If you plan to submit a bid directly to the Department of Transportation

PREQUALIFICATION

Any contractor who desires to become pre-qualified to bid on work advertised by IDOT must submit the properly completed pre-qualification forms to the Bureau of Construction no later that 4:30 p.m. prevailing time twenty-one days prior to the letting of interest. This pre-qualification requirement applies to first time contractors, contractors renewing expired ratings, contractors maintaining continuous pre-qualification or contractors requesting revised ratings. To be eligible to bid, existing pre-qualification ratings must be effective through the date of letting.

REQUESTS FOR AUTHORIZATION TO BID

Contractors wanting to bid on items included in a particular letting must submit the properly completed "Request for Authorization to Bid/or Not For Bid Status" (BDE 124INT) and the ORIGINAL "Affidavit of Availability" (BC 57) to the proper office no later than 4:30 p.m. prevailing time, three (3) days prior to the letting date.

WHO CAN BID ?

Bids will be accepted from only those companies that request and receive written **Authorization to Bid** from IDOT's Central Bureau of Construction.

WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID?: When a prospective prime bidder submits a "Request for Authorization to Bid/or Not For Bid Status"(BDE 124INT) he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued an **Authorization to Bid or Not for Bid Report**, approved by the Central Bureau of Construction that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Authorization to Bid or Not for Bid Report** will indicate the reason for denial.

ABOUT AUTHORIZATION TO BID: Firms that have not received an authorization form within a reasonable time of complete and correct original document submittal should contact the department as to status. This is critical in the week before the letting. These documents must be received three days before the letting date. Firms unsure as to authorization status should call the Prequalification Section of the Bureau of Construction at the number listed at the end of these instructions.

ADDENDA AND REVISIONS: It is the contractor's responsibility to determine which, if any, addenda or revisions pertain to any project they may be bidding. Failure to incorporate all relevant addenda or revisions may cause the bid to be declared unacceptable.

Each addendum will be placed with the contract number. Addenda and revisions will also be placed on the Addendum/Revision Checklist and each subscription service subscriber will be notified by e-mail of each addendum and revision issued.

The Internet is the Department's primary way of doing business. The subscription server e-mails are an added courtesy the Department provides. It is suggested that bidders check IDOT's website at http://www.dot.il.gov/desenv/delett.html before submitting final bid information.

IDOT IS NOT RESPONSIBLE FOR ANY E-MAIL FAILURES.

Addenda Questions may be directed to the Contracts Office at (217)782-7806 or D&Econtracts@dot.il.gov

Technical Questions about downloading these files may be directed to Tim Garman (217)524-1642 or Timothy.Garman@illinois.gov.

WHAT MUST BE INCLUDED WHEN BIDS ARE SUBMITTED?: Bidders need not return the entire proposal when bids are submitted. That portion of the proposal that must be returned includes the following:

1. All documents from the Proposal Cover Sheet through the Proposal Bid Bond
2. Other special documentation and/or information that may be required by the contract special provisions

All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed by IDOT personnel.

ABOUT SUBMITTING BIDS: It is recommended that bidders deliver bids in person to insure they arrive at the proper location prior to the time specified for the receipt of bids. Any bid received at the place of letting after the time specified will not be accepted.

WHO SHOULD BE CALLED IF ASSISTANCE IS NEEDED?

Questions Regarding	**Call**
Prequalification and/or Authorization to Bid	217/782-3413
Preparation and submittal of bids	217/782-7806
Mailing of plans and proposals	217/782-7806

ADDENDUMS AND REVISIONS TO THE PROPOSAL FORMS

Planholders should verify that they have received and incorporated any addendum and/or revision prior to submitting their bid. Failure by the bidder to include and addendum or revision could result in a bid being rejected as irregular.

RETURN WITH BID

180

Proposal Submitted By
Name
Address
City

Letting June 11, 2010

BIDDERS NEED NOT RETURN THE ENTIRE PROPOSAL
(See instructions inside front cover)

NOTICE TO PROSPECTIVE BIDDERS
This proposal can be used for bidding purposes by only those companies that request and receive written AUTHORIZATION TO BID from IDOT's Central Bureau of Construction.
(SEE INSTRUCTIONS ON THE INSIDE OF COVER)

Notice to Bidders, Specifications, Proposal, Contract and Contract Bond

Illinois Department of Transportation

Springfield, Illinois 62764

Contract No. 60828
COOK County
Section 1999-161-I
District 1 Construction Funds
Route FAI 90/94

PLEASE MARK THE APPROPRIATE BOX BELOW:

☐ A Bid Bond is included.

☐ A Cashier's Check or a Certified Check is included.

Prepared by

S

Checked by

(Printed by authority of the State of Illinois)

INSTRUCTIONS

ABOUT IDOT PROPOSALS: All proposals issued by IDOT are potential bidding proposals. Each proposal contains all Certifications and Affidavits, a Proposal Signature Sheet and a Proposal Bid Bond required for Prime Contractors to submit a bid after written **Authorization to Bid** has been issued by IDOT's Central Bureau of Construction. In addition, this proposal contains new statutory requirements applicable to the use of subcontractors and, in particular, includes the State Required Ethical Standards Governing Subcontractors to be signed and incorporated into all subcontracts.

WHO CAN BID?: Bids will be accepted from only those companies that request and receive written **Authorization to Bid** from IDOT's Central Bureau of Construction. To request authorization, a potential bidder must complete and submit Part B of the Request for Authorization to Bid/or Not For Bid Status form (BDE 124 INT) and submit an original Affidavit of Availability (BC 57).

WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID?: When a prospective prime bidder submits a "**Authorization to Bid or Not for Bid**" form, he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued a **Authorization to Bid or Not for Bid Report**, approved by the Central Bureau of Construction, that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Authorization to Bid or Not for Bid Report** will indicate the reason for denial. If a contractor has requested to bid but has not received a **Authorization to Bid or Not for Bid Report**, they should contact the Central Bureau of Construction in advance of the letting date.

WHAT MUST BE INCLUDED WHEN BIDS ARE SUBMITTED?: Bidders need not return the entire proposal when bids are submitted. That portion of the proposal that must be returned includes the following:

1. All documents from the Proposal Cover Sheet through the Proposal Bid Bond

2. Other special documentation and/or information that may be required by the contract special provisions

All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed by IDOT personnel.

ABOUT SUBMITTING BIDS: It is recommended that bidders deliver bids in person to insure they arrive at the proper location prior to the time specified for the receipt of bids. Any bid received at the place of letting after the time specified will not be accepted.

WHO SHOULD BE CALLED IF ASSISTANCE IS NEEDED?

Questions Regarding	Call
Prequalification and/or Authorization to Bid	217/782-3413
Preparation and submittal of bids	217/782-7806

RETURN WITH BID

Illinois Department of Transportation

PROPOSAL

TO THE DEPARTMENT OF TRANSPORTATION

1. Proposal of _____

_____

Taxpayer Identification Number (Mandatory) _____ a

for the improvement identified and advertised for bids in the Invitation for Bids as:

Contract No. 60828
COOK County
Section 1999-161-I
Route FAI 90/94
District 1 Construction Funds

Rehabilitation of Pump Station 26 along FAI Routes 90/94 (Dan Ryan Expressway) at Roosevelt Road and Union Avenue near UIC in Chicago.

2. The undersigned bidder will furnish all labor, material and equipment to complete the above described project in a good and workmanlike manner as provided in the contract documents provided by the Department of Transportation. This proposal will become part of the contract and the terms and conditions contained in the contract documents shall govern performance and payments.

3. **ASSURANCE OF EXAMINATION AND INSPECTION/WAIVER.** The undersigned further declares that he/she has carefully examined the proposal, plans, specifications, addenda, form of contract and contract bond, and special provisions, and that he/she has inspected in detail the site of the proposed work, and that he/she has familiarized themselves with all of the local conditions affecting the contract and the detailed requirements of construction, and understands that in making this proposal he/she waives all right to plead any misunderstanding regarding the same.

