relays not more than 2000 volts ac or 750 volts ac.
   c. ICS 6, Industrial Control And Systems: Enclosures 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
3. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
4. Underwriters Laboratories, Inc. (UL): 1008, Transfer Switch Equipment.
5. Uniform Building Code (UBC): Section 2312, Earthquake Requirements.

1.2 SUBMITTALS

A. Submittals shall be made in accordance with Section 16005, ELECTRICAL.

B. In addition, the following specific information shall be provided:

1. Shop Drawings:
   a. Descriptive product information.
   b. Dimensional drawings.
   c. Control diagrams.
   d. Conduit entrance locations.
   e. Equipment ratings.
2. Quality Control Submittals:
   a. Manufacturer's Certificate of Proper Installation.
   b. Operation and Maintenance Manual.
   c. Factory Certified test reports per Article FACTORY TESTS.

1.3 QUALITY ASSURANCE

A. Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. ASCO.

B. Zenith.

C. Cutler-Hammer.

2.2 GENERAL

A. Transfer switch to be product of a single manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's service.

B. In accordance with applicable standards of NFPA 70, NEMA ICS 1, NEMA ICS 2, NEMA ICS 6, ANSI C37.90.1, and UL 1008.

C. Transfer switch consisting of inherently double-throw power switch unit with interconnected control module.

D. Rated 100 percent, in amperes, for total system transfer of motor, electric heating, discharge lamp loads, and tungsten-filament lamp loads.

E. Main and arcing contacts visible for inspection with cabinet door and barrier covers removed.

F. Suitable for 480 volts, three-phase, three-wire, electrical service having an available short circuit current at line terminals of 35,000 amperes rms symmetrical.

G. Switch Rating: 400 continuous amperes in motor control center compartment.

H. Current carrying capacity of arcing contacts shall not be used to determine the transfer switch rating.

I. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

J. Operating Conditions:

1. Ambient Temperature: Maximum 40 degrees C.
2. Seismic: Uniform Building Code (UBC) Seismic Zone 3, Importance Factor 1.0. Transfer switch shall have an applied UBC Seismic Zone 3 certification label.
3. Equipment to be fully rated without any derating for operating conditions listed above.

2.3 ENCLOSURE

A. Type: Open for mounting in motor control center.

2.4 TRANSFER SWITCH

A. Type: Electrically operated, mechanically held, double-throw.

B. Momentarily energized, single-electrically operated mechanism energized from source to which load is to be transferred.

C. Locking mechanism to maintain constant contact pressure.

D. Mechanical interlock switch to ensure only one of two possible switch positions or time delay in neutral position.

E. Silver alloy contacts protected by arcing contacts.

F. Main and arcing contacts visible when door is open and barrier covers removed.

G. Manual operating handle accessible from the front of the MCC compartment with the compartment door closed for transfer in either direction under either loaded or unloaded conditions.

H. Internal control wire connections made with ring or spade type terminals, lock washers, and sleeve type marking labels.

2.5 CONTROL MODULE

A. Completely enclosed and mounted separately from the transfer switch unit.

B. Microprocessor for sensing and logic control with inherent digital communications capability or plug-in printed circuit boards for sensing and control logic.

C. Plug-in, industrial grade interfacing relays with dust covers.

D. Connected to transfer switch by wiring harness having keyed disconnect plug.

E. Plug-in printed circuit boards for sensing and control logic.

F. Adjustable solid state undervoltage sensors for all three phases of normal source and for one phase of standby engine generator source:

1. Pickup 85 to 100 percent nominal.
2. Dropout 75 to 98 percent of pickup setting.

G. Adjustable frequency sensors for standby engine generator source:

1. Pickup 90 to 100 percent nominal.
2. Dropout 87 to 89 percent of pickup setting.

H. Control module with adjustable time delays:

1. 0- to 5-minute engine start delay.
2. 0- to 5-minute load transfer to standby engine generator delay.
3. 0- to 30-minute retransfer to normal from standby engine generator delay.
4. 0- to 30-minute unloaded running time delay for standby engine generator.
5. Switch to bypass any of the above time delays during testing.

I. Form-C start contacts, rated 10 amperes, 32-volt dc, for two-wire engine control, wired to terminal block.

J. Exerciser, adjustable in 15-minute increments, 7-day dial clock to automatically exercise generator without load transfer, complete with door mounted NO LOAD and LOAD selector switch.

K. Adjustable electronic time delay relay for delay in neutral position.

L. All above functions may be included in a solid state control module.

2.6 METERING INSTRUMENTS

A. Meters to be connected to load side of transfer switch and mounted on transfer switch motor control center compartment door.

B. Ammeter: LED digital type with current transformers, three-phase, line-to-line, OFF, four-position selector switch.

C. Voltmeter: LED digital type with three-phase, line-to-line, OFF, four-position selector switch and 600-volt scale as applicable.

D. All above control functions may be included in a solid state control module.

2.7 INDICATORS

A. Type: Clustered light-emitting diodes.

B. Green lens to indicate switch position for normal power source.

C. Red lens to indicate switch position for standby engine generator power source.

D. Provide one normally open and one normally closed, 5 amperes, 120-volt contact for remote indication when transfer switch is in either position.

2.8 FACTORY TESTS

A. Test to Ensure Correct:

1. Operation of individual components.
2. Sequence of operation.
3. Transfer time, voltage, frequency, and time delay settings.

B. Dielectric strength test per NEMA ICS 1.

C. Factory certified test reports.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure transfer switch in motor control center compartment as required for specified seismic conditions.

3.2 FIELD QUALITY CONTROL

A. In accordance with Section 16080, ELECTRICAL TESTING.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

SECTION 16440
LOW VOLTAGE MOTOR CONTROL

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this Section:

1. American National Standard Institute (ANSI): C57.12.28, Switchgear and Transformers—Pad-Mounted Equipment—Enclosure Integrity.
2. National Electrical Manufacturers Association (NEMA):
   a. AB1, Molded Case Circuit Breakers.
   b. ICS 1, General Standards for Industrial Control and Systems.
   c. ICS 2, Standards for Industrial Control Devices, Controllers, and Assemblies.
   d. ICS 2.3, Instructions for Handling, Installation, Operation, and Maintenance of Motor Control Centers
   e. 250, Enclosures for Electrical Equipment (1,000 volts maximum).
3. National Fire Protection Association (NFPA): 70, National Electrical Code. (NEC)
4. Underwriters Laboratories, Inc. (UL):
   a. 489, Standard for Safety Molded Case Circuit Breakers and Circuit Breaker Enclosures, Seventh Edition.
   b. 845, Standard for Safety Motor Control Centers, Third Edition.
5. Uniform Building Code (UBC): Section 2312, Earthquake Requirements.

1.2 SUBMITTALS

A. Submittals shall be made in accordance with Section 16005, ELECTRICAL.

B. Action Submittals: Shop Drawings:

1. Itemized bill of material.
2. Descriptive information on motor control center, circuit breakers, motor starters, status lights, etc.
3. Dimensional drawings.
4. Conduit entrance locations.
5. Bus data.
6. Protective Devices: Copies of time-current characteristics.
7. Operational description.
8. Anchoring instructions and details.
9. Typed Tabulation:
   a. Motor name as shown on Drawings.

b. Motor horsepower.
c. Nameplate full load current.
d. Measured load current and voltage.
e. Heater catalog number.
f. Protective device trip settings.

10. Attach above typed, tabulated data to a copy of starter manufacturer's overload heater selection tables for the starters provided.
11. Control Diagrams:
    a. NEMA ICS 2, Section 322.08 Type IIS.
    b. Wiring Type B.
    c. In addition to standard NEMA control diagrams, provide the following:
        1) Remote control devices.
        2) Remote indication and/or pilot lights.
        3) Interconnections and interlocking circuits between starter and remote equipment.
        4) Remote sensors.
        5) Device names associated with all control devices and equipment.
12. One-line diagrams.
13. Schematic (elementary) diagrams.
14. Outline diagrams.
15. Interconnection diagrams.

C. Information Submittals:

1. Manufacturer's installation instructions.
2. Operation and maintenance data.
3. Factory test reports, certified.

1.3 QUALITY ASSURANCE

A. Authority Having Jurisdiction (AHJ):

1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

1.4 PACKING AND SHIPPING

A. Shipping Splits: Established by CONTRACTOR to facilitate ingress of equipment to final installation location within the building.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. General Electric.

B. Square D.

C. Allen Bradley.

D. Cutler-Hammer.

E. Siemens.

2.2 MOTOR CONTROL

A. General:

1. Like Items of Equipment: End product of one manufacturer.
2. Make adjustments as necessary to wiring, conduit, disconnect devices, motor starters, branch circuit protection, and other affected material or equipment to accommodate motors actually provided under this Contract.
3. Controllers: NEMA ICS 2, Class A.
4. Thermal Overload Protection:
   a. Inverse-time-limit characteristic.
   b. Heater: Class 10, bimetallic overload, adjustable trip.
   c. Relay Trip: Standard, Class 20.
   d. Manual reset.
   e. Provide in each ungrounded phase.
   f. Mount within starter unit.
5. Control Transformer:
   a. Two winding, 120-volt secondary, primary voltage to suit.
   b. Two current-limiting fuses for primary circuit.
   c. One fuse in secondary circuit.
   d. Mount within starter unit.
6. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
7. Lifting lugs on all equipment and devices weighing over 50 pounds.
8. Anchor Bolts: Galvanized, sized by equipment manufacturer.

9. Operating Conditiόns:
   a. Ambient Temperature: Maximum 40 degrees C.
   b. Seismic: Uniform Building Code (UBC) Seismic Zone 3, Importance Factor 1.0.
   c. Equipment to be fully rated without any derating for operating conditions listed above.
10. Enclosures: In accordance with NEMA 250 and ANSI C57.12.28.
11. Equipment Finish:
   a. Electrocoating process applied over rust-inhibiting phosphated base coating.
   b. Exterior Color: Provide manufacturer's standard.

2.3 MOTOR CONTROL CENTERS

A. General:

1. In accordance with NEMA ICS 2 and UL 845.
2. Voltage Rating: 600 volts.
3. Short Circuit Rating: 42,000 amperes rms symmetrical for entire motor control center as a complete assembly.
4. All controllers, main and branch circuit breakers, wire connections, and other devices to be front mounted and accessible unless otherwise noted.
5. NEMA ICS 2, Section 322.08.
   a. Class IIS.
   b. Type B.
   c. Provide blank spaces on interconnection diagrams to add control conductor code designations during installation of equipment.

B. Enclosure:

1. Type: NEMA 250 Type 1, gasketed.
2. Vertical Section Dimensions: 78 inches high, maximum 20 inches wide, 20 inches deep.
3. Construction:
   a. Sheet steel reinforced with channel or angle irons.
   b. Butt sections flush, end-to-end against similar section without bolts, nuts, or cover plates causing interference.
   c. Removable top cover plates and bottom cover plates.
   d. Removable plates on end panels for future bus extension.
4. Section Mounting: Removable formed-steel channel sills and lifting angles to meet specified seismic requirements.
5. Horizontal Wiring Compartments: Accessible from front, full width, top and bottom.
6. Vertical Wiring Compartment: Full height, isolated from unit starters with separate door.

7. Unit Compartment: Individual compartments separated by steel barriers for each starter, feeder, or other unit capable of being wired from front without unit removal.
8. Compartment Doors: Separate hinged doors for each starter, feeder, or other unit.
9. Door Interlocking: Interlock starter and feeder doors mechanically so doors cannot be opened with unit energized. Provide defeater mechanism to allow intentional access at any time.
10. External disconnect handles, padlockable in OFF position.
11. Cable Entrance: Main leads enter from bottom; control and feeder circuits enter from bottom.
12. Control Diagrams: Provide in a designated compartment (see MCC Elevation on Drawings) for control diagrams for each motor starter in the MCC lineup. Label each control diagram with the name of the drive to which it applies. Provide a nameplate on the compartment door which reads: "FOR STORAGE OF CONTROL DIAGRAMS".

C. Bus:

1. Bus Bar Phase Arrangement: Phases A-B-C, left-to-right, top-to-bottom, and front-to-rear as viewed from motor control center front.
2. Horizontal Power Bus:
   a. Three-phase tin-plated, fully-insulated, copper, entire width of control center, rated 600 amperes.
   b. Construct to allow future extension of additional sections.
   c. Pressure type solderless lugs for each incoming line cable.
   d. Isolated from top horizontal wireway.
   e. Provide Belleville washers on bus connection bolts.
3. Vertical Power Bus:
   a. Three-phase tin-plated, fully-insulated, copper, full height of section, rated 300 amperes.
   b. Sandwich type bus insulation providing deadfront construction with starter units removed except for bus stab openings.
   c. Insulated and isolated barrier complete with shutters.
   d. Provide Belleville washers on bus connection bolts.
4. Neutral Bus: None.
5. Ground Bus:
   a. Copper, tin-plated, 33 percent minimum of phase bus ampacity, entire width of control center.
   b. Provide Belleville washers on bus connection bolts.
6. Bus Bracing: 42,000 amperes rms symmetrical.

D. Motor Controller Unit:

1. Provide indicated individual components and control devices including pushbuttons, selector switches, indicating lights, control relays, time delay relays, and elapsed time meters as specified in Section 16005, ELECTRICAL.
2. Construction:
   a. Bolt-on combination type with cable connection to riser.
   b. Readily interchangeable with starters of similar size.
   c. Pull-apart unit control wiring terminal boards on all units.
3. Starters:
   a. NEMA ICS 2, Section 322.08 standard rating.
   b. Rating: Hp rated at 600 volt, UL listed for 42,000 amperes with overload protection.
   c. Three-phase, nonreversing.
   d. Disconnect Type: Circuit breaker.
   e. Combination Solid-State, Soft-Start, Reduced Voltage Motor Starter:
      1) NEMA Size 4.
      2) Starter with bypass and power factor correction capacitor contactors.
      3) Control: As shown on Drawings.
      4) Pilot Lights: Red – ON.
   f. Padlockable operating handle when de-energized.
   g. Unit door interlocked to prevent opening when disconnect is in closed position.
   h. Mechanical interlocked to prevent placing disconnect in ON position when unit door is open.
   i. Minimum Dimensions: 12 inches high by full section width, less vertical wireway.
4. Disconnecting Device:
   a. In each starter, control circuit disconnect to de-energize circuits in unit which are not de-energized by starter power disconnect device.
   b. Padlockable in OPEN position.
5. Circuit Breaker:
   a. Meeting the requirements of NEMA AB1 and UL 489.
   b. Molded case with manufacturer's recommended trip setting for maximum motor protection.
   c. Thermal-magnetic trip.
   d. Tripping indicated by operating-handle position.
   e. Interrupting capacity required for connection to system with short circuit capacity indicated.

6. Motor Overload Protection:
   a. Temperature compensated, three-pole relay with bi-metallic, adjustable trip elements.
   b. Manual-reset overload relays.
7. Capacitor Connection: Terminals to allow easy connection of power factor correction capacitors on source side of starter overload relays on starters where capacitor connection is shown.

E. Feeder Unit and Main Protective Device:

1. Construction: As specified in paragraph Motor Controller Unit.
2. Incoming Service Feeder: Cable entering section at bottom.
3. Molded Case Circuit Breaker:
   a. In accordance with NEMA AB1 and UL 489.
   b. Main and feeder protective device.
   c. Thermal-magnetic trip and interrupting capacity required for connection to system with short circuit capacity indicated.
   d. Indicate tripping by operating-handle position.
   e. Suitable for use with 75 degrees C wire at full NEC 75 degrees C ampacity.

F. Automatic Transfer Switch: As specified in Section 16410, AUTOMATIC TRANSFER SWITCH.

G. Pushbuttons, Indicating Lights, and Selector Switches: As specified in Section 16005, ELECTRICAL.

H. Elapsed Time Meters: As specified in Section 16005, ELECTRICAL.

I. Time Delay Relays: As specified in Section 16005, ELECTRICAL.

J. Control Relays: As specified in Section 16005, ELECTRICAL.

K. Nameplates:

1. Laminated plastic; white, engraved to black core.
2. Provide for motor control center and each unit.
3. Engrave with generic name and tag number inscription shown on one-line diagram and MCC elevation.
   a. 1/2 inch (minimum) for MCC name.
   b. 1/4 inch (minimum) for unit compartment equipment name and tag number, etc.
   c. 1/8 inch (minimum) for device/load description.
4. Provide blank nameplates on spaces for future units.
5. Attach with stainless steel panhead screws on face of control center.

L. Factory Testing: NEMA ICS 1, Section 109.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install equipment in accordance with NEMA ICS 2.3, Submittal Drawings, and Manufacturer's Instructions and Recommendations.

B. Secure equipment to mounting pads with anchor bolts of sufficient size and number and with top of MCC wall bracing adequate for specified seismic conditions.

C. Install equipment plumb and in longitudinal alignment with pad or wall.

D. Coordinate terminal connections with installation of secondary feeders.

E. Grout mounting channels into floor or mounting pads.

F. Retighten current-carrying bolted connections and enclosure support framing and panels to manufacturer's recommendations.

3.2 CIRCUIT BREAKERS

A. Field adjust trip settings of motor starter circuit breakers.

B. Adjust to approximately 11 times motor rated current.

C. Determine motor rated current from motor nameplate following installation.

3.3 OVERLOAD RELAY

A. Select and install overload relay heaters after the actual nameplate full-load current rating of motor has been determined.

3.4 MOTOR DATA

A. Provide typed, self-adhesive label attached inside each motor starter enclosure door displaying the following information:

1. Motor served by tag number and equipment name.
2. Nameplate horsepower.
3. Motor code letter.
4. Full load amperes.
5. Service factor.
6. Installed overload relay heater catalog number.

3.5 FIELD QUALITY CONTROL

A. In accordance with Section 16080, ELECTRICAL TESTING.

3.6 MANUFACTURER'S SERVICES

A. Furnish manufacturer's representative for the following services at jobsite or classroom as designated by OWNER, for minimum person-days listed below, travel time excluded:

1. 1/2 person-day for installation assistance, and inspection of installation.
2. 1/2 person-day for functional and performance testing.
3. 1/2 person-day for plant startup.

PART 4 PAYMENT

4.1 GENERAL

A. Payment for the work in this section will be included as part of the lump sum bid amount stated in the Bid Form.

END OF SECTION

PART 5

DRAWINGS

CITY OF NEWBERG
STANDARD DRAWINGS

The following City of Newberg Standard Drawings are included in this Contract:

Drawing No.	Title
519	Manhole Adjustment

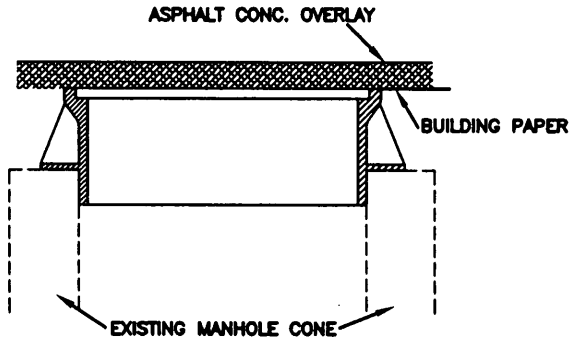
CONSTRUCTION SEQUENCE

STEP 1 COVER MANHOLE WITH BUILDING PAPER AND CONSTRUCT OVERLAY ACROSS EXISTING MANHOLES.

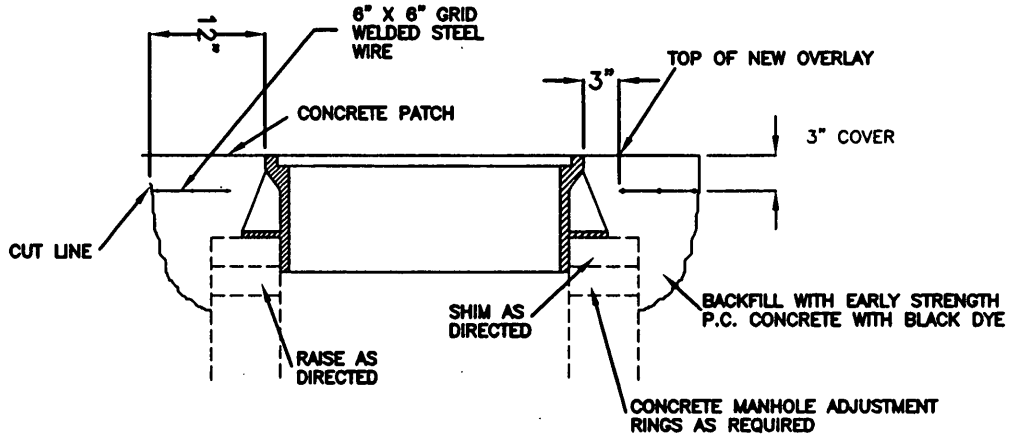
STEP 2 CUT RECTANGULAR EXCAVATION AROUND MANHOLE 12" MIN. FROM MANHOLE FRAME.

STEP 3 RAISE MANHOLE FRAME AND INSTALL CONCRETE RINGS AND SHIM TO FINISH PAVEMENT PROFILE AND CROSS SLOPE.

STEP 4 BACKFILL WITH EARLY STRENGTH CONCRETE AND ASPHALT CONCRETE TO DEPTHS AS DIRECTED.



STEP 1



STEPS 2, 3 AND 4

NOTES:
1. SAWCUT A 6 FOOT SQUARE DIAMOND PATTERN EXCAVATION AROUND MANHOLE
2. APPLY CURING COMPOUND TO FINISHED CONCRETE
3. SEAL PAVING JOINT WITH APPROVED MATERIAL AND METHOD.

City of Newberg
414 E. FIRST STREET
NEWBERG, OREGON 97132

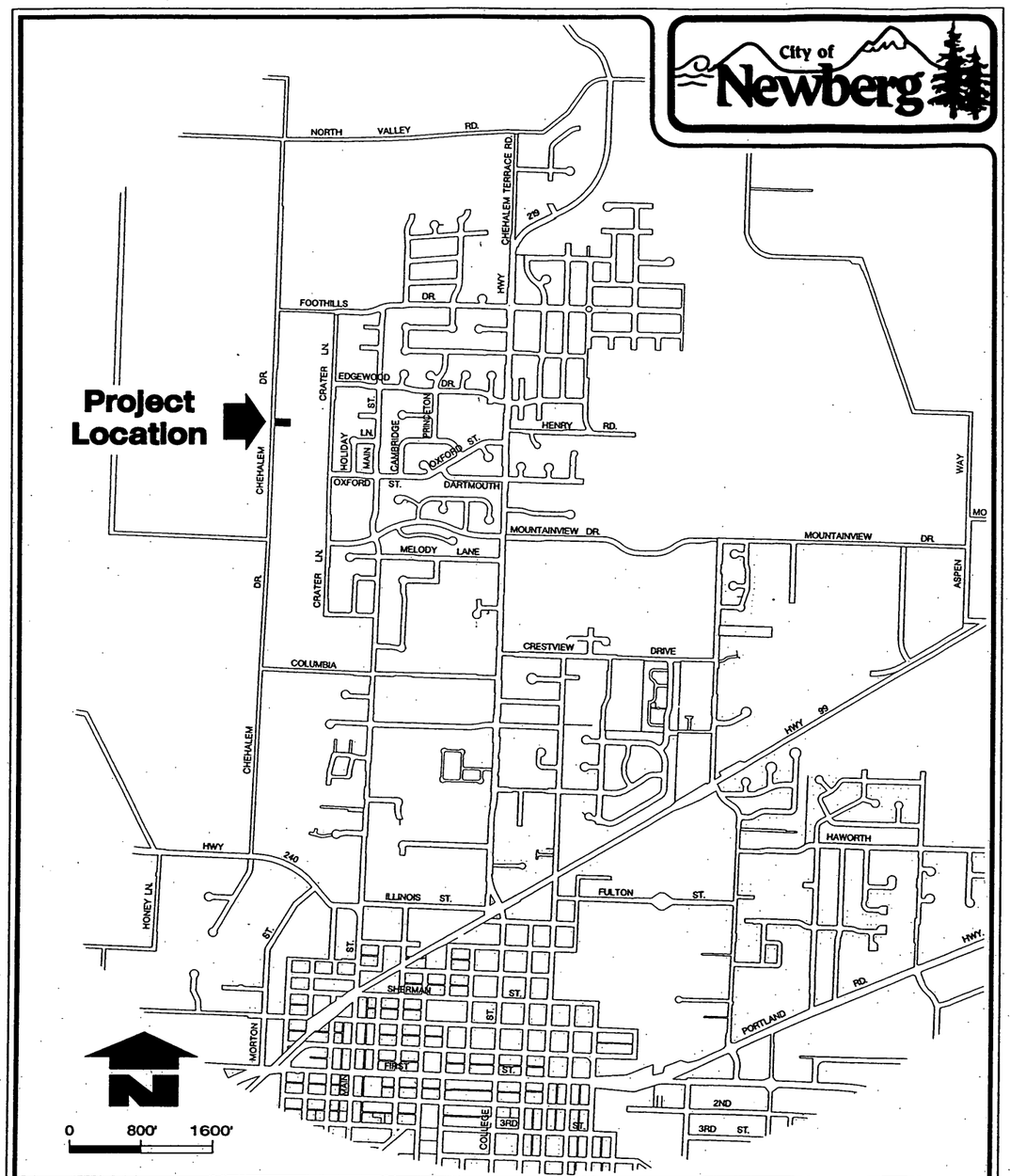
MANHOLE ADJUSTMENT

STANDARD DRAWING 519

APP. BY: D. DANICIC

DATE: JAN 2003

SCALE: N.T.S.



LOCATION MAP

The City of Newberg

CHEHALEM DRIVE SEWAGE PUMP STATION

INDEX TO DRAWINGS

SHEET NUMBER	TITLE
1	LOCATION MAP AND INDEX TO DRAWINGS
2	DESIGN DATA, NOTES, AND LEGEND
3	PUMP STATION EXISTING SITE PLAN
4	PUMP STATION NEW SITE PLAN
5	PUMP STATION PLANS
6	PUMP STATION SECTION
7	ELECTRIC BUILDING PLAN AND SECTION
8	DETAILS
9	DETAILS
10	PUMP STATION ELECTRICAL SITE PLAN
11	ELECTRICAL LEGEND, ABBREVIATIONS, AND SCHEMATICS
12	ELECTRICAL ONE-LINE DIAGRAM, MCC ELEVATION, AND PANEL SCHEDULE
13	ELECTRICAL BUILDING PLAN AND SECTION
14	ELECTRICAL CONTROL DIAGRAM, SCADA PANEL, AND SCHEMATIC
15	ELECTRICAL DETAILS
16	ELECTRICAL DETAILS

REGISTERED PROFESSIONAL ENGINEER 8208 OREGON JULY 12, 1985 RONALD P. STAFFELDT

Ronald P. Staffeldt

EXPIRES 6/30/04

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DESIGN BY:
SOUTHWOOD ENGINEERING CORPORATION
3301 SOUTHWOOD DR.
PHILOMATH, OR 97370
(541) 929-2533

DRAWN BY:
NEW TECH GRAPHICS
510 3RD ST NW
CORVALLIS, OR 97330
(541) 753-9021

REVISIONS	
NO.	DATE

CITY OF NEWBERG, OREGON
CHEHALEM DRIVE SEWAGE PUMP STATION

LOCATION MAP AND INDEX TO DRAWINGS

SHEET
1 of 16
DATE
May 2003

RAW SEWAGE PUMP STATION DESIGN DATA

CHEHALEM DRIVE PUMP STATION

LOCATION	CHEHALEM DRIVE, 1,300 FEET SOUTH OF FOOTHILLS DRIVE
TYPE	DUPLEX SUBMERSIBLE
PUMP TYPE	CONSTANT SPEED NON-CLOG
CAPACITY	630 GPM @ 112 FT TDH (0.9 MGD)
PUMP HP	30 HP EACH, 480V, 3 PHASE
LEVEL CONTROL	ULTRASONIC
OVERFLOW POINT	OVERFLOWS FROM OVERFLOW PIPE IN WET PIT INTO CREEK ALONG SOUTH SIDE OF PUMP STATION SITE. CREEK FLOWS WEST TO CHEHALEM CREEK.
OVERFLOW DISCHARGE	CHEHALEM CREEK / WILLAMETTE RIVER
AVERAGE TIME TO OVERFLOW	34.2 MIN @ 260 GPM AVG Q
ALARM TELEMETRY TYPE	CONTROL MICROSYSTEMS SCADAPACK
AUXILLARY POWER TYPE	STANDBY ENGINE GENERATOR, DIESEL
STORAGE LOCATION	PUMP STATION SITE
OUTPUT	125kW
FUEL TANK CAPACITY	180 GALLONS / 18 HOURS
TRANSFER SWITCH	AUTOMATIC

FORCE MAIN

LENGTH, TYPE	1,225 FEET, 6 INCH PVC PIPE AND, 1,895 FEET, 8 INCH PVC PIPE
PROFILE	CONTINUOUSLY ASCENDING
DISCHARGE	GRAVITY SEWER MANHOLE
AIR RELEASE VALVE	NONE
VACUUM RELEASE VALVE	NONE
DETENTION	25.6 MIN @ AVG Q, 10.5 MIN @ ULT Q
SULFIDE CONTROL SYSTEM	NONE

NOTES FOR SHEET 4

1. CONNECT TO SEWER AND FORCE MAIN PIPES AT PROPERTY LINE. SEWER AND FORCE MAIN IN ROW WILL BE INSTALLED BY OTHERS. SEWER BETWEEN WET PIT AND MH 1 SHALL BE TESTED UNDER THIS CONTRACT.
2. CONSTRUCT RECTANGULAR CATCH BASIN, RIM EL 192.3, PIPE INVT EL 189.7, BOTTOM EL 188.7. PROVIDE INLAND FOUNDRY REVERSIBLE FRAME AND GRATE STYLE C-2, OR EQUAL.
3. CONSTRUCT 6 INCH PVC (3034) STORM DRAIN. SLOPE 1.0 PERCENT. CORE DRILL WET PIT AND INSTALL PIPE WITH RUBBER MANHOLE BOOT.
4. CONSTRUCT 8 INCH THICK CONCRETE PAVEMENT W/ #4 BARS AT 12" E.W. IN CENTER OF SLAB. PROVIDE 12 INCH MINIMUM OF 3/4" INCH MINUS CRUSHED ROCK BASE, COMPACTED TO 90 PERCENT OF RELATIVE DENSITY BELOW CONCRETE. PROVIDE GEOTEXTILE FABRIC BELOW ROCK BASE.
5. CONSTRUCT CHAIN LINK FENCE.
6. CONSTRUCT 12 FOOT ROLLING GATE.
7. CONSTRUCT 12 INCH CORRUGATED HDPE CULVERT 75 FEET LONG.
8. SAWCUT AND REMOVE EXISTING AC PAVEMENT 6 INCHES FROM EDGE.
9. CONSTRUCT 6 INCH THICK AC PAVEMENT. PROVIDE 12 INCH MIN OF 3/4 INCH MINUS CRUSHED ROCK BASE, COMPACTED TO 90 PERCENT OF RELATIVE DENSITY BELOW PAVEMENT.
10. PROVIDE 50 FOOT RADIUS IN AC PAVEMENT AND EXTEND TO EXISTING PAVEMENT.
11. PROVIDE CONCRETE WHEEL STOP 6' LONG x 6" HIGH. ANCHOR WITH 2-#5 REBAR IN PAVEMENT.
12. PROVIDE 1 INCH OPEN GRADED CRUSHED QUARRY ROCK, 6 INCHES THICK.
13. WATER LINE IN ROW, 1 INCH SERVICE LINE TO METER, AND METER BOX WILL BE INSTALLED BY OTHERS.
14. PROVIDE 1 INCH COPPER SERVICE FROM METER TO BACKFLOW PREVENTER. METER WILL BE PROVIDED AND INSTALLED BY OWNER.
15. PROVIDE 1 INCH REDUCED PRESSURE BACKFLOW PREVENTER AND HOSE VALVE IN FIBERGLASS SHELTER WITH 500 WATT HEATER. LOCATE SHELTER SO IT WILL NOT CONTACT FENCE IN THE OPEN POSITION. SEE DET 1 ON SHT 9.
16. ADJUST TOP OF EXISTING MH TO MATCH FINISHED GRADE. SEE CITY OF NEWBERG STD DWG 519.
17. CONSTRUCT 8" PVC (3034) OVERFLOW PIPE TO DITCH. SLOPE 0.004 FT/FT AND PROVIDE FLAP GATE ON END. INVERT ELEVATION AT WET PIT: 189.00.
18. CONSTRUCT REMOVABLE BOLLARD. SEE DET 3 ON SHT 8.
19. CONSTRUCT 3" PVC ROOF DRAIN. CONNECT TO 6" STORM DRAIN.
20. TRANSITION FROM D.I. TO PVC PIPE AT 45 DEGREE BEND.
21. PROVIDE ARBORVITAE WITH 12" MINIMUM HEIGHT, BALLED AND BURLAPPED OR IN TWO-GALLON CANS, AND SPACED AT 3 FOOT CENTERS.
22. PROVIDE 8 SARGENT JUNIPER IN 4" CONTAINERS SPACED AT 2 FOOT CENTERS. PROVIDE 12" OF TOP SOIL AND 3" BARK MULCH IN PLANTING AREA.

LEGEND:

NEW

- WATER OR SEWER LINE W/ STATIONING (IN 100'S OF FEET)
- GATE VALVE
- FIRE HYDRANT
- PAVEMENT REPLACEMENT (A.C. UNLESS SHOWN OTHERWISE)
- 6" BO — BLOWOFF WITH SIZE
- TRENCH BACKFILL CLASSIFICATION
- 12" PVC — SIZE AND TYPE OF PIPE

EXISTING

- 8"W(PVC) — WATERLINE WITH SIZE AND TYPE
- GATE VALVE
- FIRE HYDRANT
- 6" BO — BLOWOFF
- 12"S — SANITARY SEWER WITH MANHOLE
- 6"FM — FORCE MAIN
- 8"SS — STORM SEWER WITH CATCH BASIN AND MANHOLE
- 2"G — GAS PIPELINE
- E — UNDERGROUND ELECTRICAL
- T — UNDERGROUND TELEPHONE CABLE
- TV — UNDERGROUND TELEVISION CABLE
- 6"W — WATER LINE
- WM — WATER METER
- 12" CMP — CULVERT WITH SIZE AND TYPE
- FENCE LINE
- PP — POWER POLE
- PP — POWER POLE WITH GUY ANCHOR
- 192.5 — EXISTING GROUND ELEVATION

GENERAL

- PROPERTY LINE
- EL — EASEMENT LINE
- 20'T — WIDTH OF TEMPORARY EASEMENT
- 30'P — WIDTH OF PERMANENT EASEMENT
- CENTERLINE (℄)
- DITCH SHOWING DIRECTION OF FLOW
- BM-2 — BENCH MARK LOCATION AND NUMBER
- MB — MAIL BOX

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 12, 1985 — RONALD P. STAEHLIN
EXPIRES 6/30/04

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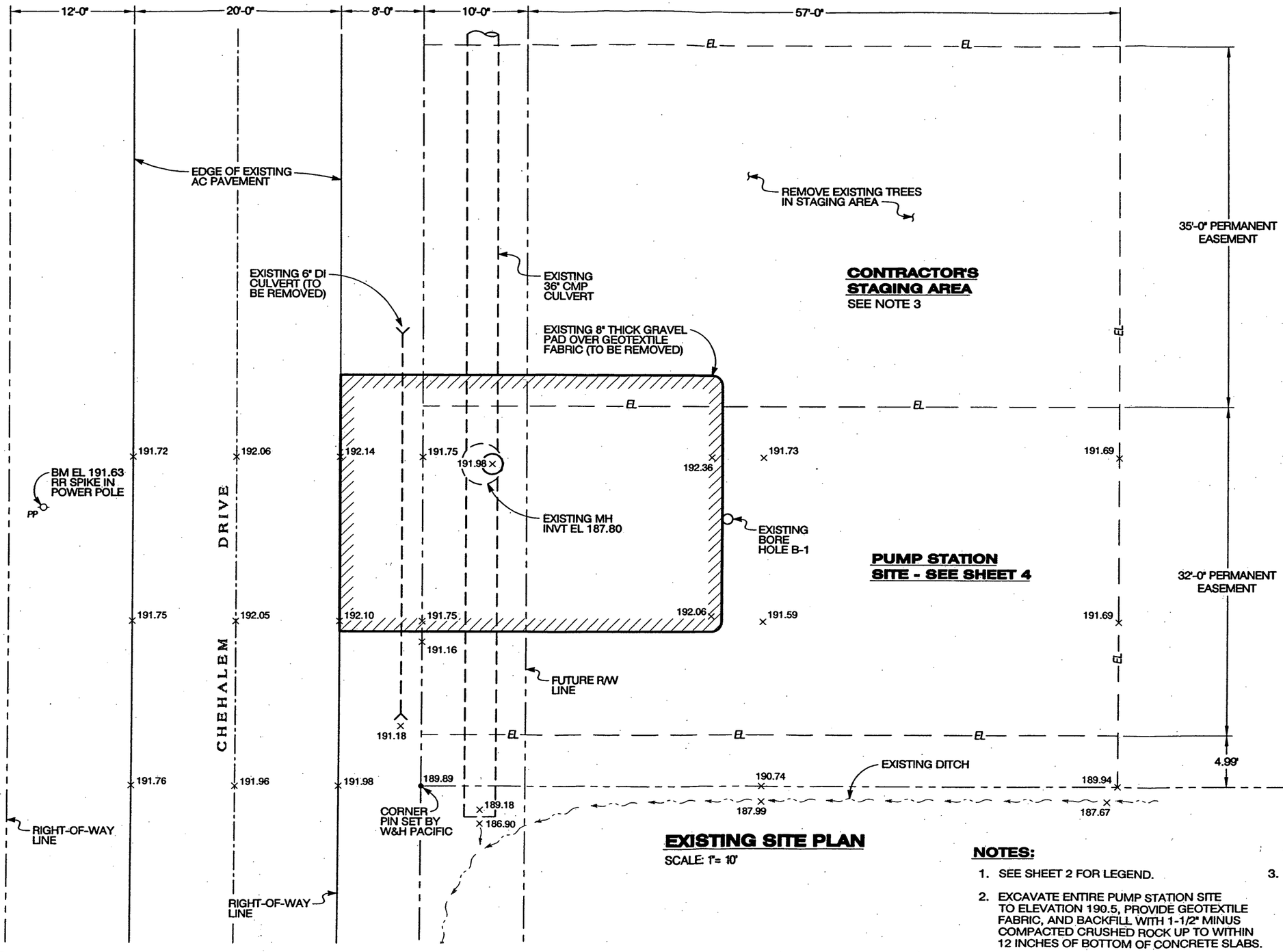

EXISTING SITE PLAN

SCALE: 1"= 10'

NOTES:

1. SEE SHEET 2 FOR LEGEND.
2. EXCAVATE ENTIRE PUMP STATION SITE TO ELEVATION 190.5, PROVIDE GEOTEXTILE FABRIC, AND BACKFILL WITH 1-1/2" MINUS COMPACTED CRUSHED ROCK UP TO WITHIN 12 INCHES OF BOTTOM OF CONCRETE SLABS.
3. CONSTRUCT TEMPORARY ACCESS DRIVEWAY AND FENCE FOR STAGING AREA AS REQUIRED DURING CONSTRUCTION. REMOVE AT COMPLETION OF CONSTRUCTION AND RESTORE SITE TO IT'S ORIGINAL CONDITION.