4. **EXECUTION OF CONTRACT AND CONTRACT BOND.** The undersigned further agrees to execute a contract for this work and present the same to the department within fifteen (15) days after the contract has been mailed to him/her. The undersigned further agrees that he/she and his/her surety will execute and present within fifteen (15) days after the contract has been mailed to him/her contract bond satisfactory to and in the form prescribed by the Department of Transportation, in the penal sum of the full amount of the contract, guaranteeing the faithful performance of the work in accordance with the terms of the contract.

5. **PROPOSAL GUARANTY.** Accompanying this proposal is either a bid bond on the department form, executed by a corporate surety company satisfactory to the department, or a proposal guaranty check consisting of a bank cashier's check or a properly certified check for not less than 5 per cent of the amount bid or for the amount specified in the following schedule:

Amount of Bid			Proposal Guaranty	Amount of Bid			Proposal Guaranty
Up to		$5,000	$150	$2,000,000	to	$3,000,000	$100,000
$5,000	to	$10,000	$300	$3,000,000	to	$5,000,000	$150,000
$10,000	to	$50,000	$1,000	$5,000,000	to	$7,500,000	$250,000
$50,000	to	$100,000	$3,000	$7,500,000	to	$10,000,000	$400,000
$100,000	to	$150,000	$5,000	$10,000,000	to	$15,000,000	$500,000
$150,000	to	$250,000	$7,500	$15,000,000	to	$20,000,000	$600,000
$250,000	to	$500,000	$12,500	$20,000,000	to	$25,000,000	$700,000
$500,000	to	$1,000,000	$25,000	$25,000,000	to	$30,000,000	$800,000
$1,000,000	to	$1,500,000	$50,000	$30,000,000	to	$35,000,000	$900,000
$1,500,000	to	$2,000,000	$75,000	over		$35,000,000	$1,000,000

Bank cashier's checks or properly certified checks accompanying proposals shall be made payable to the Treasurer, State of Illinois, when the state is awarding authority; the county treasurer, when a county is the awarding authority; or the city, village, or town treasurer, when a city, village, or town is the awarding authority.

If a combination bid is submitted, the proposal guaranties which accompany the individual proposals making up the combination will be considered as also covering the combination bid.

The amount of the proposal guaranty check is _____ $( ). If this proposal is accepted and the undersigned shall fail to execute a contract bond as required herein, it is hereby agreed that the amount of the proposal guaranty shall become the property of the State of Illinois, and shall be considered as payment of damages due to delay and other causes suffered by the State because of the failure to execute said contract and contract bond; otherwise, the bid bond shall become void or the proposal guaranty check shall be returned to the undersigned.

Attach Cashier's Check or Certified Check Here

In the event that one proposal guaranty check is intended to cover two or more proposals, the amount must be equal to the sum of the proposal guaranties which would be required for each individual proposal. If the guaranty check is placed in another proposal, state below where it may be found.

The proposal guaranty check will be found in the proposal for:

Item _____

Section No. _____

County _____

Mark the proposal cover sheet as to the type of proposal guaranty submitted.

6. **COMBINATION BIDS.** The undersigned further agrees that if awarded the contract for the sections contained in the following combination, he/she will perform the work in accordance with the requirements of each individual proposal comprising the combination bid specified in the schedule below, and that the combination bid shall be prorated against each section in proportion to the bid submitted for the same. If an error is found to exist in the gross sum bid for one or more of the individual sections included in a combination, the combination bid shall be corrected as provided in the specifications.

When a combination bid is submitted, the schedule below must be completed in each proposal comprising the combination.

If alternate bids are submitted for one or more of the sections comprising the combination, a combination bid must be submitted for each alternate.

Schedule of Combination Bids

Combination No.	Sections Included in Combination	Combination Bid Dollars	Cents

7. **SCHEDULE OF PRICES.** The undersigned bidder submits herewith, in accordance with the rules and instructions, a schedule of prices for the items of work for which bids are sought. The unit prices bid are in U.S. dollars and cents, and all extensions and summations have been made. The bidder understands that the quantities appearing in the bid schedule are approximate and are provided for the purpose of obtaining a gross sum for the comparison of bids. If there is an error in the extension of the unit prices, the unit prices shall govern. Payment to the contractor awarded the contract will be made only for actual quantities of work performed and accepted or materials furnished according to the contract. The scheduled quantities of work to be done and materials to be furnished may be increased, decreased or omitted as provided elsewhere in the contract.

8. **AUTHORITY TO DO BUSINESS IN ILLINOIS.** Section 20-43 of the Illinois Procurement Code (30 ILCS 500/20-43) provides that a person (other than an individual acting as a sole proprietor) must be a legal entity authorized to do business in the State of Illinois prior to submitting the bid.

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - 60828

State Job # - C-91-411-99
PPS NBR - 1-75784-0100
County Name - COOK- -
Code - 31 - -
District - 1 - -
Section Number - 1999-161-I

Project Number

Route
FAI 90/94

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
X0301028	PUMP STA SCADA EQUIP	L SUM	1.000				
X0322256	TEMP INFO SIGNING	SQ FT	18.000				
X0323426	SED CONT DR ST INL CL	EACH	12.000				
X0323880	COMP SPARE M-PUMP ASM	L SUM	1.000				
X0325305	STR REP CON DP = < 5	SQ FT	18.000				
X0326957	COMP SPAR LF PUMP ASY	L SUM	1.000				
X0326958	CON EN RC 1-5 6-4 PVC	FOOT	160.000				
X0326959	CON EN RC 1-5 6-4 RGC	FOOT	16.000				
X0335700	P.S. GENERAL WORK	L SUM	1.000				
X0783300	P.S. ELECTRICAL WORK	L SUM	1.000				
X0783500	P.S. MECHANICAL WORK	L SUM	1.000				
X8040305	ELECT SERV CONNECT	L SUM	1.000				
Z0018500	DRAINAGE STR CLEANED	EACH	3.000				
28000510	INLET FILTERS	EACH	4.000				
40601005	HMA REPL OVER PATCH	TON	6.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - 60828

State Job # - C-91-411-99
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County Name - COOK- -
Code - 31 - -
District - 1 - -
Section Number - 1999-161-I

Project Number

Route
FAI 90/94

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
42001300	PROTECTIVE COAT	SQ YD	291.000				
42400200	PC CONC SIDEWALK 5	SQ FT	88.000				
44000300	CURB REM	FOOT	30.000				
44000600	SIDEWALK REM	SQ FT	88.000				
44002218	HMA RM OV PATCH 4 1/2	SQ YD	24.000				
44004250	PAVED SHLD REMOVAL	SQ YD	37.000				
44201373	CL C PATCH T1 12	SQ YD	10.000				
44201377	CL C PATCH T2 12	SQ YD	10.000				
50604200	CLEAN & PT STL RL N1	L SUM	1.000				
50606400	C&D LEAD PT CL RES	L SUM	1.000				
550A0140	STORM SEW CL A 1 30	FOOT	15.000				
60600605	CONC CURB TB	FOOT	30.000				
66400565	CH LK FENCE 7 SPL	FOOT	22.000				
66403705	CH LK GT 7X4 SINGL SP	EACH	2.000				
66404505	CH LK GT 7X12 SNGL SP	EACH	1.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - 60828

State Job # - C-91-411-99
PPS NBR - 1-75784-0100
County Name - COOK- -
Code - 31 - -
District - 1 - -
Section Number - 1999-161-I

Project Number

Route FAI 90/94

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
66411900	TEMP FENCE	FOOT	220.000				
67000400	ENGR FIELD OFFICE A	CAL MO	10.000				
67100100	MOBILIZATION	L SUM	1.000				
70101800	TRAF CONT & PROT SPL	L SUM	1.000				
70106800	CHANGEABLE MESSAGE SN	CAL MO	6.000				
81900200	TR & BKFIL F ELECT WK	FOOT	170.000				

CONTRACT NUMBER **60828**

THIS IS THE TOTAL BID **$** _____

NOTES:

1. **Each PAY ITEM should have a UNIT PRICE and a TOTAL PRICE.**
2. **The UNIT PRICE shall govern if no TOTAL PRICE is shown or if there is a discrepancy between the product of the UNIT PRICE multiplied by the QUANTITY.**
3. **If a UNIT PRICE is omitted, the TOTAL PRICE will be divided by the QUANTITY in order to establish a UNIT PRICE.**
4. **A bid may be declared UNACCEPTABLE if neither a unit price nor a total price is shown.**

RETURN WITH BID

STATE REQUIRED ETHICAL STANDARDS GOVERNING CONTRACT PROCUREMENT: ASSURANCES, CERTIFICATIONS AND DISCLOSURES

I. GENERAL

A. Article 50 of the Illinois Procurement Code establishes the duty of all State chief procurement officers, State purchasing officers, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

B. In order to comply with the provisions of Article 50 and to carry out the duty established therein, all bidders are to adhere to ethical standards established for the procurement process, and to make such assurances, disclosures and certifications required by law. Except as otherwise required in subsection III, paragraphs J-N, by execution of the Proposal Signature Sheet, the bidder indicates that each of the mandated assurances have been read and understood, that each certification is made and understood, and that each disclosure requirement has been understood and completed.

C. In addition to all other remedies provided by law, failure to comply with any assurance, failure to make any disclosure or the making of a false certification shall be grounds for the chief procurement officer to void the contract, or subcontract, and may result in the suspension or debarment of the bidder or subcontractor.

II. ASSURANCES

The assurances hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder.

A. Conflicts of Interest

1. The Illinois Procurement Code provides in pertinent part:

Section 50-13. Conflicts of Interest.

(a) Prohibition. It is unlawful for any person holding an elective office in this State, holding a seat in the General Assembly, or appointed to or employed in any of the offices or agencies of state government and who receives compensation for such employment in excess of 60% of the salary of the Governor of the State of Illinois, or who is an officer or employee of the Capital Development Board or the Illinois Toll Highway Authority, or who is the spouse or minor child of any such person to have or acquire any contract, or any direct pecuniary interest in any contract therein, whether for stationery, printing, paper, or any services, materials, or supplies, that will be wholly or partially satisfied by the payment of funds appropriated by the General Assembly of the State of Illinois or in any contract of the Capital Development Board or the Illinois Toll Highway authority.

(b) Interests. It is unlawful for any firm, partnership, association or corporation, in which any person listed in subsection (a) is entitled to receive (i) more than 7 1/2% of the total distributable income or (ii) an amount in excess of the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(c) Combined interests. It is unlawful for any firm, partnership, association, or corporation, in which any person listed in subsection (a) together with his or her spouse or minor children is entitled to receive (i) more than 15%, in the aggregate, of the total distributable income or (ii) an amount in excess of 2 times the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(d) Securities. Nothing in this Section invalidates the provisions of any bond or other security previously offered or to be offered for sale or sold by or for the State of Illinois.

(e) Prior interests. This Section does not affect the validity of any contract made between the State and an officer or employee of the State or member of the General Assembly, his or her spouse, minor child or any combination of those persons if that contract was in existence before his or her election or employment as an officer, member, or employee. The contract is voidable, however, if it cannot be completed within 365 days after the officer, member, or employee takes office or is employed.

The current salary of the Governor is $177,412.00. Sixty percent of the salary is $106,447.20.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-13, or that an effective exemption has been issued by the Board of Ethics to any individual subject to the Section 50-13 prohibitions pursuant to the provisions of Section 50-20 of the Code and Executive Order Number 3 (1998). Information concerning the exemption process is available from the Department upon request.

B. Negotiations

1. The Illinois Procurement Code provides in pertinent part:

Section 50-15. Negotiations.

(a) It is unlawful for any person employed in or on a continual contractual relationship with any of the offices or agencies of State government to participate in contract negotiations on behalf of that office or agency with any firm, partnership, association, or corporation with whom that person has a contract for future employment or is negotiating concerning possible future employment.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-15, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

C. Inducements

1. The Illinois Procurement Code provides:

Section 50-25. Inducement. Any person who offers or pays any money or other valuable thing to any person to induce him or her not to bid for a State contract or as recompense for not having bid on a State contract is guilty of a Class 4 felony. Any person who accepts any money or other valuable thing for not bidding for a State contract or who withholds a bid in consideration of the promise for the payment of money or other valuable thing is guilty of a Class 4 felony.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-25, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

D. Revolving Door Prohibition

1. The Illinois Procurement Code provides:

Section 50-30. Revolving door prohibition. Chief procurement officers, State purchasing officers, procurement compliance monitors, their designees whose principal duties are directly related to State procurement, and executive officers confirmed by the Senate are expressly prohibited for a period of 2 years after terminating an affected position from engaging in any procurement activity relating to the State agency most recently employing them in an affected position for a period of at least 6 months. The prohibition includes, but is not limited to: lobbying the procurement process; specifying; bidding; proposing bid, proposal, or contract documents; on their own behalf or on behalf of any firm, partnership, association, or corporation. This Section applies only to persons who terminate an affected position on or after January 15, 1999.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-30, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

E. Reporting Anticompetitive Practices

1. The Illinois Procurement Code provides:

Section 50-40. Reporting anticompetitive practices. When, for any reason, any vendor, bidder, contractor, chief procurement officer, State purchasing officer, designee, elected official, or State employee suspects collusion or other anticompetitive practice among any bidders, offerors, contractors, proposers, or employees of the State, a notice of the relevant facts shall be transmitted to the Attorney General and the chief procurement officer.

2. The bidder assures the Department that it has not failed to report any relevant facts concerning the practices addressed in Section 50-40 which may involve the contract for which the bid is submitted.

F. Confidentiality

1. The Illinois Procurement Code provides:

Section 50-45. Confidentiality. Any chief procurement officer, State purchasing officer, designee, or executive officer who willfully uses or allows the use of specifications, competitive bid documents, proprietary competitive information, proposals, contracts, or selection information to compromise the fairness or integrity of the procurement, bidding, or contract process shall be subject to immediate dismissal, regardless of the Personnel code, any contract, or any collective bargaining agreement, and may in addition be subject to criminal prosecution.

2. The bidder assures the Department that it has no knowledge of any fact relevant to the practices addressed in Section 50-45 which may involve the contract for which the bid is submitted.

G. Insider Information

1. The Illinois Procurement Act provides:

Section 50-50. Insider information. It is unlawful for any current or former elected or appointed State official or State employee to knowingly use confidential information available only by virtue of that office or employment for actual or anticipated gain for themselves or another person.

2. The bidder assures the Department that it has no knowledge of any facts relevant to the practices addressed in Section 50-50 which may involve the contract for which the bid is submitted.

III. CERTIFICATIONS

The certifications hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. Section 50-2 of the Illinois Procurement Code provides that every person that has entered into a multi-year contract and every subcontractor with a multi-year subcontract shall certify, by July 1 of each fiscal year covered by the contract after the initial fiscal year, to the responsible chief procurement officer whether it continues to satisfy the requirements of Article 50 pertaining to the eligibility for a contract award. If a contractor or subcontractor is not able to truthfully certify that it continues to meet all requirements, it shall provide with its certification a detailed explanation of the circumstances leading to the change in certification status. A contractor or subcontractor that makes a false statement material to any given certification required under Article 50 is, in addition to any other penalties or consequences prescribed by law, subject to liability under the Whistleblower Reward and Protection Act for submission of a false claim.

A. Bribery

1. The Illinois Procurement Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

(1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or

(2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government, or subcontracting under such a contract, as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

(1) the business has been finally adjudicated not guilty; or

(2) the business demonstrates to the governmental entity with which it seeks to contract, or which is signatory to the contract which the subcontract relates, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State, and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the contractor or the subcontractor, respectively, that the contractor or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any certifications required by this Section are false. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50.5.

B. Felons

1. The Illinois Procurement Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any State agency, or enter into a subcontract, from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

2. Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder or contractor or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any of the certifications required by this Section are false.