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 12, 1985 — RONALD P. STAERKEL

Ronald P. Staerkel

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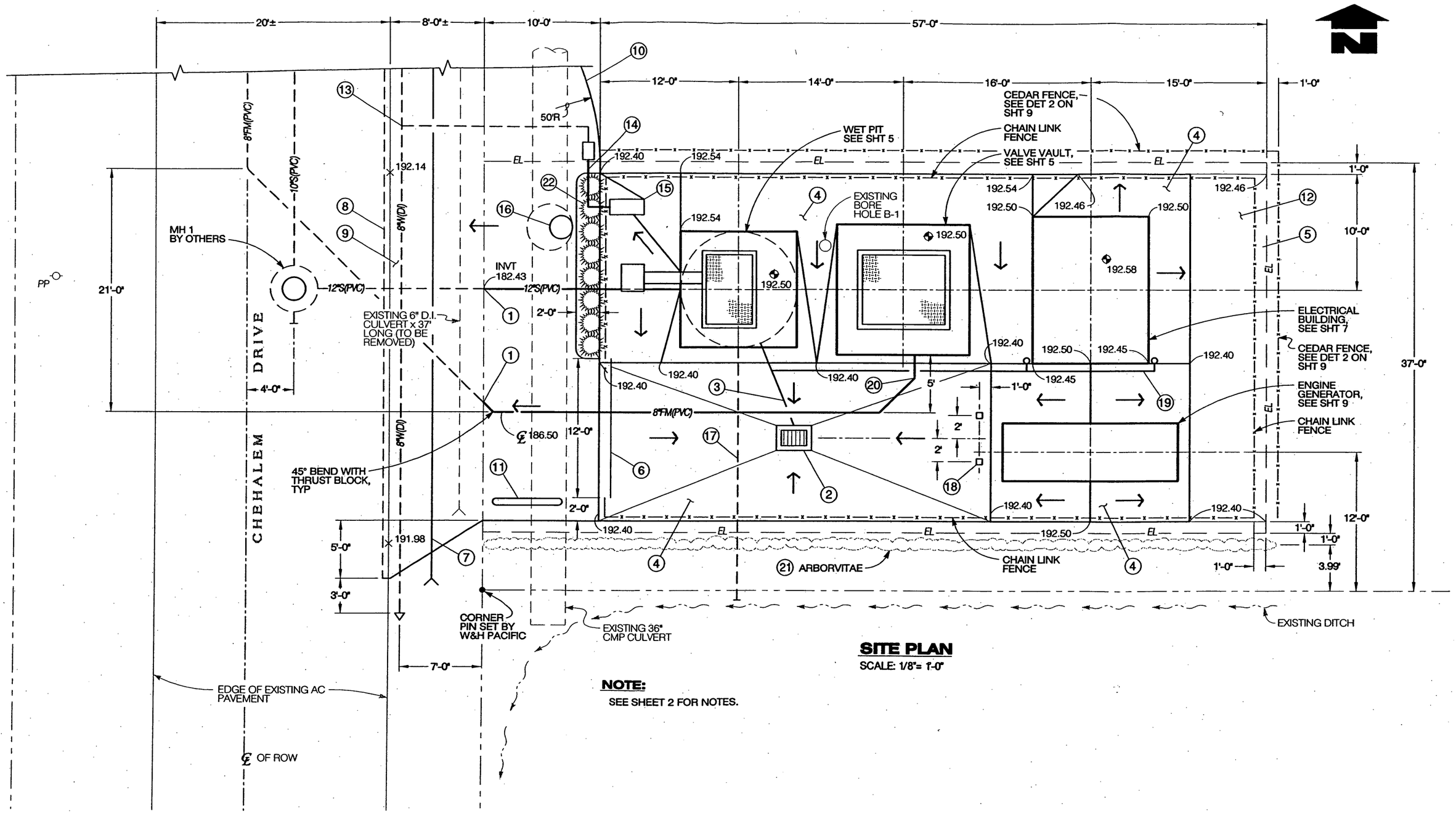
CITY OF NEWBERG, OREGON

CHEHALEM DRIVE SEWAGE PUMP STATION

PUMP STATION EXISTING SITE PLAN

SHEET 3 of 16

DATE May 2003



SITE PLAN

SCALE: 1/8"= 1'-0"

NOTE:

SEE SHEET 2 FOR NOTES.

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 12, 1985 — RONALD P. STAEHLIN

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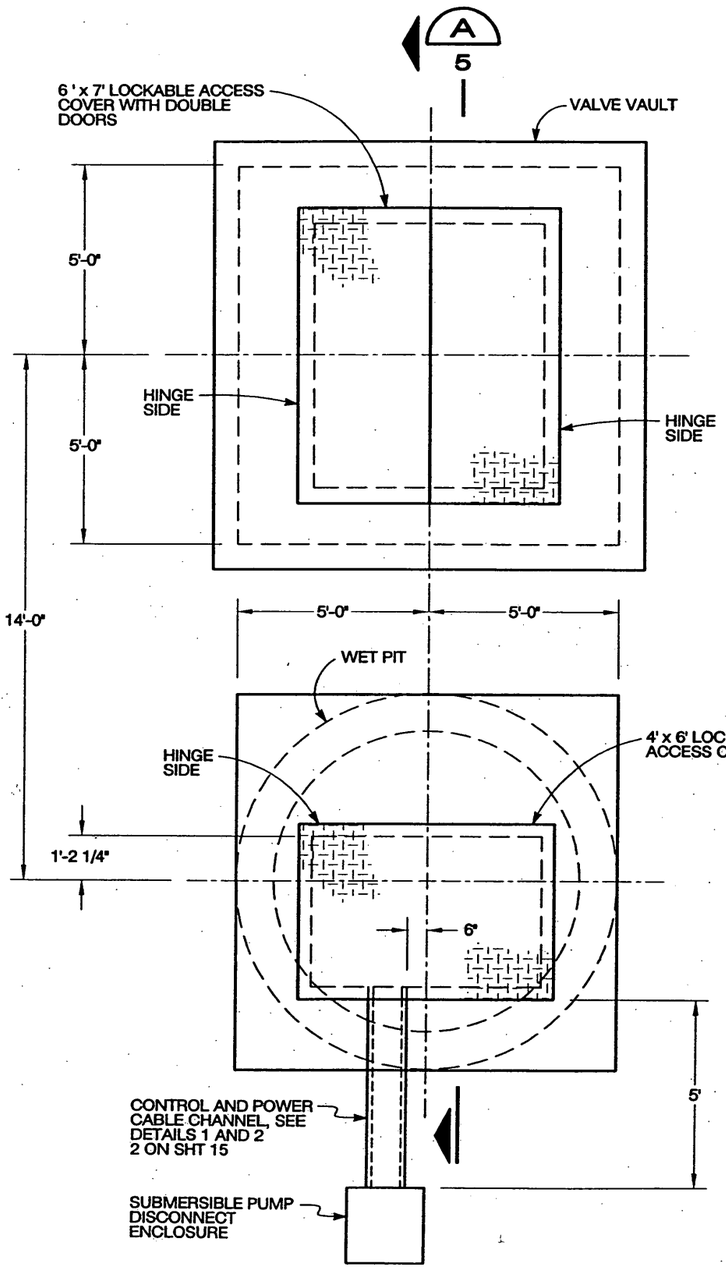
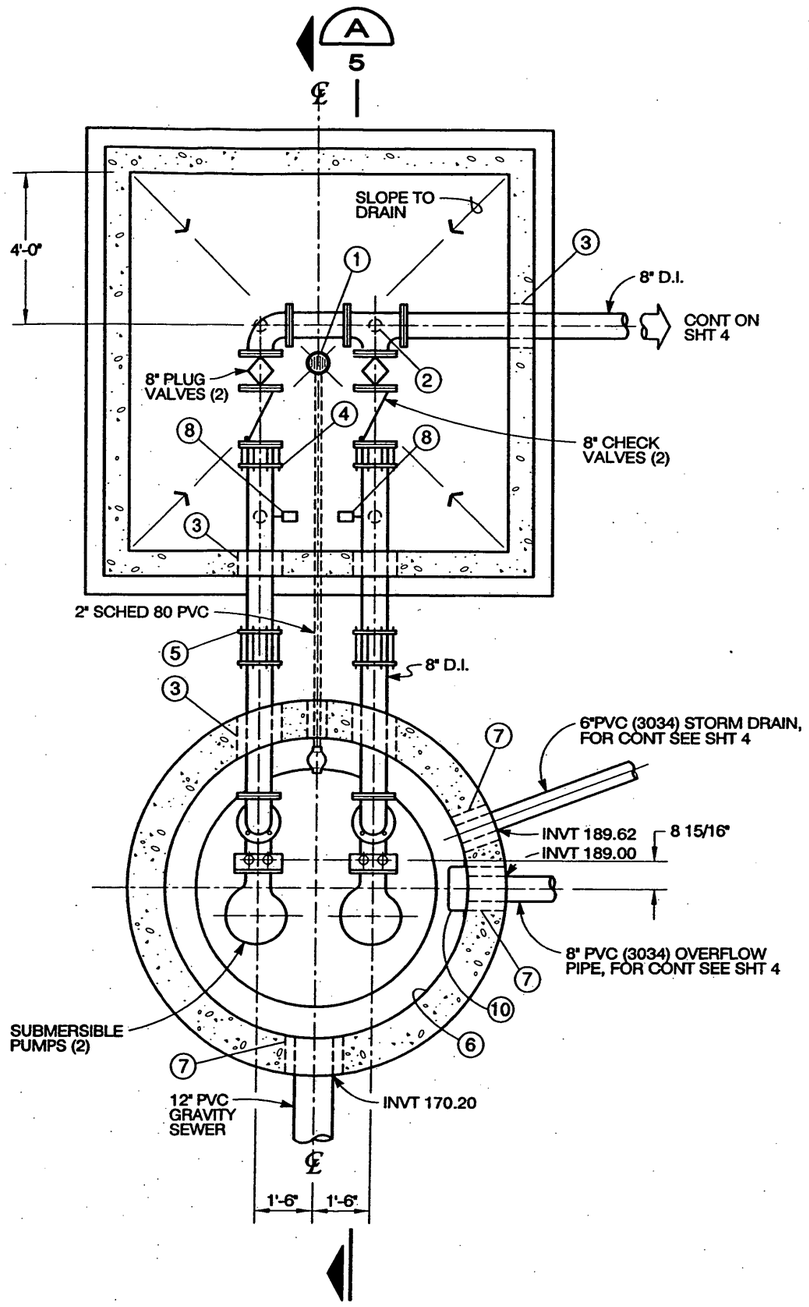
CITY OF NEWBERG, OREGON	CHEHALEM DRIVE SEWAGE PUMP STATION
PUMP STATION NEW SITE PLAN	SHEET 4 of 16; DATE May 2003



PLAN ABOVE GRADE

SCALE: 1/4"= 1'-0"



PLAN BELOW GRADE

SCALE: 1/4"= 1'-0"

N

NOTES:

1. PROVIDE 2 INCH FLOOR DRAIN WITH P-TRAP IN CENTER OF VALVE VAULT.
2. PROVIDE PIPE SUPPORT, SEE SHEET 8.
3. PROVIDE PIPE SLEEVE IN WALL OR CORE DRILL HOLE AND PROVIDE MODULAR MECHANICAL SEAL WITH STAINLESS STEEL BOLTS, NUTS, AND WASHERS. SEE DET 5 ON SHEET 8.
4. PROVIDE FLANGED COUPLING ADAPTORS WITH THRUST PROTECTION.
5. PROVIDE FLEXIBLE COUPLINGS WITH THRUST PROTECTION.
6. COAT WET PIT WALLS WITH 80 MILS MINIMUM RAVEN 405 AS MANUFACTURED BY RAVEN LINING SYSTEMS (1-800-324-2810). APPLY COATING IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION.
7. CORE DRILL HOLE IN WET PIT AND INSTALL SEWER WITH MANHOLE BOOT.
8. PROVIDE PRESSURE GAUGES. SEE DET 1 ON SHEET 8.
9. ALL PIPING SHALL BE BOLTED WITH STAINLESS STEEL BOLTS AND NUTS.
10. PROVIDE OVERFLOW BOX. SEE DET 4 ON SHT 8.

REGISTERED PROFESSIONAL ENGINEER 6208 OREGON JULY 12, 1988 RONALD P. STAERKEL

Ronald P. Staerkel

EXPIRES 6/30/04

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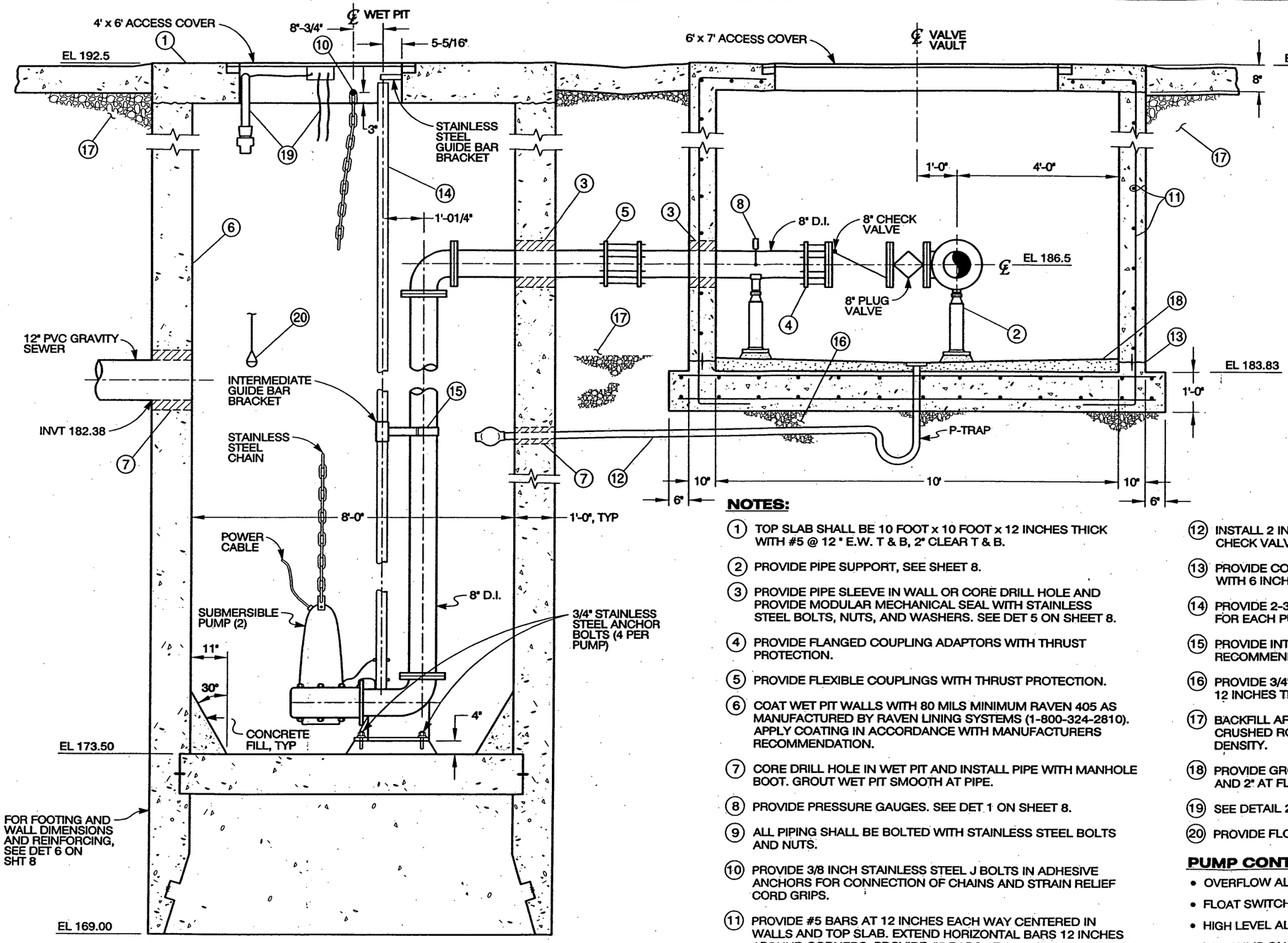
CITY OF NEWBERG, OREGON