C. Debt Delinquency

1. The Illinois Procurement Code provides:

Section 50-11 and 50-12. Debt Delinquency.
The contractor or bidder or subcontractor, respectively, certifies that it, or any affiliate, is not barred from being awarded a contract or subcontract under the Procurement Code. Section 50-11 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The bidder or contractor or subcontractor, respectively, further acknowledges that the chief procurement officer may declare the related contract void if this certification is false or if the bidder, contractor, or subcontractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

D. Prohibited Bidders, Contractors and Subcontractors

1. The Illinois Procurement Code provides:

Section 50-10.5 and 50-60(c). Prohibited bidders, contractors and subcontractors.
The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 or if in violation of Subsection (c) for a period of five years from the date of conviction. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder, contractor, or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer shall declare the related contract void if any of the certifications completed pursuant to this Section are false.

E. Section 42 of the Environmental Protection Act

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-12 that the bidder, contractor, or subcontractor, is not barred from being awarded a contract or entering into a subcontract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency, or entering into any subcontract, that is subject to the Procurement Code by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The bidder or contractor or subcontractor, respectively, acknowledges that the chief procurement officer may declare the contract void if this certification is false.

F. Educational Loan

1. Section 3 of the Educational Loan Default Act provides:

§ 3. No State agency shall contract with an individual for goods or services if that individual is in default, as defined in Section 2 of this Act, on an educational loan. Any contract used by any State agency shall include a statement certifying that the individual is not in default on an educational loan as provided in this Section.

2. The bidder, if an individual as opposed to a corporation, partnership or other form of business organization, certifies that the bidder is not in default on an educational loan as provided in Section 3 of the Act.

G. Bid-Rigging/Bid Rotating

1. Section 33E-11 of the Criminal Code of 1961 provides:

§ 33E-11. (a) Every bid submitted to and public contract executed pursuant to such bid by the State or a unit of local government shall contain a certification by the prime contractor that the prime contractor is not barred from contracting with any unit of State or local government as a result of a violation of either Section 33E-3 or 33E-4 of this Article. The State and units of local government shall provide the appropriate forms for such certification.

(b) A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

A violation of Section 33E-3 would be represented by a conviction of the crime of bid-rigging which, in addition to Class 3 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be barred for 5 years from the date of conviction from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

A violation of Section 33E-4 would be represented by a conviction of the crime of bid-rotating which, in addition to Class 2 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be permanently barred from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

2. The bidder certifies that it is not barred from contracting with the Department by reason of a violation of either Section 33E-3 or Section 33E-4.

H. International Anti-Boycott

1. Section 5 of the International Anti-Boycott Certification Act provides:

§ 5. State contracts. Every contract entered into by the State of Illinois for the manufacture, furnishing, or purchasing of supplies, material, or equipment or for the furnishing of work, labor, or services, in an amount exceeding the threshold for small purchases according to the purchasing laws of this State or $10,000.00, whichever is less, shall contain certification, as a material condition of the contract, by which the contractor agrees that neither the contractor nor any substantially-owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the U.S. Export Administration Act of 1979 or the regulations of the U.S. Department of Commerce promulgated under that Act.

2. The bidder makes the certification set forth in Section 5 of the Act.

I. Drug Free Workplace

1. The Illinois “Drug Free Workplace Act” applies to this contract and it is necessary to comply with the provisions of the “Act” if the contractor is a corporation, partnership, or other entity (including a sole proprietorship) which has 25 or more employees.

2. The bidder certifies that if awarded a contract in excess of $5,000 it will provide a drug free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance, including cannabis, is prohibited in the contractor’s workplace; specifying the actions that will be taken against employees for violations of such prohibition; and notifying the employee that, as a condition of employment on such contract, the employee shall abide by the terms of the statement, and notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction.

(b) Establishing a drug free awareness program to inform employees about the dangers of drug abuse in the workplace; the contractor’s policy of maintaining a drug free workplace; any available drug counseling, rehabilitation, and employee assistance programs; and the penalties that may be imposed upon employees for drug violations.

(c) Providing a copy of the statement required by subparagraph (1) to each employee engaged in the performance of the contract and to post the statement in a prominent place in the workplace.

(d) Notifying the Department within ten (10) days after receiving notice from an employee or otherwise receiving actual notice of the conviction of an employee for a violation of any criminal drug statute occurring in the workplace.

(e) Imposing or requiring, within 30 days after receiving notice from an employee of a conviction or actual notice of such a conviction, an appropriate personnel action, up to and including termination, or the satisfactory participation in a drug abuse assistance or rehabilitation program approved by a federal, state or local health, law enforcement or other appropriate agency.

(f) Assisting employees in selecting a course of action in the event drug counseling, treatment, and rehabilitation is required and indicating that a trained referral team is in place.

(g) Making a good faith effort to continue to maintain a drug free workplace through implementation of the actions and efforts stated in this certification.

J. Disclosure of Business Operations in Iran

Section 50-36 of the Illinois Procurement Code, 30ILCS 500/50-36 provides that each bid, offer, or proposal submitted for a State contract shall include a disclosure of whether or not the Company acting as the bidder, offeror, or proposing entity, or any of its corporate parents or subsidiaries, within the 24 months before submission of the bid, offer, or proposal had business operations that involved contracts with or provision of supplies or services to the Government of Iran, companies in which the Government of Iran has any direct or indirect equity share, consortiums or projects commissioned by the Government of Iran, or companies involved in consortiums or projects commissioned by the Government of Iran and either of the following conditions apply:

(1) More than 10% of the Company's revenues produced in or assets located in Iran involve oil-related activities or mineral-extraction activities; less than 75% of the Company's revenues produced in or assets located in Iran involve contracts with or provision of oil-related or mineral-extraction products or services to the Government of Iran or a project or consortium created exclusively by that government; and the Company has failed to take substantial action.

(2) The Company has, on or after August 5, 1996, made an investment of $20 million or more, or any combination of investments of at least $10 million each that in the aggregate equals or exceeds $20 million in any 12-month period, which directly or significantly contributes to the enhancement of Iran's ability to develop petroleum resources of Iran.

The terms “Business operations”, “Company”, “Mineral-extraction activities”, “Oil-related activities”, “Petroleum resources”, and “Substantial action” are all defined in the Code.

Failure to make the disclosure required by the Code shall cause the bid, offer or proposal to be considered not responsive. The disclosure will be considered when evaluating the bid, offer, or proposal or awarding the contract. The name of each Company disclosed as doing business or having done business in Iran will be provided to the State Comptroller.

Check the appropriate statement:

/___/ Company has no business operations in Iran to disclose.

/___/ Company has business operations in Iran as disclosed the attached document.

K. Apprenticeship and Training Certification (Does not apply to federal aid projects)

In accordance with the provisions of Section 30-22 (6) of the Illinois Procurement Code, the bidder certifies that it is a participant, either as an individual or as part of a group program, in the approved apprenticeship and training programs applicable to each type of work or craft that the bidder will perform with its own forces. The bidder further certifies for work that will be performed by subcontract that each of its subcontractors submitted for approval either (a) is, at the time of such bid, participating in an approved, applicable apprenticeship and training program; or (b) will, prior to commencement of performance of work pursuant to this contract, begin participation in an approved apprenticeship and training program applicable to the work of the subcontract. The Department, at any time before or after award, may require the production of a copy of each applicable Certificate of Registration issued by the United States Department of Labor evidencing such participation by the contractor and any or all of its subcontractors. Applicable apprenticeship and training programs are those that have been approved and registered with the United States Department of Labor. The bidder shall list in the space below, the official name of the program sponsor holding the Certificate of Registration for all of the types of work or crafts in which the bidder is a participant and that will be performed with the bidder’s forces. Types of work or craft work that will be subcontracted shall be included and listed as subcontract work. The list shall also indicate any type of work or craft job category that does not have an applicable apprenticeship or training program. **The bidder is responsible for making a complete report and shall make certain that each type of work or craft job category that will be utilized on the project as reported on the Construction Employee Workforce Projection (Form BC-1256) and returned with the bid is accounted for and listed.**

_____

_____

_____

The requirements of this certification and disclosure are a material part of the contract, and the contractor shall require this certification provision to be included in all approved subcontracts. In order to fulfill this requirement, it shall not be necessary that an applicable program sponsor be currently taking or that it will take applications for apprenticeship, training or employment during the performance of the work of this contract.

L. Political Contributions and Registration with the State Board of Elections

Sections 20-160 and 50-37 of the Illinois Procurement Code regulate political contributions from business entities and any affiliated entities or affiliated persons bidding on or contracting with the state. Generally under Section 50-37, any business entity, and any affiliated entity or affiliated person of the business entity, whose current year contracts with all state agencies exceed an awarded value of $50,000, are prohibited from making any contributions to any political committees established to promote the candidacy of the officeholder responsible for the awarding of the contracts or any other declared candidate for that office for the duration of the term of office of the incumbent officeholder or a period 2 years after the termination of the contract, whichever is longer. Any business entity and affiliated entities or affiliated persons whose state contracts in the current year do not exceed an awarded value of $50,000, but whose aggregate pending bids and proposals on state contracts exceed $50,000, either alone or in combination with contracts not exceeding $50,000, are prohibited from making any political contributions to any political committee established to promote the candidacy of the officeholder responsible for awarding the pending contract during the period beginning on the date the invitation for bids or request for proposals is issued and ending on the day after the date of award or selection if the entity was not awarded or selected. Section 20-160 requires certification of registration of affected business entities in accordance with procedures found in Section 9-35 of The Election Code.

By submission of a bid, the contractor business entity acknowledges and agrees that it has read and understands Sections 20-160 and 50-37 of the Illinois Procurement Code, and that it makes the following certification:

The undersigned business entity certifies that it has registered as a business with the State Board of Elections and acknowledges a continuing duty to update the registration in accordance with the above referenced statutes. A copy of the certificate of registration shall be submitted with the bid. The bidder is cautioned that the Department will not award a contract without submission of the certificate of registration.

These requirements and compliance with the above referenced statutory sections are a material part of the contract, and any breach thereof shall be cause to void the contract under Section 50-60 of the Illinois Procurement Code. This provision does not apply to Federal-aid contracts.

M. Lobbyist Disclosure

Section 50-38 of the Illinois Procurement Code requires that any bidder or offeror on a State contract that hires a person required to register under the Lobbyist Registration Act to assist in obtaining a contract shall:

(i) Disclose all costs, fees, compensation, reimbursements, and other remunerations paid or to be paid to the lobbyist related to the contract,

(ii) Not bill or otherwise cause the State of Illinois to pay for any of the lobbyist's costs, fees, compensation, reimbursements, or other remuneration, and

(iii) Sign a verification certifying that none of the lobbyist's costs, fees, compensation, reimbursements, or other remuneration were billed to the State.

This information, along with all supporting documents, shall be filed with the agency awarding the contract and with the Secretary of State. The chief procurement officer shall post this information, together with the contract award notice, in the online Procurement Bulletin.

Pursuant to Subsection (c) of this Section, no person or entity shall retain a person or entity to attempt to influence the outcome of a procurement decision made under the Procurement Code for compensation contingent in whole or in part upon the decision or procurement. Any person who violates this subsection is guilty of a business offense and shall be fined not more than $10,000.

Bidder acknowledges that it is required to disclose the hiring of any person required to register pursuant to the Illinois Lobbyist Registration Act (25 ILCS 170) in connection with this contract.

☐ Bidder has not hired any person required to register pursuant to the Illinois Lobbyist Registration Act in connection with this contract.

Or

☐ Bidder has hired the following persons required to register pursuant to the Illinois Lobbyist Registration Act in connection with the contract:

Name and address of person: _____

All costs, fees, compensation, reimbursements and other remuneration paid to said person: _____

_____

_____

_____

IV. DISCLOSURES

A. The disclosures hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The bidder further certifies that the Department has received the disclosure forms for each bid.

The chief procurement officer may void the bid, contract, or subcontract, respectively, if it is later determined that the bidder or subcontractor rendered a false or erroneous disclosure. A contractor or subcontractor may be suspended or debarred for violations of the Procurement Code. Furthermore, the chief procurement officer may void the contract and the surety providing the performance bond shall be responsible for completion of the contract.

B. Financial Interests and Conflicts of Interest

1. Section 50-35 of the Illinois Procurement Code provides that all bids of more than $10,000 shall be accompanied by disclosure of the financial interests of the bidder. This disclosed information for the successful bidder, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act, filed with the Procurement Policy Board, and shall be incorporated as a material term of the contract. Furthermore, pursuant to Section 5-5, the Procurement Policy Board may review a proposal, bid, or contract and issue a recommendation to void a contract or reject a proposal or bid based on any violation of the Procurement Code or the existence of a conflict of interest as provided in subsections (b) and (d) of Section 50-35.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the bidding entity or its parent entity, whichever is less, unless the contractor or bidder is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

In addition, all disclosures shall indicate any other current or pending contracts, proposals, leases, or other ongoing procurement relationships the bidding entity has with any other unit of state government and shall clearly identify the unit and the contract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. Subject individuals should be covered each by one form. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies. **The forms must be included with each bid or incorporated by reference.**

C. Disclosure Form Instructions

Form A Instructions for Financial Information & Potential Conflicts of Interest

If the bidder is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. If a bidder is not subject to Federal 10K reporting, the bidder must determine if any individuals are required by law to complete a financial disclosure form. To do this, the bidder should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the NOT APPLICABLE STATEMENT on Form A must be signed and dated by a person that is authorized to execute contracts for the bidding company. Note: These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity? YES ___ NO ___
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than $106,447.20? YES ___ NO___
3. Does anyone in your organization receive more than $106,447.20 of the bidding entity's or parent entity's distributive income? (Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.) YES ___ NO __
4. Does anyone in your organization receive greater than 5% of the bidding entity's or parent entity's total distributive income, but which is less than $106,447.20? YES ___ NO __

   (Note: Only one set of forms needs to be completed per person per bid even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The bidder must determine each individual in the bidding entity or the bidding entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable**. The person signing can be, but does not have to be, the person for which the form is being completed. The bidder is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the NOT APPLICABLE STATEMENT of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

Form B: Instructions for Identifying Other Contracts & Procurement Related Information

Disclosure Form B must be completed for each bid submitted by the bidding entity. *Note: Checking the NOT APPLICABLE STATEMENT on Form A does not allow the bidder to ignore Form B. Form B must be completed, checked, and dated or the bidder may be considered nonresponsive and the bid will not be accepted.*

The Bidder shall identify, by checking Yes or No on Form B, whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the bidder only needs to complete the check box on the bottom of Form B. If "Yes" is checked, the bidder must do one of the following:

Option I: If the bidder did not submit an Affidavit of Availability to obtain authorization to bid, the bidder must list all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Do not include IDOT contracts. Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included. Bidders who submit Affidavits of Availability are suggested to use Option II.

Option II: If the bidder is required and has submitted an Affidavit of Availability in order to obtain authorization to bid, the bidder may write or type "See Affidavit of Availability" which indicates that the Affidavit of Availability is incorporated by reference and includes all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. For any contracts that are not covered by the Affidavit of Availability, the bidder must identify them on Form B or on an attached sheet(s). These might be such things as leases.

RETURN WITH BID

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form A
Financial Information & Potential Conflicts of Interest Disclosure

Contractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Code (30 ILCS 500). Vendors desiring to enter into a contract with the State of Illinois must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for bids in excess of $10,000, and for all open-ended contracts. **A publicly traded company may submit a 10K disclosure (or equivalent if applicable) in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.**

DISCLOSURE OF FINANCIAL INFORMATION

1. Disclosure of Financial Information. The individual named below has an interest in the BIDDER (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than $106,447.20 (60% of the Governor's salary as of 7/1/07). **(Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)**

FOR INDIVIDUAL (type or print information)

NAME: _____

ADDRESS _____

_____

Type of ownership/distributable income share:

stock _____ sole proprietorship _____ Partnership _____ other: (explain on separate sheet):

% or $ value of ownership/distributable income share: _____

2. Disclosure of Potential Conflicts of Interest. Check "Yes" or "No" to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is "Yes", please attach additional pages and describe.