CHEHALEM DRIVE SEWAGE PUMP STATION

PUMP STATION PLANS

SHEET 5 of 16

DATE May 2003



SECTION A

SCALE: 3/8"= 1'-0"

4

NOTES:

1. TOP SLAB SHALL BE 10 FOOT x 10 FOOT x 12 INCHES THICK WITH #5 @ 12 " E.W. T & B, 2" CLEAR T & B.
2. PROVIDE PIPE SUPPORT, SEE SHEET 8.
3. PROVIDE PIPE SLEEVE IN WALL OR CORE DRILL HOLE AND PROVIDE MODULAR MECHANICAL SEAL WITH STAINLESS STEEL BOLTS, NUTS, AND WASHERS. SEE DET 5 ON SHEET 8.
4. PROVIDE FLANGED COUPLING ADAPTORS WITH THRUST PROTECTION.
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6. COAT WET PIT WALLS WITH 80 MILS MINIMUM RAVEN 405 AS MANUFACTURED BY RAVEN LINING SYSTEMS (1-800-324-2810). APPLY COATING IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATION.
7. CORE DRILL HOLE IN WET PIT AND INSTALL PIPE WITH MANHOLE BOOT. GROUT WET PIT SMOOTH AT PIPE.
8. PROVIDE PRESSURE GAUGES. SEE DET 1 ON SHEET 8.
9. ALL PIPING SHALL BE BOLTED WITH STAINLESS STEEL BOLTS AND NUTS.
10. PROVIDE 3/8 INCH STAINLESS STEEL J BOLTS IN ADHESIVE ANCHORS FOR CONNECTION OF CHAINS AND STRAIN RELIEF CORD GRIPS.
11. PROVIDE #5 BARS AT 12 INCHES EACH WAY CENTERED IN WALLS AND TOP SLAB. EXTEND HORIZONTAL BARS 12 INCHES AROUND CORNERS. PROVIDE #5 BARS AT 12 INCHES EACH WAY TOP AND BOTTOM OF BOTTOM SLAB, 2" CLR TOP AND 3" CLR BOTTOM.
12. INSTALL 2 INCH SCHED 80 PVC DRAIN AT 2% SLOPE WITH CHECK VALVE IN WET PIT.
13. PROVIDE CONSTRUCTION JOINT 2 INCHES ABOVE SLAB WITH 6 INCH GALV STEEL WATER STOP.
14. PROVIDE 2-3 INCH DIA STAINLESS STEEL GUIDE BARS FOR EACH PUMP.
15. PROVIDE INTERMEDIATE GUIDE BAR BRACKETS AT SPACING RECOMMENDED BY PUMP MFR.
16. PROVIDE 3/4" INCH MINUS COMPACTED CRUSHED GRAVEL 12 INCHES THICK UNDER STRUCTURES.
17. BACKFILL AROUND STRUCTURE WITH 3/4" INCH MINUS CRUSHED ROCK COMPACTED TO 90 PERCENT RELATIVE DENSITY.
18. PROVIDE GROUT IN BOTTOM OF VALVE VAULT, 3" AT WALLS AND 2" AT FLOOR DRAIN.
19. SEE DETAIL 2 ON SHEET 15.
20. PROVIDE FLOAT SWITCH FOR REDUNDANT HIGH LEVEL ALARM.

PUMP CONTROL LEVELS

- OVERFLOW ALARM - EL 189.0
- FLOAT SWITCH HIGH LEVEL ALARM - EL 183.5
- HIGH LEVEL ALARM - EL 183.0
- LAG PUMP ON / ALARM - EL 182.5
- LEAD PUMP ON - EL 182.0
- PUMPS OFF - EL 176.5

REGISTERED PROFESSIONAL ENGINEER 8206 MAY 12, 1998 RONALD P. STAERKLIN

EXPIRES 6/30/04

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CITY OF NEWBERG, OREGON

CHEHALEM DRIVE SEWAGE PUMP STATION

PUMP STATION SECTION

SHEET 6 of 16

DATE May 2003

ELECTRICAL BUILDING NOTES:

1. WALLS:
   - 8"W x 16"L x 8" H SPLIT FACE CONCRETE BLOCKS WITH COMPRESSIVE STRENGTH=1500 PSI
   - NO. 4 VERTICAL REBAR AT 24 INCHES O.C.
   - NO. 5 HORIZONTAL REBAR IN BOND BEAMS AT 48 INCHES O.C,
   - WALLS FULLY GROUTED WITH CONCRETE
2. INTERIOR FINISH:

   PAINT WALLS AND CEILING WHITE.
3. DOOR:

   18 GAUGE GALVANIZED HOLLOW METAL WITH HONEYCOMB CORE AND BAKED ENAMEL FINISH. PROVIDE STAINLESS STEEL HARDWARE.
4. DOOR FRAME:

   16 GAUGE WELDED, GALVANIZED HOLLOW METAL, 2 INCH FRAME WIDTH AT JAMB, 4 INCHES AT HEAD, 8 INCHES DEEP, AND BAKED ENAMEL FINISH.
5. ROOF:

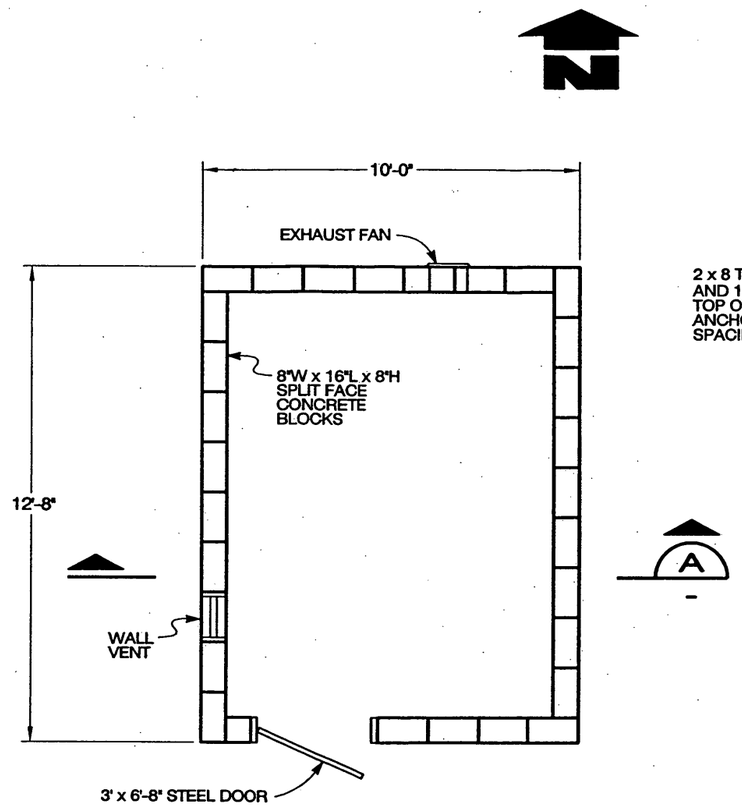
   EXTERIOR SHEATHING SHALL BE 3/4 INCH CDX PLYWOOD. PROVIDE 1/2" T-111 SIDING AT GABLED ENDS WITH 1 x 4 TRIM AT ROOF LINE.
6. ROOFING:

   3-TAB FIBERGLASS COMPOSITION ROOF OVER 15# ASHALT FELT, COLOR AS SELECTED BY OWNER.
7. ATTIC VENTS:

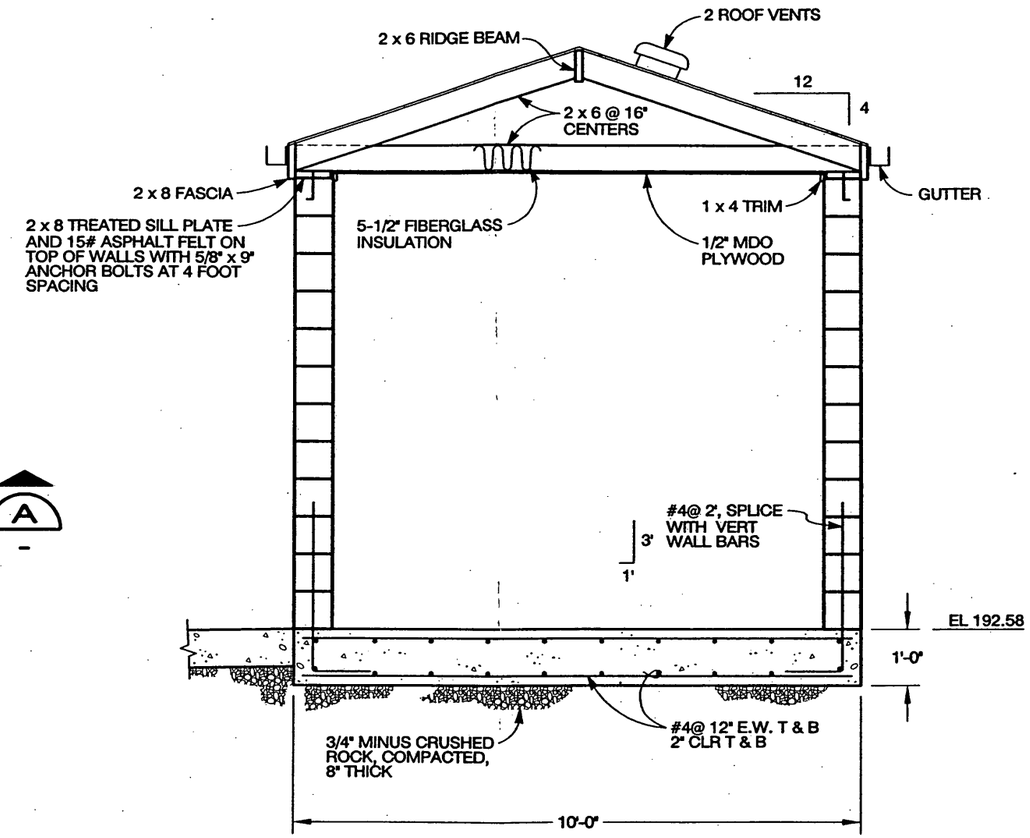
   PROVIDE SCREENED ATTIC VENTS AT GABLED ENDS. NET AREA AT EACH END SHALL BE 48 SQ. INCHES.
8. WALL VENT:

   1/8 INCH STEEL FRAME AND EXPANDED MESH WELDED TO GALVANIZED LOUVERS WITH FINE MESH SCREEN, POWDER COATED. BOTTOM SHALL BE 3 FEET ABOVE FLOOR. NET AREA SHALL BE 72 SQ. INCHES.
9. GUTTERS:

   GUTTERS SHALL BE 24 GAUGE EXTRUDED ALUMINUM WITH BAKED ENAMEL FINISH. GUTTERS SHALL BE 4" WITH 3" DOWNSPOUTS.



ELECTRICAL BUILDING PLAN
SCALE: 1/4"= 1'-0"



SECTION A
3/8" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER OREGON JULY 12, 1985 RONALD P. STARKLIN
Ronald P. Starklin
EXPIRES 6/30/04

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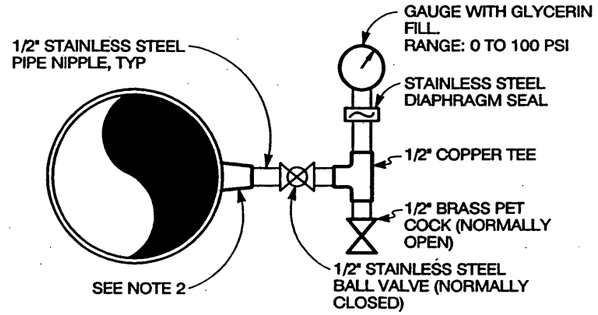


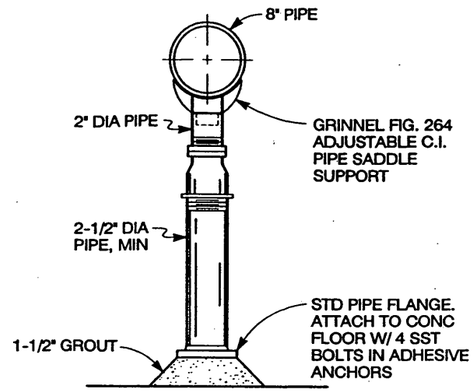
NOTES:

1. GUAGES AND DIAPHRAGM SEALS SHALL BE ASHCROFT OR EQUAL.
2. INSTALL GAUGES WITH DRIP LEG AS SHOWN ON 1/2" WELDOLET, THREADOLET, OR PIPE SADDLE.

PRESSURE GAUGE DETAIL 1

NTS

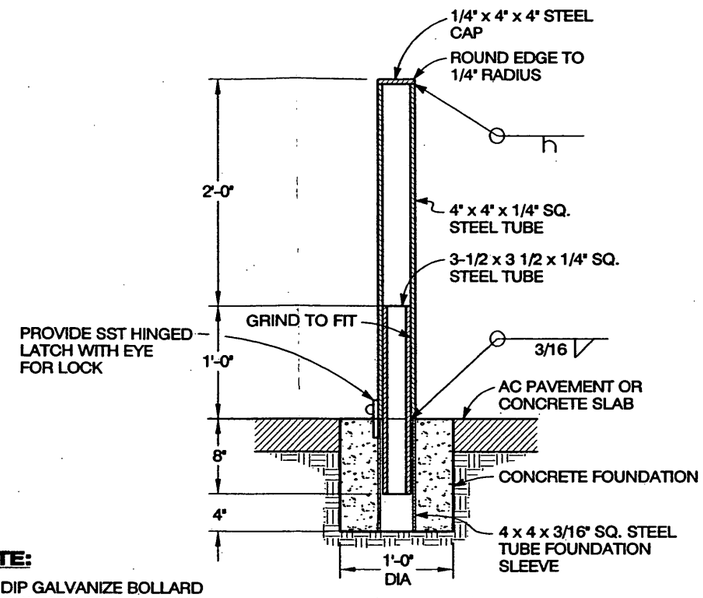
5,6



PIPE SUPPORT DETAIL 2

NTS

5,6



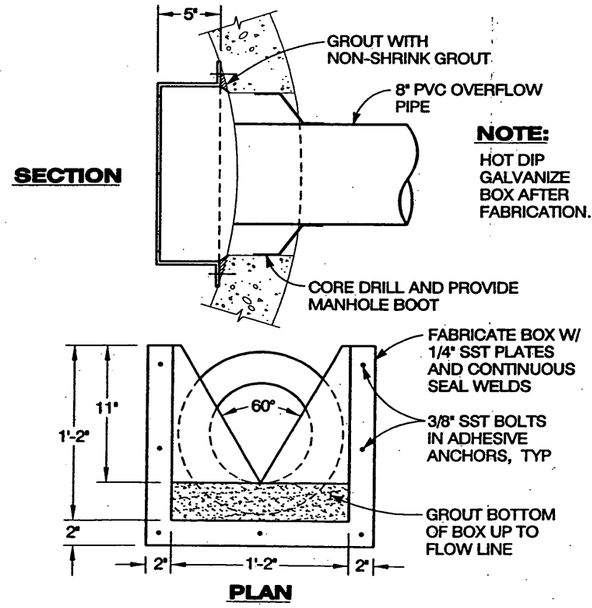
NOTE:

HOT DIP GALVANIZE BOLLARD AND BOLLARD FOUNDATION SLEEVE AFTER FABRICATION.

REMOVABLE BOLLARD DETAIL 3

SCALE: 3/4" = 1'-0"

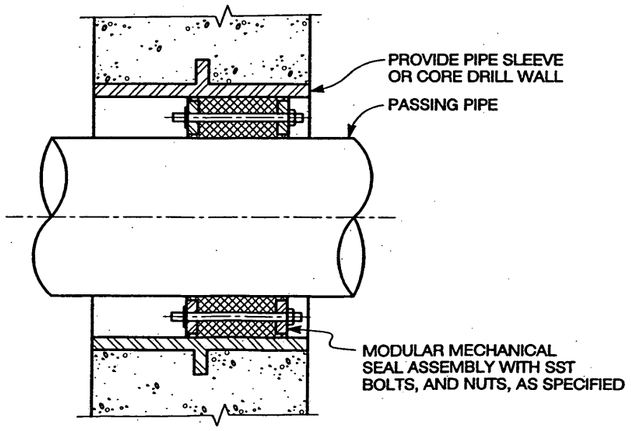
4



OVERFLOW BOX DETAIL 4

SCALE: 1" = 1'-0"

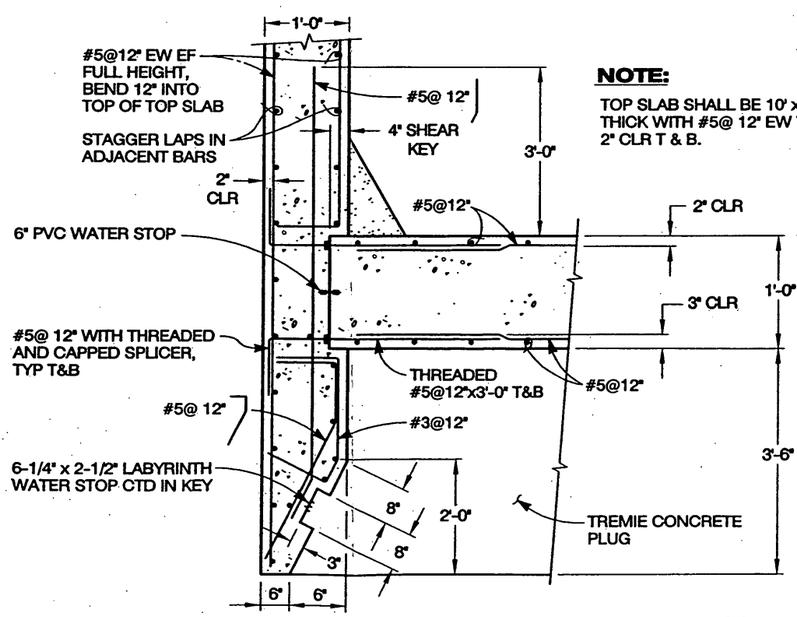
5



WALL PENETRATION SEAL DETAIL 5

NTS

5,6



CAISSON FOOTING AND WALL DETAIL 6

NTS

6

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 12, 1985 — RONALD P. STAEHLIN