(a) State employment, currently or in the previous 3 years, including contractual employment of services.
Yes ___ No __

If your answer is yes, please answer each of the following questions.

1. Are you currently an officer or employee of either the Capitol Development Board or the Illinois Toll Highway Authority? Yes ___ No __

2. Are you currently appointed to or employed by any agency of the State of Illinois? If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $106,447.20, (60% of the Governor's salary as of 7/1/07) provide the name the State agency for which you are employed and your annual salary. _____
_____

3. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $106,447.20, (60% of the Governor's salary as of 7/1/07) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes ___No __

4. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes ___No __

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment services in the previous 2 years.

Yes ___No __

If your answer is yes, please answer each of the following questions.

1. Is your spouse or any minor children currently an officer or employee of the Capitol Development Board or the Illinois Toll Highway Authority? Yes ___No __

2. Is your spouse or any minor children currently appointed to or employed by any agency of the State of Illinois? If your spouse or minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $106,447.20, (60 % of the Governor's salary as of 7/1/07) provide the name of your spouse and/or minor children, the name of the State agency for which he/she is employed and his/her annual salary. _____
_____

3. If your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $106,447.20, (60% of the salary of the Governor as of 7/1/07) are you entitled to receive (i) more then 71/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes ___No __

4. If your spouse or any minor children are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor?

Yes ___No __

(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years. Yes ___No __

(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___No __

(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United States of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years. Yes ___No __

(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___No __

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government. Yes ___No __

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___ No __

(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections.
Yes ___ No __

(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections.
Yes ___ No __

---

2. **Communication Disclosure.**

Disclose the name and address of each lobbyist and other agent of the bidder or offeror who is not identified in Section 2 of this form, who is has communicated, is communicating, or may communicate with any State officer or employee concerning the bid or offer. This disclosure is a continuing obligation and must be promptly supplemented for accuracy throughout the process and throughout the term of the contract. If no person is identified, enter "None" on the line below:

Name and address of person(s): _____

_____

_____

_____

4. Debarment Disclosure. For each of the persons identified under Sections 2 and 3 of this form, disclose whether any of the following has occurred within the previous 10 years: debarment from contracting with any governmental entity; professional licensure discipline; bankruptcies; adverse civil judgments and administrative findings; and criminal felony convictions. This disclosure is a continuing obligation and must be promptly supplemented for accuracy throughout the procurement process and term of the contract. If no person is identified, enter "None" on the line below:

Name of person(s): _____

Nature of disclosure: _____

_____

_____

_____

APPLICABLE STATEMENT

This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page. Under penalty of perjury, I certify the contents of this disclosure to be true and accurate to the best of my knowledge.

Completed by: ☐ _____ _____

Signature of Individual or Authorized Representative — Date

NOT APPLICABLE STATEMENT

Under penalty of perjury, I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.

This Disclosure Form A is submitted on behalf of the CONTRACTOR listed on the previous page.

☐ _____ _____

Signature of Authorized Representative — Date

The bidder has a continuing obligation to supplement these disclosures under Sec. 50-35 of the Procurement Code.

RETURN WITH BID

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form B
Other Contracts & Procurement Related Information Disclosure

Contractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Act (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for bids in excess of $10,000, and for all open-ended contracts.

DISCLOSURE OF OTHER CONTRACTS AND PROCUREMENT RELATED INFORMATION

1. Identifying Other Contracts & Procurement Related Information. The BIDDER shall identify whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency: Yes ___ No __
If "No" is checked, the bidder only needs to complete the signature box on the bottom of this page.

2. If "Yes" is checked. Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

THE FOLLOWING STATEMENT MUST BE CHECKED

☐ _____ _____
Signature of Authorized Representative Date

RETURN WITH BID

SPECIAL NOTICE TO CONTRACTORS

The following requirements of the Illinois Department of Human Rights' Rules and Regulations are applicable to bidders on all construction contracts advertised by the Illinois Department of Transportation:

CONSTRUCTION EMPLOYEE UTILIZATION PROJECTION

(a) All bidders on construction contracts shall complete and submit, along with and as part of their bids, a Bidder's Employee Utilization Form (Form BC-1256) setting forth a projection and breakdown of the total workforce intended to be hired and/or allocated to such contract work by the bidder including a projection of minority and female employee utilization in all job classifications on the contract project.

(b) The Department of Transportation shall review the Employee Utilization Form, and workforce projections contained therein, of the contract awardee to determine if such projections reflect an underutilization of minority persons and/or women in any job classification in accordance with the Equal Employment Opportunity Clause and Section 7.2 of the Illinois Department of Human Rights' Rules and Regulations for Public Contracts adopted as amended on September 17, 1980. If it is determined that the contract awardee's projections reflect an underutilization of minority persons and/or women in any job classification, it shall be advised in writing of the manner in which it is underutilizing and such awardee shall be considered to be in breach of the contract unless, prior to commencement of work on the contract project, it submits revised satisfactory projections or an acceptable written affirmative action plan to correct such underutilization including a specific timetable geared to the completion stages of the contract.

(c) The Department of Transportation shall provide to the Department of Human Rights a copy of the contract awardee's Employee Utilization Form, a copy of any required written affirmative action plan, and any written correspondence related thereto. The Department of Human Rights may review and revise any action taken by the Department of Transportation with respect to these requirements.

RETURN WITH BID

Illinois Department of Transportation

Contract No. 60828
COOK County
Section 1999-161-I
Route FAI 90/94
District 1 Construction Funds

PART I. IDENTIFICATION

Dept. Human Rights #_____ Duration of Project: _____

Name of Bidder: _____

PART II. WORKFORCE PROJECTION

A. The undersigned bidder has analyzed minority group and female populations, unemployment rates and availability of workers for the location in which this contract work is to be performed, and for the locations from which the bidder recruits employees, and hereby submits the following workforce projection including a projection for minority and female employee utilization in all job categories in the workforce to be allocated to this contract:

TABLE A

TOTAL Workforce Projection for Contract													TABLE B: CURRENT EMPLOYEES TO BE ASSIGNED TO CONTRACT			
			MINORITY EMPLOYEES						TRAINEES							
JOB CATEGORIES	TOTAL EMPLOYEES		BLACK		HISPANIC		*OTHER MINOR.		APPREN-TICES		ON THE JOB TRAINEES		TOTAL EMPLOYEES		MINORITY EMPLOYEES	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
OFFICIALS (MANAGERS)																
SUPERVISORS																
FOREMEN																
CLERICAL																
EQUIPMENT OPERATORS																
MECHANICS																
TRUCK DRIVERS																
IRONWORKERS																
CARPENTERS																
CEMENT MASONS																
ELECTRICIANS																
PIPEFITTERS, PLUMBERS																
PAINTERS																
LABORERS, SEMI-SKILLED																
LABORERS, UNSKILLED																
TOTAL																

TABLE C

TOTAL Training Projection for Contract								
EMPLOYEES IN TRAINING	TOTAL EMPLOYEES		BLACK		HISPANIC		*OTHER MINOR.	
	M	F	M	F	M	F	M	F
APPRENTICES								
ON THE JOB TRAINEES								

FOR DEPARTMENT USE ONLY

* Other minorities are defined as Asians (A) or Native Americans (N).
Please specify race of each employee shown in Other Minorities column.

BC 1256 (Rev. 12/11/07)

Note: See instructions on page 2

PART II. WORKFORCE PROJECTION - continued

B. Included in "Total Employees" under Table A is the total number of **new hires** that would be employed in the event the undersigned bidder is awarded this contract.

The undersigned bidder projects that: (number) _____ new hires would be recruited from the area in which the contract project is located; and/or (number) _____ new hires would be recruited from the area in which the bidder's principal office or base of operation is located.

C. Included in "Total Employees" under Table A is a projection of numbers of persons to be employed directly by the undersigned bidder as well as a projection of numbers of persons to be employed by subcontractors.

The undersigned bidder estimates that (number) _____ persons will be directly employed by the prime contractor and that (number) _____ persons will be employed by subcontractors.

PART III. AFFIRMATIVE ACTION PLAN

A. The undersigned bidder understands and agrees that in the event the foregoing minority and female employee utilization projection included under **PART II** is determined to be an underutilization of minority persons or women in any job category, and in the event that the undersigned bidder is awarded this contract, he/she will, prior to commencement of work, develop and submit a written Affirmative Action Plan including a specific timetable (geared to the completion stages of the contract) whereby deficiencies in minority and/or female employee utilization are corrected. Such Affirmative Action Plan will be subject to approval by the contracting agency and the **Department of Human Rights**.

B. The undersigned bidder understands and agrees that the minority and female employee utilization projection submitted herein, and the goals and timetable included under an Affirmative Action Plan if required, are deemed to be part of the contract specifications.

Company _____ Telephone Number _____

_____

Address _____

NOTICE REGARDING SIGNATURE

The Bidder's signature on the Proposal Signature Sheet will constitute the signing of this form. The following signature block needs to be completed if revisions are required.

Signature: ☐ _____ Title: _____ Date: _____

Instructions: All tables must include subcontractor personnel in addition to prime contractor personnel.

Table A - Include both the number of employees that would be hired to perform the contract work and the total number currently employed (Table B) that will be allocated to contract work, and include all apprentices and on-the-job trainees. The "Total Employees" column should include all employees including all minorities, apprentices and on-the-job trainees to be employed on the contract work.

Table B - Include all employees currently employed that will be allocated to the contract work including any apprentices and on-the-job trainees currently employed.

Table C - Indicate the racial breakdown of the total apprentices and on-the-job trainees shown in Table A.

BC-1256 (Rev. 12/11/07)

RETURN WITH BID
Contract No. 60828
COOK County
Section 1999-161-I
Route FAI 90/94
District 1 Construction Funds

PROPOSAL SIGNATURE SHEET

The undersigned bidder hereby makes and submits this bid on the subject Proposal, thereby assuring the Department that all requirements of the Invitation for Bids and rules of the Department have been met, that there is no misunderstanding of the requirements of paragraph 3 of this Proposal, and that the contract will be executed in accordance with the rules of the Department if an award is made on this bid.

Firm Name _____

(IF AN INDIVIDUAL)

Signature of Owner _____

Business Address _____

_____

Firm Name _____

By _____

(IF A CO-PARTNERSHIP)

Business Address _____

_____

Name and Address of All Members of the Firm:

_____ _____

_____ _____

Corporate Name _____

By _____

Signature of Authorized Representative

_____

Typed or printed name and title of Authorized Representative

(IF A CORPORATION)

Attest _____

Signature

(IF A JOINT VENTURE, USE THIS SECTION FOR THE MANAGING PARTY AND THE SECOND PARTY SHOULD SIGN BELOW)

Business Address _____

_____

Corporate Name _____

By _____

Signature of Authorized Representative

_____

Typed or printed name and title of Authorized Representative

(IF A JOINT VENTURE)

Attest _____

Signature

Business Address _____

_____

If more than two parties are in the joint venture, please attach an additional signature sheet.

Illinois Department of Transportation

Return with Bid

Division of Highways
Proposal Bid Bond
(Effective November 1, 1992)

Item No. _____

Letting Date _____

KNOW ALL MEN BY THESE PRESENTS, That We _____

_____

as PRINCIPAL, and _____

_____ as SURETY, are held jointly, severally and firmly bound unto the STATE OF ILLINOIS in the penal sum of 5 percent of the total bid price, or for the amount specified in Article 102.09 of the "Standard Specifications for Road and Bridge Construction" in effect on the date of invitation for bids, whichever is the lesser sum, well and truly to be paid unto said STATE OF ILLINOIS, for the payment of which we bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH, that whereas, the PRINCIPAL has submitted a bid proposal to the STATE OF ILLINOIS, acting through the Department of Transportation, for the improvement designated by the Transportation Bulletin Item Number and Letting Date indicated above.

NOW, THEREFORE, if the Department shall accept the bid proposal of the PRINCIPAL; and if the PRINCIPAL shall, within the time and as specified in the bidding and contract documents, submit a DBE Utilization Plan that is accepted and approved by the Department; and if, after award by the Department, the PRINCIPAL shall enter into a contract in accordance with the terms of the bidding and contract documents including evidence of the required insurance coverages and providing such bond as specified with good and sufficient surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof; or if, in the event of the failure of the PRINCIPAL to make the required DBE submission or to enter into such contract and to give the specified bond, the PRINCIPAL pays to the Department the difference not to exceed the penalty hereof between the amount specified in the bid proposal and such larger amount for which the Department may contract with another party to perform the work covered by said bid proposal, then this obligation shall be null and void, otherwise, it shall remain in full force and effect.

IN THE EVENT the Department determines the PRINCIPAL has failed to comply with any requirement as set forth in the preceding paragraph, then Surety shall pay the penal sum to the Department within fifteen (15) days of written demand therefor. If Surety does not make full payment within such period of time, the Department may bring an action to collect the amount owed. Surety is liable to the Department for all its expenses, including attorney's fees, incurred in any litigation in which it prevails either in whole or in part.

In TESTIMONY WHEREOF, the said PRINCIPAL and the said SURETY have caused this instrument to be signed by

their respective officers this _____ day of _____ A.D., _____ .

PRINCIPAL **SURETY**

_____ _____
(Company Name) (Company Name)

By _____ By: _____
(Signature & Title) (Signature of Attorney-in-Fact)

Notary Certification for Principal and Surety

STATE OF ILLINOIS,
County of _____

I, _____ , a Notary Public in and for said County, do hereby certify that

_____ and _____
(Insert names of individuals signing on behalf of PRINCIPAL & SURETY)

who are each personally known to me to be the same persons whose names are subscribed to the foregoing instrument on behalf of PRINCIPAL and SURETY, appeared before me this day in person and acknowledged respectively, that they signed and delivered said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this _____ day of _____ A.D. _____

My commission expires _____ _____
Notary Public

In lieu of completing the above section of the Proposal Bid Form, the Principal may file an Electronic Bid Bond. By signing the proposal and marking the check box next to the Signature and Title line below, the Principal is ensuring the identified electronic bid bond has been executed and the Principal and Surety are firmly bound unto the State of Illinois under the conditions of the bid bond as shown above.

_____ _____ ☐ _____
Electronic Bid Bond ID# Company / Bidder Name Signature and Title

PROPOSAL ENVELOPE

Illinois Department of Transportation

PROPOSALS

for construction work advertised for bids by the
Illinois Department of Transportation

Item No.	Item No.	Item No.

Submitted By:

Name:
Address:
Phone No.

Bidders should use an IDOT proposal envelope or affix this form to the front of a 10” x 13” envelope for the submittal of bids. If proposals are mailed, they should be enclosed in a second or outer envelope addressed to:

Engineer of Design and Environment - Room 326
Illinois Department of Transportation
2300 South Dirksen Parkway
Springfield, Illinois 62764

NOTICE

Individual bids, including Bid Bond and/or supplemental information if required, should be securely stapled.

CONTRACTOR OFFICE COPY OF CONTRACT SPECIFICATIONS

NOTICE

None of the following material needs to be returned with the bid package unless the special provisions require documentation and/or other information to be submitted.

Contract No. 60828
COOK County
Section 1999-161-I
Route FAI 90/94
District 1 Construction Funds

Illinois Department of Transportation

SUBCONTRACTOR DOCUMENTATION

P.A. 96-0795, effective July 1, 2010, enacted substantial changes to the provisions of the Illinois Procurement Code (30 ILCS 500). Among the changes are provisions affecting subcontractors. The Contractor awarded this contract will be required as a material condition of the contract to implement and enforce the contract requirements applicable to subcontractors approved in accordance with article 108.01 of the Standard Specifications for Road and Bridge Construction.

If the Contractor seeks approval of subcontractors to perform a portion of the work, and approval is granted by the Department, the Contractor shall provide a copy of the subcontract to the Chief Procurement Officer within 20 calendar days after execution of the subcontract.