EXPIRES 6/30/04

VERIFY SCALE	DESIGN BY:	DRAWN BY:	REVISIONS		
BAR IS ONE INCH ON ORIGINAL DRAWING 0 — 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	SOUTHWOOD ENGINEERING CORPORATION 3301 SOUTHWOOD DR. PHILOMATH, OR 97370 (541) 929-2533	NEW TECH GRAPHICS 510 3RD ST NW CORVALLIS, OR 97330 (541) 753-9021	NO.	DATE	

CITY OF NEWBERG, OREGON

CHEHALEM DRIVE SEWAGE PUMP STATION

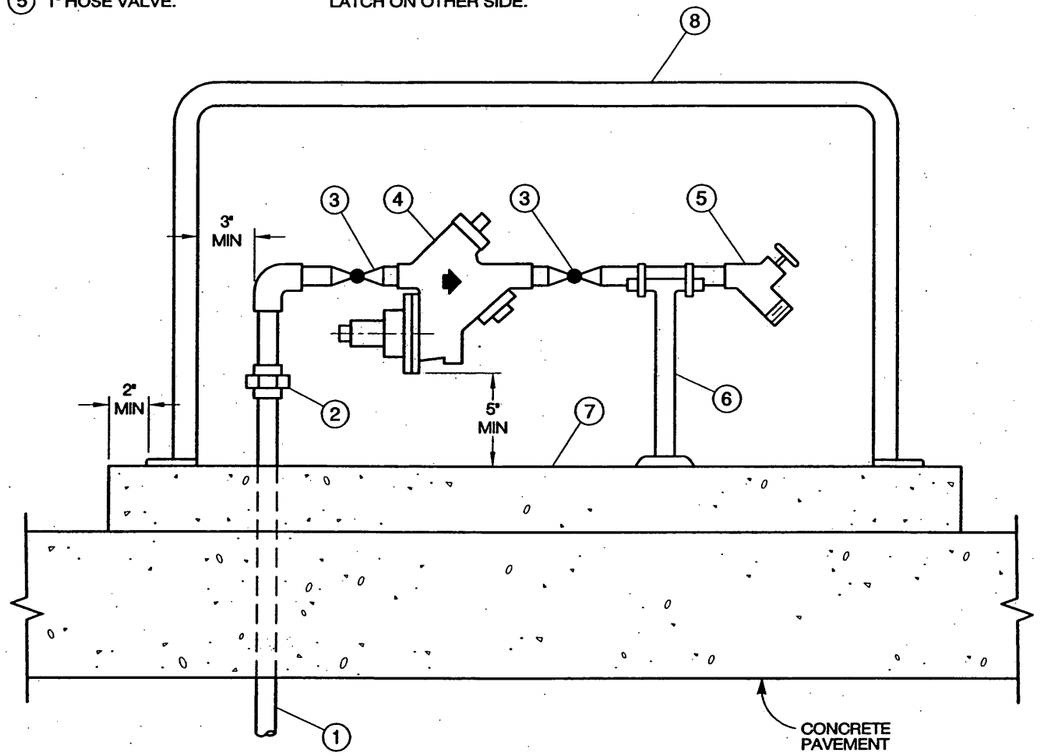
DETAILS

SHEET 8 of 16

DATE May 2003

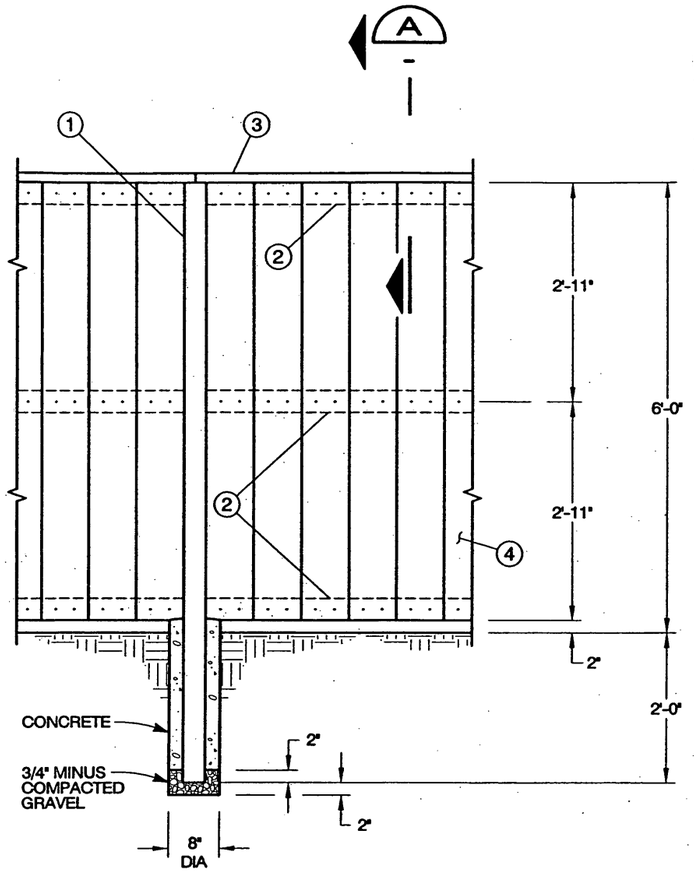
NOTES:

1. 1" COPPER WATER LINE.
2. 1" UNION.
3. 1" BALL VALVE.
4. 1" REDUCED PRESSURE BACKFLOW PREVENTER.
5. 1" HOSE VALVE.
6. 1-1/4" COPPER PIPE SUPPORT WITH HALF TEE ON TOP AND FLOOR FLANGE ON BOTTOM. FASTEN FLOOR FLANGE WITH STAINLESS STEEL BOLTS IN WEDGE ANCHORS. FASTEN PIPE WITH 2 STAINLESS STEEL HOSE CLAMPS.
7. CONCRETE PAD, 3-1/2" THICK.
8. FIBERGLASS SHELTER WITH 500 WATT HEATER. PROVIDE STAINLESS STEEL HINGE ON ONE SIDE AND LOCKABLE LATCH ON OTHER SIDE.



BACKFLOW PREVENTER DETAIL 1/4

SCALE: 1-1/2"= 1'-0"

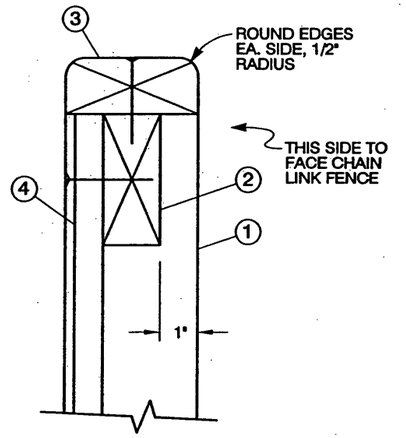


ELEVATION

SCALE: 1/2"= 1'-0"

NOTES:

1. 4 x 4 x 8' CEDAR POSTS AT 8 FT. MAXIMUM SPACING.
2. 2 x 4 CEDAR RAILS. FASTEN TO POSTS WITH HEAVY DUTY JOIST HANGERS WITH FLANGES TURNED IN.
3. 2 x 4 CEDAR TOP GAP. FASTEN TO POSTS WITH 2-#8 x 3" GALV. DECK SCREWS EACH END. FASTEN TO TOP RAIL WITH #8 x 3" GALV. DECK SCREWS AT 12" CENTERS.
4. 1 x 8 CEDAR WITH 1/8 INCH GAP AT JOINTS. FASTEN TO RAILS WITH 2-#8 x 2" GALV. DECK SCREWS.



SECTION A

SCALE: 3"= 1'-0"

CEDAR FENCE DETAIL 2/4

REGISTERED PROFESSIONAL ENGINEER OREGON JULY 12, 1988 RONALD P. STAERKEL

EXPIRES 6/30/04

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 ——— 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGN BY: SOUTHWOOD ENGINEERING CORPORATION, 3301 SOUTHWOOD DR. PHILOMATH, OR 97370, (541) 929-2533

DRAWN BY: NEW TECH GRAPHICS, 510 3RD ST NW, CORVALLIS, OR 97330, (541) 753-9021

REVISIONS	
NO.	DATE

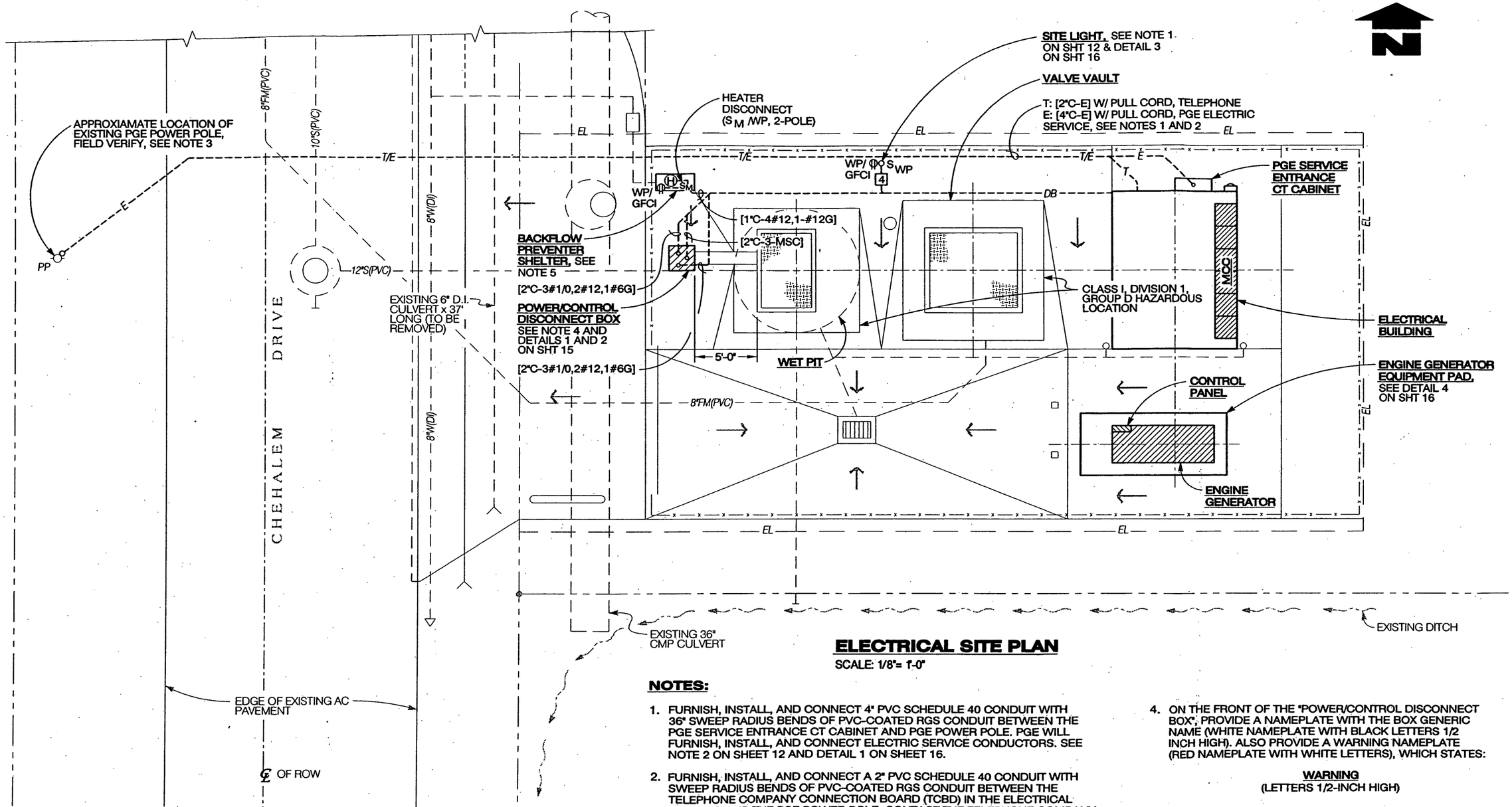
CITY OF NEWBERG, OREGON

CHEHALEM DRIVE SEWAGE PUMP STATION

DETAIL

SHEET 9 of 16

DATE May 2003



ELECTRICAL SITE PLAN

SCALE: 1/8"= 1'-0"

NOTES:

1. FURNISH, INSTALL, AND CONNECT 4" PVC SCHEDULE 40 CONDUIT WITH 36" SWEEP RADIUS BENDS OF PVC-COATED RGS CONDUIT BETWEEN THE PGE SERVICE ENTRANCE CT CABINET AND PGE POWER POLE. PGE WILL FURNISH, INSTALL, AND CONNECT ELECTRIC SERVICE CONDUCTORS. SEE NOTE 2 ON SHEET 12 AND DETAIL 1 ON SHEET 16.
2. FURNISH, INSTALL, AND CONNECT A 2" PVC SCHEDULE 40 CONDUIT WITH SWEEP RADIUS BENDS OF PVC-COATED RGS CONDUIT BETWEEN THE TELEPHONE COMPANY CONNECTION BOARD (TCBD) IN THE ELECTRICAL BUILDING AND THE PGE POWER POLE. CONTACT THE TELEPHONE COMPANY AND SCHEDULE FOR THEM TO FURNISH, INSTALL, AND CONNECT THE TELEPHONE CABLE TO THE TCBD. COSTS FOR THE TELEPHONE COMPANY WORK WILL BE BILLED DIRECTLY TO THE CITY OF NEWBERG. SEE DETAIL 1 ON SHEET 16.
3. EXTEND CONDUITS 10' UP THE POLE AFG AND CAP.
4. ON THE FRONT OF THE "POWER/CONTROL DISCONNECT BOX", PROVIDE A NAMEPLATE WITH THE BOX GENERIC NAME (WHITE NAMEPLATE WITH BLACK LETTERS 1/2 INCH HIGH). ALSO PROVIDE A WARNING NAMEPLATE (RED NAMEPLATE WITH WHITE LETTERS), WHICH STATES:

   WARNING
   (LETTERS 1/2-INCH HIGH)

   NO-LOAD RECEPTACLES AND PLUGS
   DEENERGIZE CIRCUIT BEFORE INSERTING OR REMOVING PLUG
   (LETTERS 1/4-INCH HIGH)
5. SURFACE MOUNT ALL ELECTRICAL DEVICES TO 1-INCH TYPE 316 STAINLESS STEEL CHANNEL MOUNTED TO THE TOP OF THE CONCRETE SLAB.

REGISTERED PROFESSIONAL ENGINEER 8309 OREGON FEB. 14, 1975 JERRY LESTER HILDENBRAND
Jerry L. Hildenbrand 5-13-03
EXP. 6/30/03

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CITY OF NEWBERG, OREGON

CHEHALEM DRIVE SEWAGE PUMP STATION

PUMP STATION ELECTRICAL SITE PLAN

SHEET 10 of 16

DATE May 2003

LEGEND

SYMBOL	DESCRIPTION
MCC-A	MAJOR ELECTRICAL COMPONENT OR DEVICE - NAME OR IDENTIFYING SYMBOL AS SHOWN.
5	INDUCTION MOTOR WITH HORSEPOWER AS INDICATED
	CONNECTION POINT TO EQUIPMENT SPECIFIED, FURNISHED, AND INSTALLED UNDER OTHER DIVISIONS. RACEWAY, CONDUCTORS, AND CONNECTIONS SPECIFIED, FURNISHED, AND INSTALLED UNDER DIVISION 16. COORDINATE FINAL CONNECTION WITH EQUIPMENT SUPPLIER.
1	LUMINAIRE, SEE NOTE 1 ON SHEET 13
2	EMERGENCY LIGHTING UNIT, SEE NOTE 1 ON SHEET 13
3	WALL MOUNTED LUMINAIRE, SEE NOTE 1 ON SHEET 13
4	LUMINAIRE AND POLE, SEE NOTE 1 ON SHEET 13
[3/4"C-3#10]	TYPICAL CONDUIT WITH INDIVIDUAL CONDUCTORS
or G	EXPOSED CONDUIT AND CONDUCTORS*
	NOTE: * ALL UNMARKED CONDUIT RUNS CONSIST OF TWO NO. 12, ONE NO. 12G CONDUCTORS IN CONDUIT. RUNS MARKED W/ CROSSHATCHES INDICATE NUMBER OF NO.12 CONDUCTORS. CROSSHATCH WITH SUBSCRIPT "G" INDICATES GREEN GROUND CONDUCTOR. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE (3/4"MIN).
	CONDUIT DOWN
	CONDUIT UP
— E —	UNDERGROUND ELECTRICAL CONDUIT
— T —	UNDERGROUND TELEPHONE CONDUIT
— G —	GROUND CONDUCTOR
	CAPACITOR
J or HH	GENERAL CONTROL OR WIRING DEVICE. LETTER SYMBOLS OR ABBREVIATIONS INDICATE TYPE OF DEVICE.
S	WALL SWITCH
EP	EXPLOSION PROOF
M	MOTOR RATED TOGGLE SWITCH WITHOUT OVERLOADS
WP	WEATHERPROOF
	CONTACT - NORMALLY OPEN
	CONTACT - NORMALLY CLOSED
	OVERLOAD RELAY HEATER
400	CIRCUIT BREAKER, THERMAL MAGNETIC, CURRENT RATING SHOWN, 3 POLE UNLESS INDICATED OTHERWISE
	FUSE
	DUPLEX RECEPTACLE
	GROUND
	GROUND ROD (3/4"x10' COPPER BONDED) TOP OF GROUND ROD SHALL BE 6" BFG.
M	PGE METER BOX
	REMOTE DEVICE
	SURGE ARRESTER
200:5 (3)	CURRENT TRANSFORMER WITH RATIO AND QUANTITY INDICATED
H A 1 XOO 2 OOX	SELECTOR SWITCH - MAINTAINED CONTACT - CHART IDENTIFIES OPERATION:

POSITION			
CKT	HAND	OFF	AUTO
1	X	O	O
2	O	O	X

X - CLOSED CONTACT
O - OPEN CONTACT

A	INDICATING LIGHT, PUSH-TO-TEST LED TYPE, LETTER INDICATES COLOR: A - AMBER G - GREEN B - BLUE R - RED

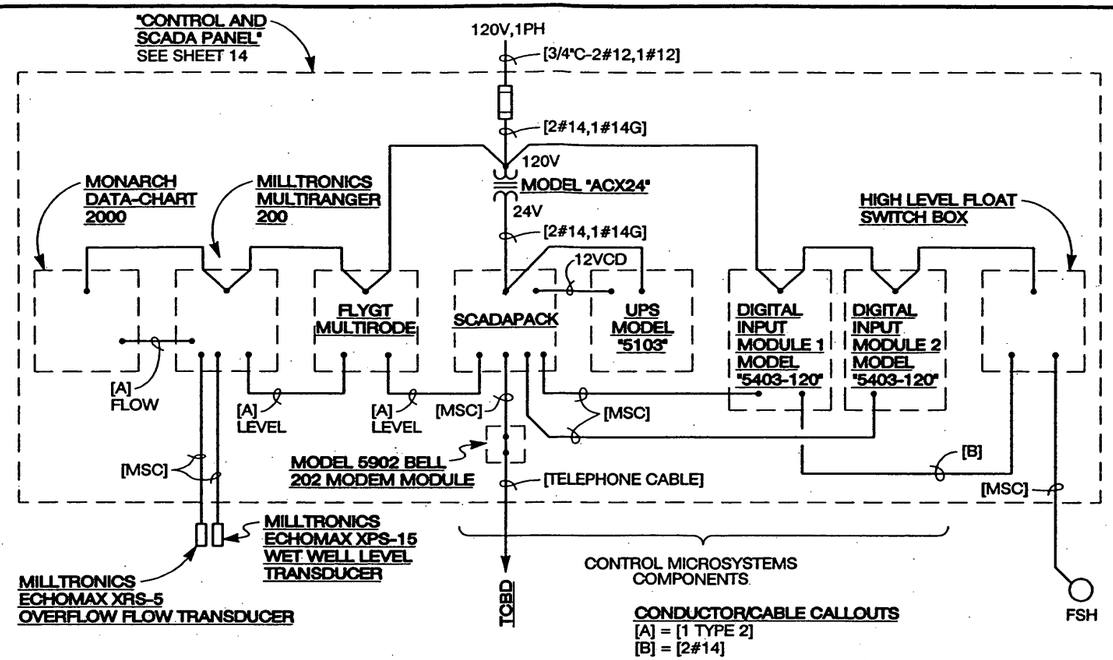
CONTROL CABLE TYPE IDENTIFICATION:

A (B) TYPE C

A = NUMBER OF CABLES
B = NUMBER OF SINGE WIRES OR WIRE PAIRS IN EACH CABLE
C = CABLE TYPE NUMBER PER SPECIFICATIONS

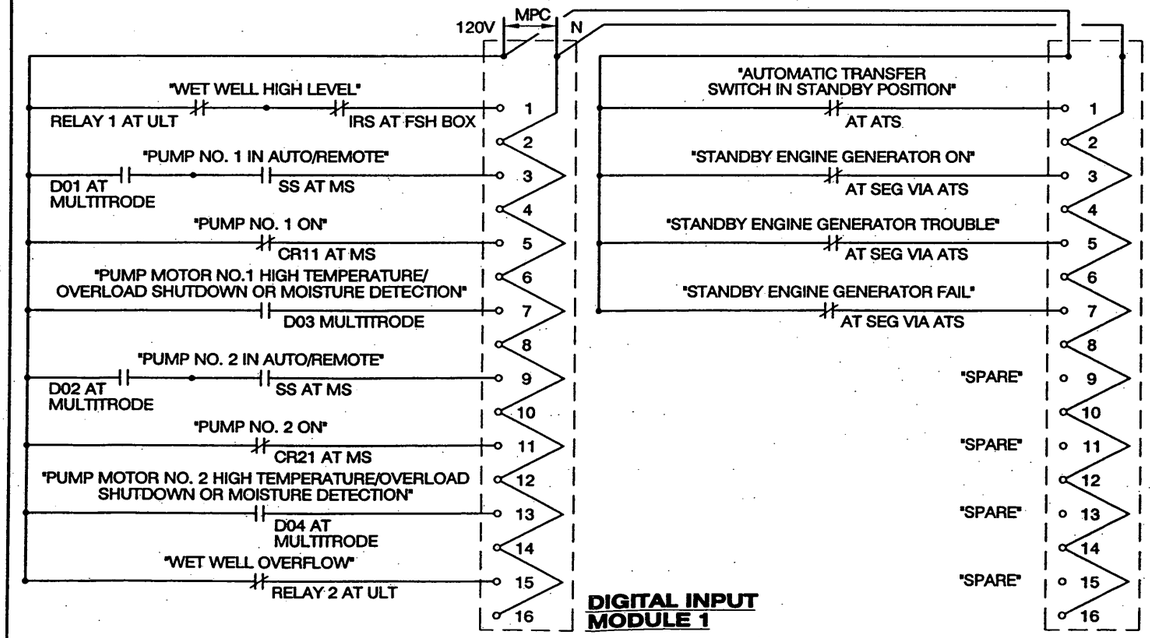
ABBREVIATIONS

	DESCRIPTION
A	AMPERE OR AMBER
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
APD	AUTOMATIC PHONE DIALER
ASCC	AVAILABLE SHORT CIRCUIT CURRENT
ATS	AUTOMATIC TRANSFER SWITCH
BCP	BRANCH CIRCUIT PANEL
BFG	BELOW FINISHED GRADE
BLDG	BUILDING
C	COMMON CONDUIT, OR CONTACTOR COIL/CONTACTS
CAS	CONTROL AND STATUS
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLF	CURRENT LIMITING FUSE
CP	CONTROL PANEL
CR	CONTROL RELAY
CRS	PVC-COATED RGS
CT	CURRENT TRANSFORMER
DWG	DRAWING
E	EMPTY
EF	EXHAUST FAN
EQPT	EQUIPMENT
ETM	ELAPSED TIME METER
EXST	EXISTING
FCR	FAULT CURRENT RATING
FLR	FLOOR
FSH	FLOAT SWITCH HIGH LEVEL
G	GENERATOR, GREEN, OR GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
H	HEATER
HP	HORSEPOWER
ISR	INTRINSICALLY SAFE RELAY
J, J-BOX	JUNCTION BOX
kVA	KILOVOLT-AMPERES
kW	KILOWATTS
LT-FLEX	LIQUID-TIGHT FLEXIBLE METAL
M	METER, MOTOR, OR MAGNET CONTACTOR COIL/CONTACTS
MAX	MAXIMUM
MB	BYPASS CONTACTOR COIL/CONTACTS
MC	CAPACITOR CONTACTOR COIL/CONTACTS
MCC	MOTOR CONTROL CENTER
MIN	MINIMUM
MIS	ISOLATION CONTACTOR COIL/CONTACTS
MPC	MINI POWER CENTER
MR	MOISTURE (CONTROL) RELAY
MS	MOTOR STARTER
MSC	MANUFACTURER SUPPLIED CABLE
MT	MOUNT
MTD	MOUNTED
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NO	NORMALLY OPEN
NP	NAMEPLATE
NTS	NOT TO SCALE
OL	OVERLOAD RELAY
OOA	ON/OFF/AUTO SELECTOR SWITCH
P	PUMP
PC	PHOTOCELL
PFCC	POWER FACTOR CORRECTION CAPACITOR
PGE	PORTLAND GENERAL ELECTRIC COMPANY
PH	PHASE
PNL	PANEL
PSCP	PUMP SEQUENCE CONTROL PANEL
PVC	POLYVINYL CHLORIDE
PWR	POWER
R	RED
RCPT	RECEPTACLE
REQD	REQUIRED
RGS	RIGID GALVANIZED STEEL
RMS	ROOT-MEAN-SQUARE
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SEG	STANDBY ENGINE GENERATOR
SHT	SHEET
SS	SELECTOR SWITCH, SOFT-START (MOTOR) STARTER
SST	TYPE 316 STAINLESS STEEL
SYMM	SYMMETRICAL
T	THERMOSTAT
TB	TERMINAL BOARD
TC	TIME CLOSE
TCBD	TELEPHONE CONNECTION BOARD
TJB	TERMINAL JUNCTION BOX
TO	TIME OPEN
TPNL	TELEMETRY PANEL
TSP	TWISTED SHIELDED PAIR
TYP	TYPICAL
ULT	ULTRASONIC LEVEL TRANSMITTER
V	VOLTS
W	WATTS OR WIRE
WP	WEATHERPROOF



CONTROL AND SCADA EQUIPMENT SCHEMATIC

NTS



SCADA EQUIPMENT INPUT SCHEMATIC

NTS

Jerry L. Hildenbrand
REGISTERED PROFESSIONAL ENGINEER 8309 OREGON FEB. 14, 1975 JERRY LESTER HILDENBRAND
5-13-03
EXP. 6/30/03

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGN BY: SOUTHWOOD ENGINEERING CORPORATION
3301 SOUTHWOOD DR. PHILOMATH, OR 97370
(541) 929-2533

DRAWN BY: NEW TECH GRAPHICS
510 3RD ST NW CORVALLIS, OR 97330
(541) 753-9021

REVISIONS	
NO.	DATE

CITY OF NEWBERG, OREGON
CHEHALEM DRIVE SEWAGE PUMP STATION

ELECTRICAL LEGEND, ABBREVIATIONS AND SCHEMATICS

SHEET 11 of 16
DATE May 2003

NOTES:

1. FURNISH, INSTALL, AND CONNECT A CT CABINET (NEMA 4X SST) AND A METER SOCKET AND BOX (NEMA 3R) PER PGE REQUIREMENTS. THE CT CABINET SHALL BE SIZED FOR INSTALLATION OF PGE 250:5 METERING CT'S FOR FUTURE UPGRADE OF THE ELECTRIC SERVICE WHEN THE 30 HP PUMPS ARE REPLACED WITH 88 HP PUMPS. MOUNT THE CT CABINET AND METER BOX WHERE SHOWN ON SHT 13, AND INSTALL THE CT'S AND METER PROVIDED BY PGE IN THE CT CABINET AND METER BOX. SEE NOTE 2.

2. CONTACT PORTLAND GENERAL COMPANY (PGE) ABOUT ELECTRICAL SERVICE (125 AMPS INITIAL SERVICE, 250 AMPS FUTURE SERVICE) TO THE CHEHALEM DRIVE SEWAGE PUMP STATION. SERVICE EQUIPMENT AND INSTALLATION INCLUDING SERVICE CONDUCTORS, CT CABINET AND METER BOX CONDUCTOR CONNECTIONS, AND CT'S AND METER WILL BE PROVIDED BY PGE. COSTS FOR PGE WORK WILL BE BILLED DIRECTLY TO THE CITY OF NEWBERG. COORDINATE THIS WORK WITH:

   MR. RALPH REISBECK
   PORTLAND GENERAL ELECTRIC COMPANY
   4245 KALE STREET N. E.
   SALEM, OREGON 97305

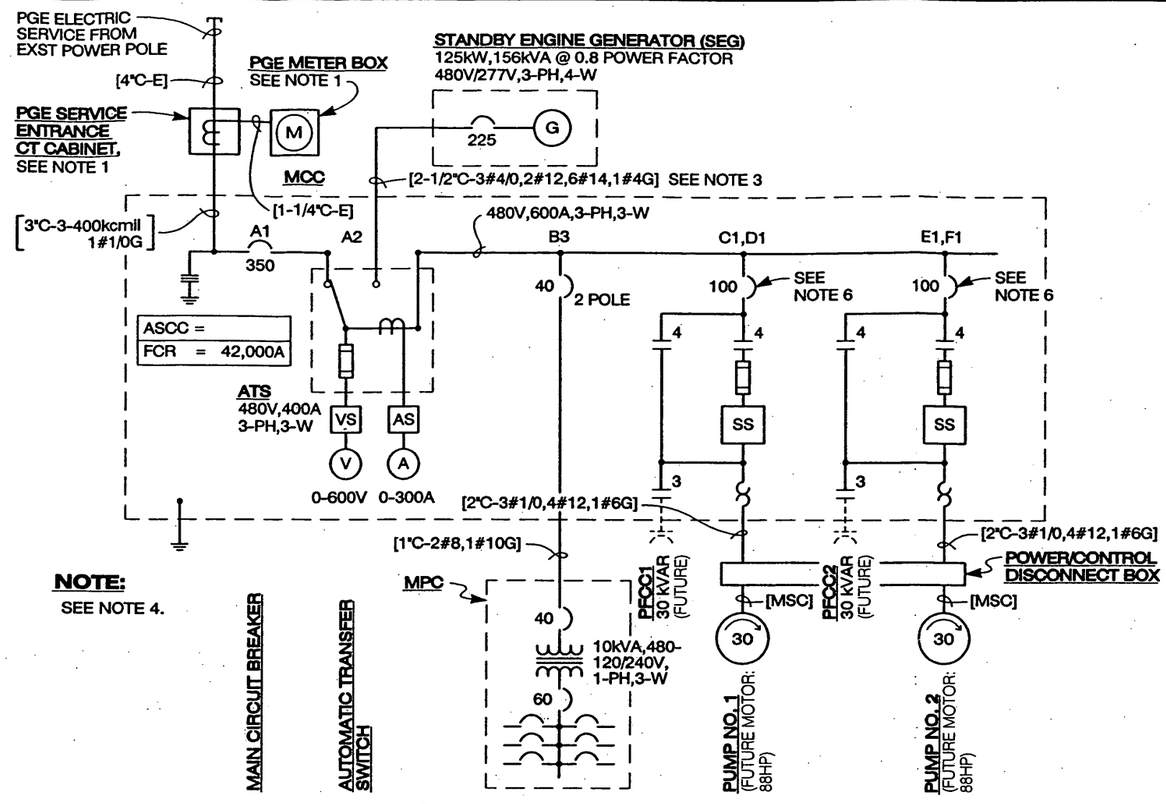
   PHONE: (503)463-6188
   FAX: (503)463-4308

3. STANDBY ENGINE GENERATOR (SEG) CONDUCTORS INCLUDE POWER (4#3/0,1#4G), CONTROL (2#12 FOR ENGINE START/ STOP FROM THE ATS), AND STATUS (6#14 FOR SEG ON, TROUBLE, AND FAIL TO THE SCADA INPUT MODULE). SEG STATUS CONDUCTORS SHALL BE ROUTED FROM THE SEG CONTROL PANEL TO THE SCADA INPUT MODULE VIA THE ATS.

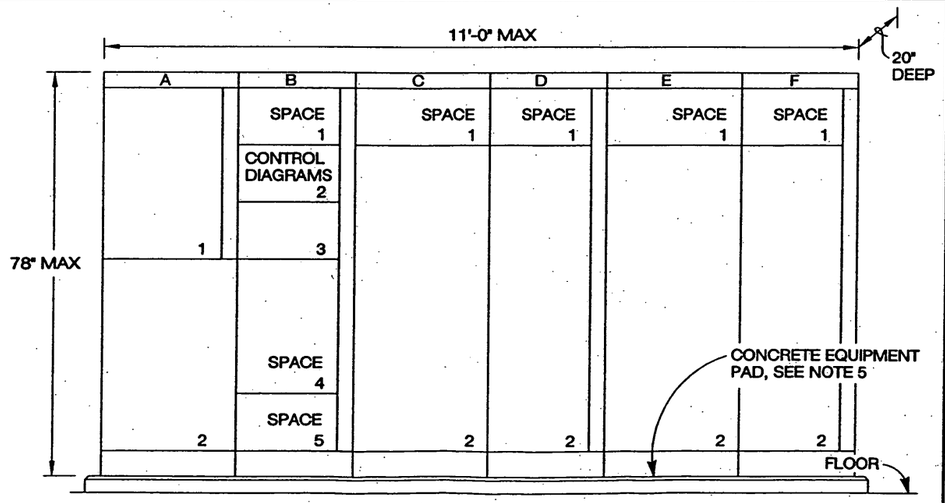
4. FOR LOCATIONS OF ELECTRICAL EQUIPMENT AND ELECTRICAL LOADS, SEE SHEETS 10 AND 13.

5. MCC SHALL BE INSTALLED ON A 3-1/2" CONCRETE PAD WITH BEVELED EDGES. DESIGN AND BUILD THE PAD BASED ON THE DIMENSIONS OF THE MCC ACTUALLY PROVIDED. SEE CONCRETE PAD DETAIL 2 ON SHEET 16.

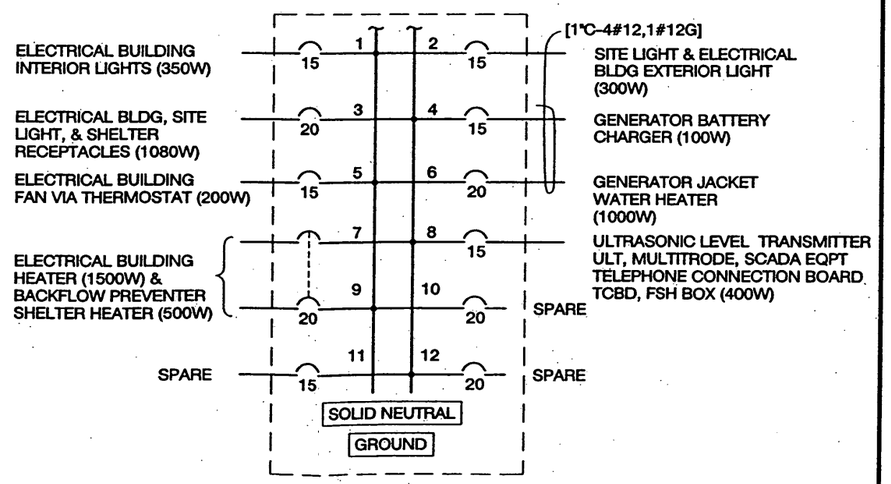
6. PROVIDE SPACE AND PROVISIONS IN EACH MOTOR STARTER COMPARTMENT TO REPLACE THE 50/M CIRCUIT BREAKERS WITH 250/M CIRCUIT BREAKERS WHEN THE 30 HP PUMPS ARE REPLACED WITH 88 HP PUMPS IN THE FUTURE.



ONE-LINE DIAGRAM
NTS



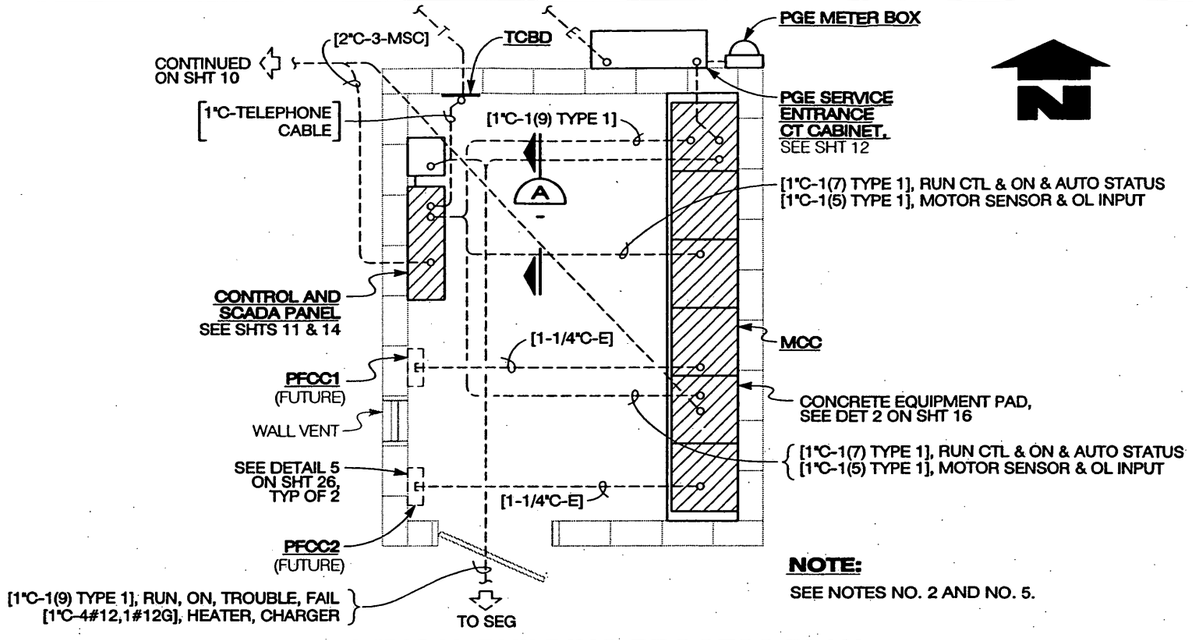
MCC ELEVATION
NTS



MPC DISTRIBUTION PANEL SCHEDULE
NTS

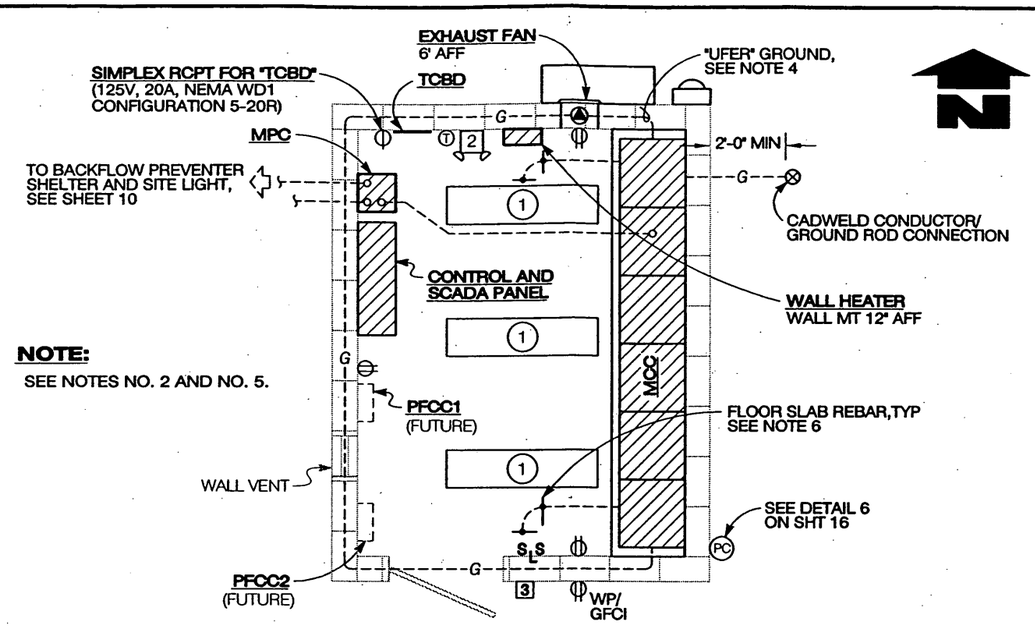
Jerry L. Hildenbrand
REGISTERED PROFESSIONAL ENGINEER OREGON 8309 FEB. 14, 1975 JERRY LESTER HILDENBRAND
5-13-03
EXP. 6/30/03

VERIFY SCALE: BAR IS ONE INCH ON ORIGINAL DRAWING (0 — 1"); IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	DESIGN BY: SOUTHWOOD ENGINEERING CORPORATION, 3301 SOUTHWOOD DR. PHILOMATH, OR 97370, (541) 929-2533	DRAWN BY: NEW TECH GRAPHICS, 510 3RD ST NW CORVALLIS, OR 97330, (541) 753-9021	REVISIONS: NO. / DATE	CITY OF NEWBERG, OREGON — CHEHALEM DRIVE SEWAGE PUMP STATION	ELECTRICAL ONE-LINE DIAGRAM, MCC ELEVATION, AND PANEL SCHEDULE — SHEET 12 of 16 — DATE May 2003



ELECTRICAL BUILDING PROCESS PLAN

SCALE: 1/4"= 1'-0"



ELECTRICAL BUILDING FACILITY PLAN

SCALE: 1/4"= 1'-0"

NOTES:

1. LUMINAIRES:

   TYPE 1:
   ALUMINUM CEILING MTD FLUORESCENT 2-LAMP LUMINAIRE, PRISMATIC ACRYLIC LENS, ONE-PIECE LENS/DIFFFUSER, IMPACT RESISTANT PLASTIC, ELECTRONIC BALLAST, T-8 LAMPS, UL LISTED. MANUFACTURER: DAY-BRITE, CATALOG NO. CP232-N-120.

   TYPE 2:
   BATTERY UNIT WITH TWO SEALED BEAM LAMP HEADS, UL LISTED, SEALED LEAD CALCIUM BATTERY, TEST SWITCH/POWER INDICATOR LIGHT, WALL MT 6'-9" ABOVE FINISHED FLOOR. MANUFACTURER: COOPER LIGHTING SURE-LITES, MODEL HR87-120V.

   TYPE 3:
   120V, 50W HPS, DIE CAST ALUMINUM HOUSING WITH BRONZE PAINT FINISH, HIGH POWER FACTOR BALLAST, CHEMICALLY BRIGHTENED AND ANODIZED REFLECTOR, BOROSILICATE PRISMATIC GLASS REFRACTOR, UL LISTED SUITABLE FOR WET LOCATIONS, WALL MT 6'-9" AFG. MANUFACTURER: HOLOPHANE "WALLPACKETTE" CATALOG NO. WP-1-A-50DHP-12-BZ-F1". SEE DETAIL 6 ON SHEET 16.

   TYPE 4:
   120V, 150W HPS, POLE MOUNTED, LOW PROFILE, UL LISTED, 25°C WET LOCATION, BOROSILICATE PRISMATIC GLASS REFRACTOR, IES TYPE III LIGHT DISTRIBUTION, ADJUSTABLE LAMP SOCKET, CAST ALUMINUM DOOR FRAME, GASKETED, BRONZE POLYESTER POWDER PAINT FINISH. MANUFACTURER: HOLOPHANE "SOMERSET" SMST SERIES.
   POLE:
   9'-8" MOUNTING HEIGHT, ROUND TAPERED ALUMINUM POLE WITH TOP CAP AND 5-3/4" ARM MT, FINISH COLOR AND APPLICATION TO MATCH LUMINAIRE, 7" BOLT CIRCLE, 3 ANCHOR BOLTS MIN, 3/4" DIA x LENGTH AS REQ'D. MT POLE USING COVER PLATE, BASE, NON-SHRINK GROUT AND ANCHOR BOLTS AS REQ'D BY MANUFACTURER. SEE DETAIL 3 ON SHEET 16.

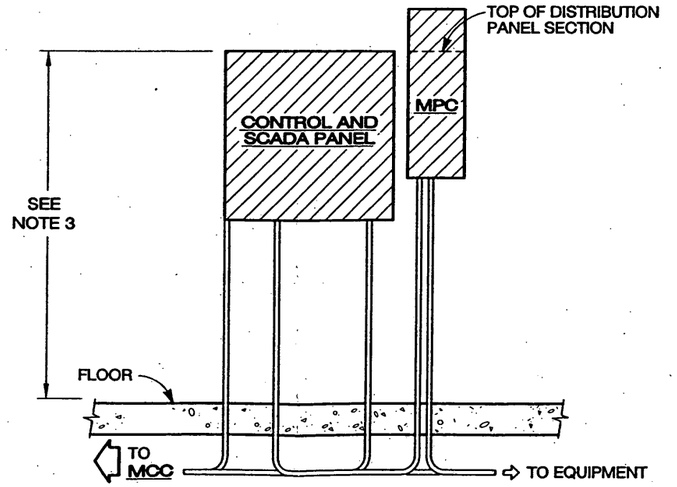
2. CIRCUIT NUMBERS FOR LIGHTS (SWITCHED INTERIOR TYPE 1, NONSWITCHED EMERGENCY TYPE 2, AND PHOTOCELL CONTROLLED TYPE 3), RCPT'S, WALL HEATER, AND THE THERMOSTATICALLY CONTROLLED EXHAUST FAN ARE LISTED ON THE "MPC DISTRIBUTION PANEL SCHEDULE" ON SHEET 22. SIZE, FURNISH, INSTALL, AND CONNECT CONDUIT AND CONDUCTORS AS REQ'D FOR THESE CIRCUITS. MT THE THERMOSTAT 54", LIGHT SWITCH 48", AND INTERIOR WALL RCPT'S 15" AFF. MT THE EXTERIOR RCPT 24" AFG.

3. MOUNT TOP OF MPC DISTRIBUTION SECTION 6'-0" ABOVE FINISHED FLOOR OR AS HIGH AS POSSIBLE, IF CEILING HEIGHT DOES NOT ALLOW 6'-0" MOUNTING HEIGHT.

4. FURNISH, INSTALL, AND CONNECT A #2 AWG STRANDED BARE COPPER "UFER" GROUND CONDUCTOR IN THE BUILDING FOUNDATION PER OAR 918-305-0160 (4) WHERE SHOWN. CONNECT TO EACH END OF THE MCC GROUND BUS.

5. FOR CONDUIT/CONDUCTOR CALLOUTS, SEE ONE-LINE DIAGRAM ON SHEET 12 AND PUMP CONTROL DIAGRAM AND SCHEMATIC ON SHEET 14. ROUTE CONDUITS UNDER THE FLOOR SLAB.

6. FURNISH, INSTALL, AND CONNECT A #2 STRANDED BARE COPPER GROUND CONDUCTOR IN THE FLOOR SLAB FROM EACH END OF THE MCC. CADWELD EACH CONDUCTOR TO STRUCTURAL REBAR IN TWO PLACES IN THE FLOOR SLAB AS SHOWN. GROUND ALL ELECTRICAL EQUIPMENT AS REQUIRED BY NEC AND AS SHOWN.



PEDESTAL MOUNTED ELECTRICAL EQUIPMENT ELEVATION SECTION (A)

SCALE: 3/8" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER — Jerry L. Hildenbrand — OREGON — FEB. 14, 1975 — JERRY LESTER HILDENBRAND
5-13-08
EXP. 6/30/03

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 — 1"
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DESIGN BY: SOUTHWOOD ENGINEERING CORPORATION
3301 SOUTHWOOD DR.
PHILOMATH, OR 97370
(541) 929-2533

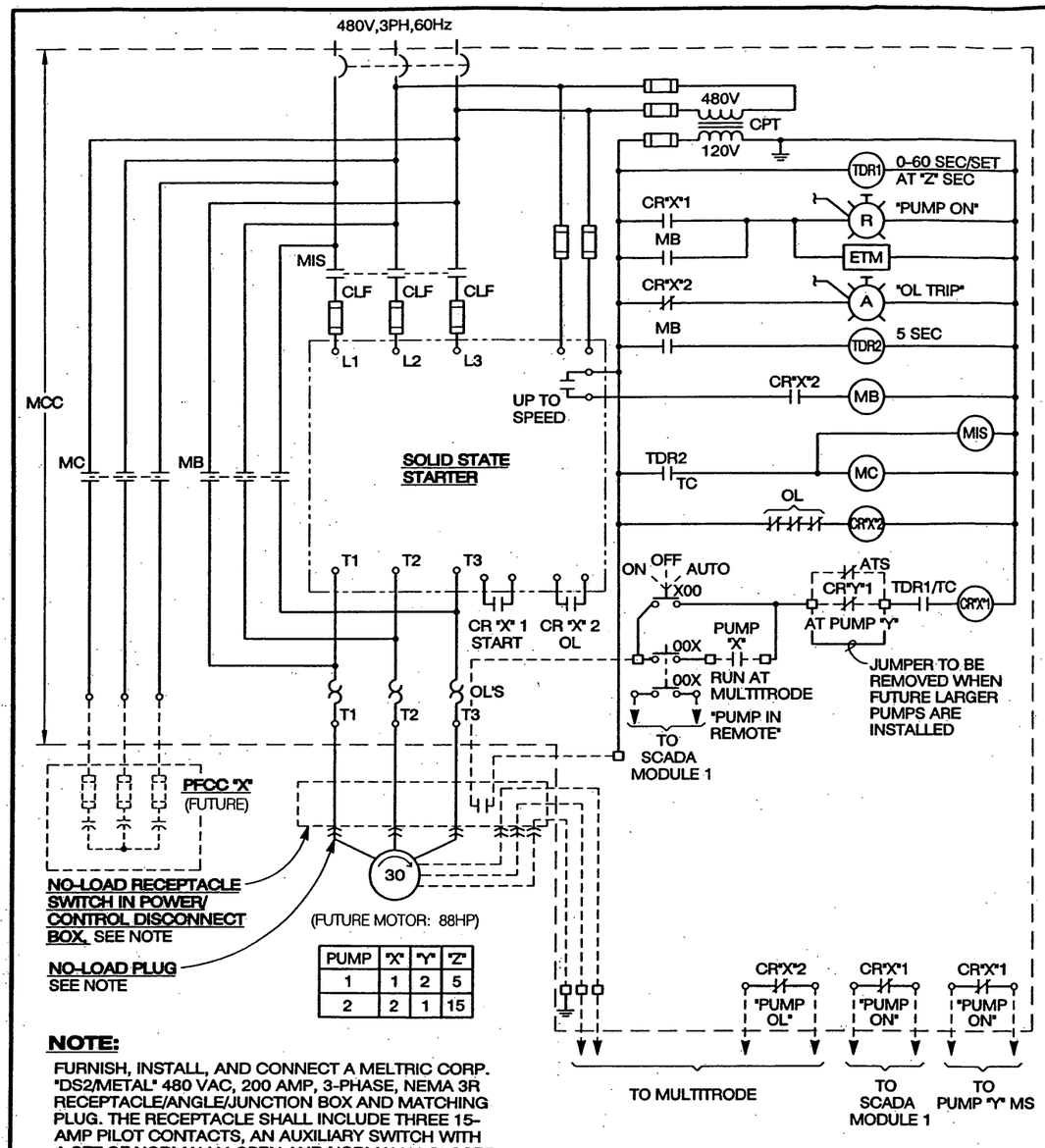
DRAWN BY: NEW TECH GRAPHICS
510 3RD ST NW
CORVALLIS, OR 97330
(541) 753-9021

REVISIONS	
NO.	DATE

CITY OF NEWBERG, OREGON
CHEHALEM DRIVE
SEWAGE PUMP STATION

ELECTRICAL BUILDING PLAN AND SECTION

SHEET 13 of 16
DATE May 2003



PUMP	"X"	"Y"	"Z"
1	1	2	5
2	2	1	15

NOTE:

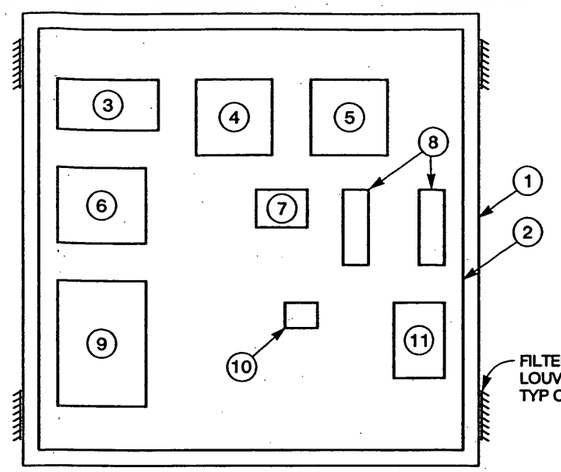
FURNISH, INSTALL, AND CONNECT A MELTRIC CORP. "DS2/METAL" 480 VAC, 200 AMP, 3-PHASE, NEMA 3R RECEPTACLE/ANGLE/JUNCTION BOX AND MATCHING PLUG. THE RECEPTACLE SHALL INCLUDE THREE 15-AMP PILOT CONTACTS, AN AUXILIARY SWITCH WITH A SET OF NORMALLY-OPEN AND NORMALLY-CLOSED 5-AMP CONTACTS, LOW PRESSURE WATERPROOFING, AND CLOSED LID CONFIGURATION. THE MELTRIC CORP. RECEPTACLE PART NUMBER IS "37-24143-173-270-LP-NC". THE MELTRIC CORP. PLUG PART NUMBER IS "37-28143-173-NNF".

PUMPS NO. 1 AND NO. 2 CONTROL DIAGRAM

NTS

EQUIPMENT LIST:

1. NEMA 12 PAINTED STEEL ENCLOSURE WITH FOUR 4"x4" (MIN) FILTERED LOUVERS, CONTINUOUS HINGE REMOVABLE GASKETED DOOR, DOOR CLAMPS, AND HASP AND STAPLE FOR PADLOCKING. SEE NOTE.
   DIMENSIONS (H,W,D): 36"x36"x12"
   MANUFACTURER & CATALOG NUMBER:
   HOFFMAN "A-363612LP"
2. STEEL ENCLOSURE MOUNTING PANEL.
   DIMENSIONS (H,W): 33"x33"
   MANUFACTURER & CATALOG NUMBER:
   HOFFMAN "A-36P36"
3. DUPLEX PUMP CONTROLLER. BASE UNIT IS SHOWN. MOUNT THE DISPLAY AND KEYPAD ON THE FRONT OF THE ENCLOSURE DOOR.
   DIMENSIONS (H,W,D): 4"x8"x5"
   MANUFACTURER & CATALOG NUMBER:
   MULTITRODE "MT2PC"
4. SCADA TRANSFORMER, 120V TO 24V AT 40 VA.
   MANUFACTURER & MODEL NUMBER:
   CONTROL MICROSYSTEMS "ACX24".
5. SCADA UPS POWER SUPPLY WITH 24VAC INPUT AND 12VDC OUTPUT.
   MANUFACTURER & MODEL NUMBER:
   CONTROL MICROSYSTEMS "5103" WITH 24-HOUR, 12VDC BACKUP BATTERY.
6. PAPERLESS CHART RECORDER WITH TWO CHANNEL ANALOG INPUT, MONOCHROME COLOR DISPLAY, TOUCH SCREEN CONTROL, AND WINDOWS BASED SOFTWARE FOR DATA FILE TRANSFER, STORAGE, PRINTING, AND EXPORT TO A SPREADSHEET.
   MANUFACTURER & MODEL NUMBER:
   MONARCH INSTRUMENT "DC2M1STU200000"
7. COMPACT PROGRAMMABLE LOGIC CONTROLLER (PLC) FOR SCADA AND TELEMETRY APPLICATIONS.
   DIMENSIONS (H,W,D): 7"x9"x3"
   MANUFACTURER & MODEL NUMBER:
   CONTROL MICROSYSTEMS "SCADAPACK P1-100-01-0-1"
8. TWO SCADA DIGITAL INPUT MODULES EACH WITH EIGHT 120V DISCRETE INPUTS.
   MANUFACTURER & MODEL NUMBER:
   CONTROL MICROSYSTEMS "5403-120"
9. DUAL CHANNEL UTRASONIC LEVEL MONITORING SYSTEM CAPABLE OF MEASURING PUMP STATION WET WELL LEVEL AND OVERFLOW OPEN CHANNEL FLOW AT THE SAME TIME. SYSTEM SHALL INCLUDE ULTRASONIC LEVEL TRANSCEIVER, INFRARED PROGRAMMER, WET WELL LEVEL TRANSDUCER WITH 6-DEGREE BEAM ANGLE, 1 TO 50 FOOT RANGE, AND 100 FEET OF INTERCONNECT CABLE, AND WET WELL OVERFLOW FLOW TRANSDUCER WITH 10-DEGREE BEAM ANGLE, 1 TO 26 FOOT RANGE, AND 100 FEET OF INTERCONNECT CABLE.
   ULTRASONIC LEVEL TRANSCEIVER (ULT) DIMENSIONS (H,W,D): 10"x7"x4"
   MANUFACTURER & MODEL NUMBER:
   TRANSCEIVER:
   SIEMENS-MILLTRONICS "MULTIRANGER 200"
   WET WELL LEVEL SENSOR:
   SIEMENS-MILTONICS "XPS-15"
   WET WELL FLOW SENSOR:
   SIEMENS-MILLTRONICS "XRS-5"
10. BELL 202 MODEM MODULE FOR CONNECTION TO THE LEASED PHONE LINE WITH RS-232 CABLE FOR CONNECTION TO THE SCADAPACK RS-232 PORT.
    MANUFACTURER & MODEL NUMBER:
    CONTROL MICROSYSTEMS "5902"
11. HIGH LEVEL FLOAT SWITCH BOX AND INTRINSICALLY SAFE RELAY. FURNISH AND INSTALL AN INTRINSICALLY SAFE RELAY IN A NEMA 1 BOX FOR THE HIGH LEVEL FLOAT SWITCH AND CONNECT AS SHOWN. SIZE THE BOX PER NEC REQUIREMENTS.

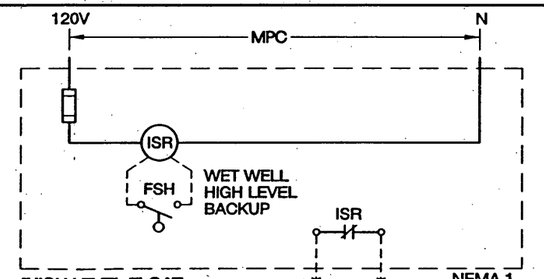


NOTE:

INSTALL 120-VOLT POWER, CONTROL, AND STATUS CIRCUITS THROUGH THE BOTTOM OF THE ENCLOSURE AT THE SIDES, UP THE SIDES, AND ACROSS THE TOP. INSTALL LOW VOLTAGE DISCRETE, ANALOG, AND MSC CABLES THROUGH THE BOTTOM OF THE ENCLOSURE AT THE CENTER AND UP THROUGH THE CENTER SECTION OF THE ENCLOSURE.

CONTROL AND SCADA PANEL COMPONENT LAYOUT

SCALE: 1" = 1'-0"



NOTE:

SIZE, FURNISH, AND INSTALL THE BOX PER NEC REQUIREMENTS. MOUNT THE BOX IN THE "PUMP AND SCADA PANEL" AS SHOWN.

HIGH LEVEL FLOAT SWITCH BOX SCHEMATIC

NTS

MULTITRODE CONTROLLER / ULTRASONIC LEVEL TRANSMITTER (ULT) PUMP START/STOP AND ALARM SETPOINTS			
PUMP/ALARM IDENTIFICATION	CONTROL SOURCE	WET WELL ELEVATION	REMARKS
LEAD PUMP	MULTITRODE	START: 182.0 STOP: 176.5	
LAG PUMP	MULTITRODE	START: 182.5 STOP: 176.5	
HIGH WET WELL	ULT RELAY 1	183.0	ALARM
HIGH WET WELL	FSH	183.5	BACKUP ALARM
WET WELL OVERFLOW	ULT RELAY 2	189.0	ALARM

REGISTERED PROFESSIONAL ENGINEER 8309 OREGON JERRY LESTER HILDERBRAND FEB. 14, 1975
Jerry L. Hildenbrand
5-13-03
EXP. 6/30/03

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGN BY:
SOUTHWOOD ENGINEERING CORPORATION
3301 SOUTHWOOD DR.
PHILOMATH, OR 97370
(541) 929-2533

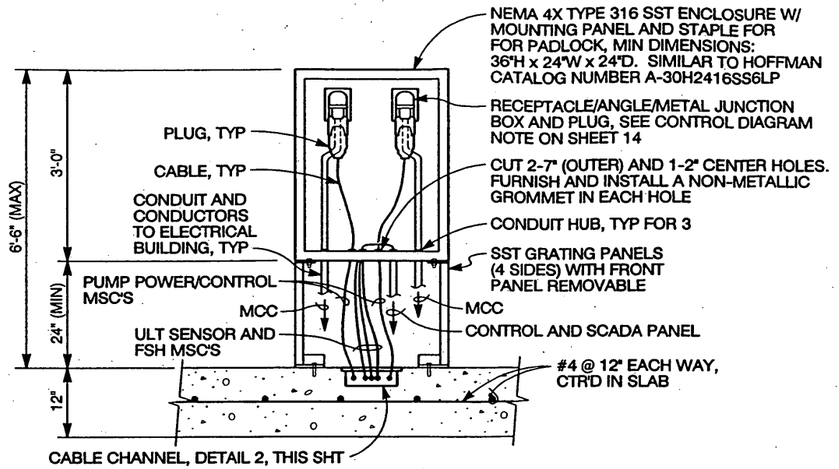
DRAWN BY:
NEW TECH GRAPHICS
510 3RD ST NW
CORVALLIS, OR 97330
(541) 753-9021

REVISIONS	
NO.	DATE

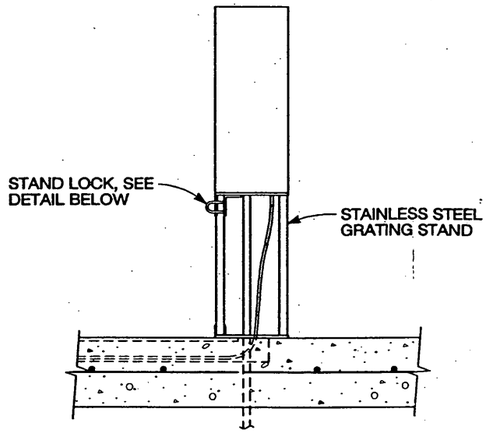
CITY OF NEWBERG, OREGON
CHEHALEM DRIVE SEWAGE PUMP STATION

ELECTRICAL CONTROL DIAGRAM, SCADA PANEL, AND SCHEMATIC

SHEET 14 of 16
DATE May 2003



FRONT VIEW
NTS

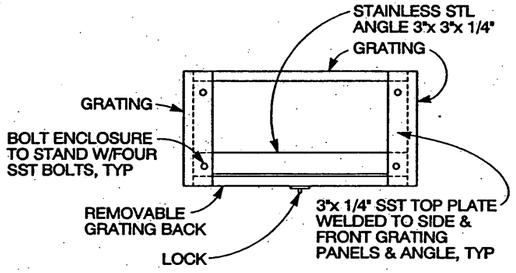


SIDE VIEW
NTS

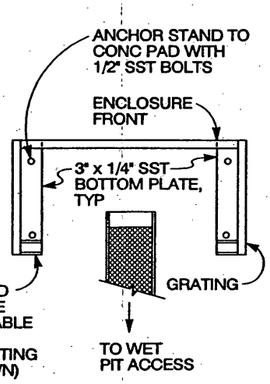
NOTES:

1. SIZE, FURNISH, INSTALL, AND CONNECT SUBMERSIBLE PUMP POWER/CONTROL TJB ULC CABLE, HIGH LEVEL FLOAT SWITCH CABLE, PUMP SENSOR CABLES, AND PUMP POWER CABLES.

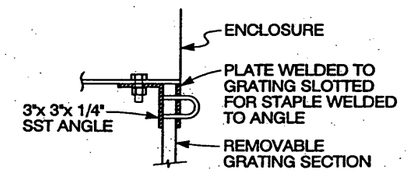
2. STAINLESS STEEL GRATING SHALL HAVE CROSS BARS AT 4" CENTERS (IN VERTICAL) AND BEARING BARS 3/4" x 1/8" MINIMUM, AT 1-3/16" CENTERS. ALL EDGES SHALL BE BANDED. GRATING SHALL BE 19-4-32 MANUFACTURED BY KLEMP GRATING OR APPROVED EQUAL.



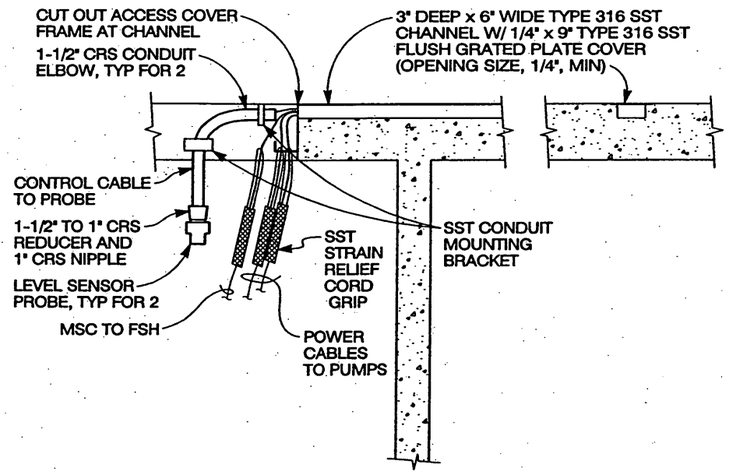
STAND TOP
NTS



STAND BASE
NTS



STAND LOCK DETAIL
NTS



DETAIL 2
3/8" = 1'-0" 6

SUBMERSIBLE PUMP POWER/ CONTROL DISCONNECT BOX 1
NTS 5,10

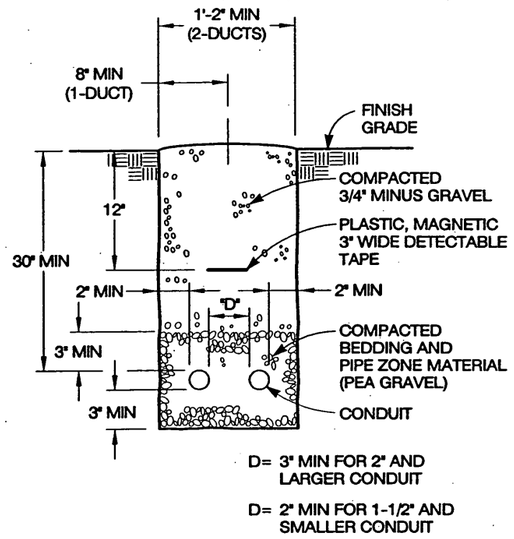
REGISTERED PROFESSIONAL ENGINEER 8309 OREGON FEB. 14, 1975 JERRY LESTER HILDENBRAND
Jerry L. Hildenbrand 5-13-03
EXP. 6/30/03

VERIFY SCALE	DESIGN BY:	DRAWN BY:	REVISIONS		
BAR IS ONE INCH ON ORIGINAL DRAWING 0 ——— 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	SOUTHWOOD ENGINEERING CORPORATION 3301 SOUTHWOOD DR. PHILOMATH, OR 97370 (541) 929-2533	NEW TECH GRAPHICS 510 3RD ST NW CORVALLIS, OR 97330 (541) 753-9021	NO.	DATE	

CITY OF NEWBERG, OREGON
CHEHALEM DRIVE
SEWAGE PUMP STATION

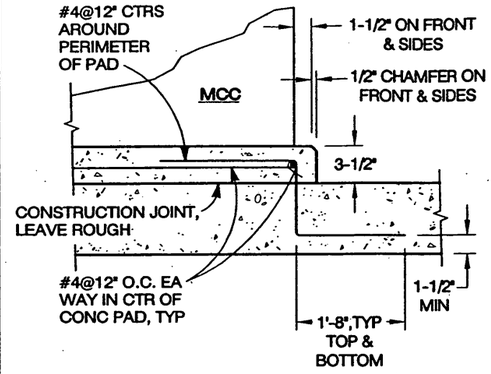
ELECTRICAL DETAILS

SHEET 15 of 16
DATE May 2003



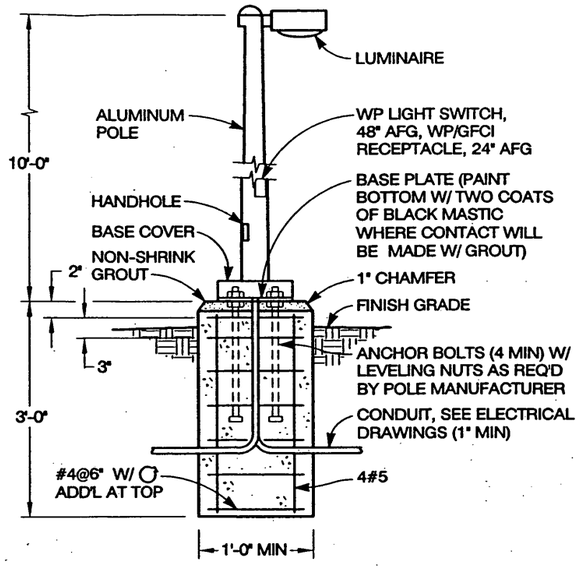
TRENCH AND CONDUIT PLACEMENT DETAIL 1

NTS 10



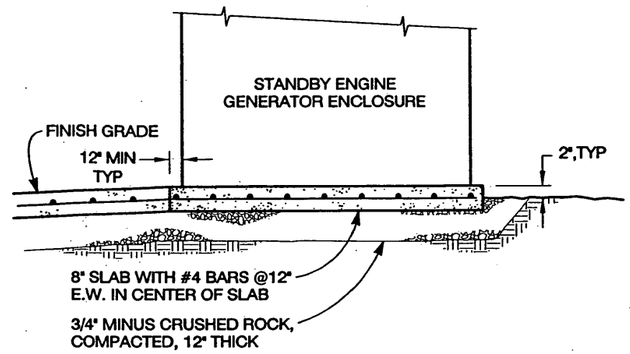
CONCRETE EQUIPMENT PAD DETAIL 2

NTS 12



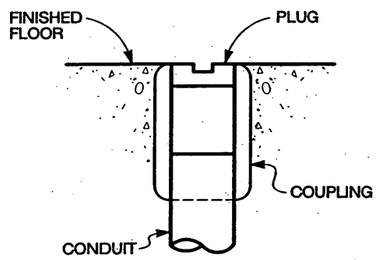
POST LIGHT FOUNDATION DETAIL 3

NTS 12,13



CONCRETE SLAB DETAIL 4

NTS 10

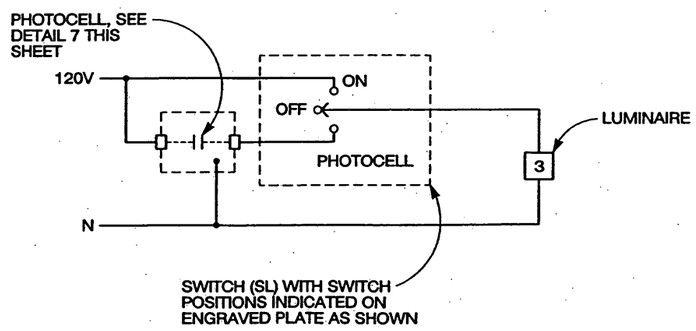


NOTE:

CONDUITS WHICH ARE STUBBED UP IN A CONCRETE SLAB FOR FUTURE EXTENSION SHALL BE INSTALLED IN ACCORDANCE WITH THIS DETAIL.

FLUSH CONDUIT STUB DETAIL 5

NTS 13

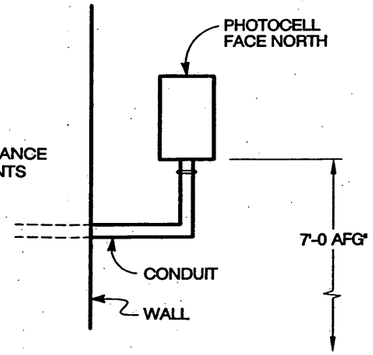


EXTERIOR BUILDING LIGHT CONTROL DETAIL 6

NTS 13

NOTE:

PHOTOCELL SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THIS DETAIL.



PHOTOCELL MOUNTING DETAIL 7

NTS -

REGISTERED PROFESSIONAL ENGINEER
OREGON
JERRY LESTER HILDENBRAND
FEB. 14, 1972
Jerry L. Hildenbrand
5-13-03
EXP. 6/30/03

VERIFY SCALE	DESIGN BY:	DRAWN BY:	REVISIONS
BAR IS ONE INCH ON ORIGINAL DRAWING 0 — 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	SOUTHWOOD ENGINEERING CORPORATION 3301 SOUTHWOOD DR. PHILOMATH, OR 97370 (541) 929-2533	NEW TECH GRAPHICS 510 3RD ST NW CORVALLIS, OR 97330 (541) 753-9021	NO. DATE

CITY OF NEWBERG, OREGON

CHEHALEM DRIVE
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ELECTRICAL DETAILS

SHEET 16 of 16

DATE May 2003