The subcontract shall contain the certifications required to be made by subcontractors pursuant to Article 50 of the Illinois Procurement Code. This Notice to Bidders includes a document incorporating all required subcontractor certifications and disclosures for use by the Contractor in compliance with this mandate. The document is entitled State Required Ethical Standards Governing Subcontractors.

RETURN WITH SUBCONTRACT

STATE ETHICAL STANDARDS GOVERNING SUBCONTRACTORS

Article 50 of the Illinois Procurement Code establishes the duty of all State chief procurement officers, State purchasing officers, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

The certifications hereinafter made by the subcontractor are each a material representation of fact upon which reliance is placed should the Department approve the subcontractor. The chief procurement officer may terminate or void the subcontract approval if it is later determined that the bidder or subcontractor rendered a false or erroneous certification.

Section 50-2 of the Illinois Procurement Code provides that every person that has entered into a multi-year contract and every subcontractor with a multi-year subcontract shall certify, by July 1 of each fiscal year covered by the contract after the initial fiscal year, to the responsible chief procurement officer whether it continues to satisfy the requirements of Article 50 pertaining to the eligibility for a contract award. If a contractor or subcontractor is not able to truthfully certify that it continues to meet all requirements, it shall provide with its certification a detailed explanation of the circumstances leading to the change in certification status. A contractor or subcontractor that makes a false statement material to any given certification required under Article 50 is, in addition to any other penalties or consequences prescribed by law, subject to liability under the Whistleblower Reward and Protection Act for submission of a false claim.

A. Bribery

1. The Illinois Procurement Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

(1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or

(2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government, or subcontracting under such a contract, as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

(1) the business has been finally adjudicated not guilty; or

(2) the business demonstrates to the governmental entity with which it seeks to contract, or which is signatory to the contract to which the subcontract relates, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State, and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the contractor or the subcontractor, respectively, that the contractor or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any certifications required by this Section are false. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50.5.

B. Felons

1. The Illinois Procurement Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any State agency, or enter into a subcontract, from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

2. Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder or contractor or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any of the certifications required by this Section are false.

C. Debt Delinquency

1. The Illinois Procurement Code provides:

Section 50-11 and 50-12. Debt Delinquency.
The contractor or bidder or subcontractor, respectively, certifies that it, or any affiliate, is not barred from being awarded a contract or subcontract under the Procurement Code. Section 50-11 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The bidder or contractor or subcontractor, respectively, further acknowledges that the chief procurement officer may declare the related contract void if this certification is false or if the bidder, contractor, or subcontractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

D. Prohibited Bidders, Contractors and Subcontractors

1. The Illinois Procurement Code provides:

Section 50-10.5 and 50-60(c). Prohibited bidders, contractors and subcontractors.
The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 or if in violation of Subsection (c) for a period of five years from the date of conviction.. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder, contractor, or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer shall declare the related contract void if any of the certifications completed pursuant to this Section are false.

E. Section 42 of the Environmental Protection Act

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-12 that the bidder, contractor, or subcontractor, is not barred from being awarded a contract or entering into a subcontract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency, or entering into any subcontract, that is subject to the Procurement Code by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The bidder or contractor or subcontractor, respectively, acknowledges that the chief procurement officer may declare the contract void if this certification is false.

The undersigned, on behalf of the subcontracting company, has read and understands the above certifications and makes the certifications as required by law.

_____
Name of Subcontracting Company

_____ _____
Authorized Officer Date

RETURN WITH SUBCONTRACT

SUBCONTRACTOR DISCLOSURES

I. DISCLOSURES

A. The disclosures hereinafter made by the subcontractor are each a material representation of fact upon which reliance is placed. The subcontractor further certifies that the Department has received the disclosure forms for each subcontract.

The chief procurement officer may void the bid, contract, or subcontract, respectively, if it is later determined that the bidder or subcontractor rendered a false or erroneous disclosure. A contractor or subcontractor may be suspended or debarred for violations of the Procurement Code. Furthermore, the chief procurement officer may void the contract or subcontract.

B. Financial Interests and Conflicts of Interest

1. Section 50-35 of the Illinois Procurement Code provides that all subcontracts of more than $10,000 shall be accompanied by disclosure of the financial interests of the subcontractor. This disclosed information for the subcontractor, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act, filed with the Procurement Policy Board, and shall be incorporated as a material term of the Prime Contractor's contract. Furthermore, pursuant to this Section, the Procurement Policy Board may recommend to allow or void a contract or subcontract based on a potential conflict of interest.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the subcontracting entity or its parent entity, whichever is less, unless the subcontractor is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. If a subcontractor is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

In addition, all disclosures shall indicate any other current or pending contracts, subcontracts, proposals, leases, or other ongoing procurement relationships the subcontracting entity has with any other unit of state government and shall clearly identify the unit and the contract, subcontract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. Subject individuals should be covered each by one form. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies. **The forms must be included with each bid or incorporated by reference.**

C. Disclosure Form Instructions

Form A Instructions for Financial Information & Potential Conflicts of Interest

If the subcontractor is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a subcontractor is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. If a subcontractor is not subject to Federal 10K reporting, the subcontractor must determine if any individuals are required by law to complete a financial disclosure form. To do this, the subcontractor should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the NOT APPLICABLE STATEMENT on the second page of Form A must be signed and dated by a person that is authorized to execute contracts for the subcontracting company. Note: These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity? YES ___ NO ___
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than $106,447.20? YES ___ NO___
3. Does anyone in your organization receive more than $106,447.20 of the subcontracting entity's or parent entity's distributive income? (Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.) YES ___ NO __
4. Does anyone in your organization receive greater than 5% of the subcontracting entity's or parent entity's total distributive income, but which is less than $106,447.20? YES ___ NO __

   (Note: Only one set of forms needs to be completed per person per subcontract even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The subcontractor must determine each individual in the subcontracting entity or the subcontracting entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable**. The person signing can be, but does not have to be, the person for which the form is being completed. The subcontractor is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the NOT APPLICABLE STATEMENT on page 2 of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

RETURN WITH SUBCONTRACT

Form B: **Instructions for Identifying Other Contracts & Procurement Related Information**

Disclosure Form B must be completed for each subcontract submitted by the subcontracting entity. *Note: Checking the NOT APPLICABLE STATEMENT on Form A does not allow the subcontractor to ignore Form B. Form B must be completed, checked, and dated or the subcontract will not be approved.*

The Subcontractor shall identify, by checking Yes or No on Form B, whether it has any pending contracts, subcontracts, leases, bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the subcontractor only needs to complete the check box on the bottom of Form B. If "Yes" is checked, the subcontractor must list all non-IDOT State of Illinois agency pending contracts, subcontracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts or subcontracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included.

RETURN WITH SUBCONTRACT

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form A
Subcontractor: Financial Information & Potential Conflicts of Interest Disclosure

Subcontractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Code (30 ILCS 500). Subcontractors desiring to enter into a subcontract of a State of Illinois contract must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for bids in excess of $10,000, and for all open-ended contracts. **A publicly traded company may submit a 10K disclosure (or equivalent if applicable) in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.**

DISCLOSURE OF FINANCIAL INFORMATION

1. Disclosure of Financial Information. The individual named below has an interest in the SUBCONTRACTOR (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than $106,447.20 (60% of the Governor's salary as of 7/1/07). **(Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)**

FOR INDIVIDUAL (type or print information)

NAME: _____

ADDRESS _____

_____

Type of ownership/distributable income share:

stock _____ sole proprietorship _____ Partnership _____ other: (explain on separate sheet):

% or $ value of ownership/distributable income share: _____

2. Disclosure of Potential Conflicts of Interest. Check "Yes" or "No" to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is "Yes", please attach additional pages and describe.

(a) State employment, currently or in the previous 3 years, including contractual employment of services.
Yes ___ No __

If your answer is yes, please answer each of the following questions.

1. Are you currently an officer or employee of either the Capitol Development Board or the Illinois Toll Highway Authority? Yes ___ No __

2. Are you currently appointed to or employed by any agency of the State of Illinois? If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $106,447.20, (60% of the Governor's salary as of 7/1/07) provide the name the State agency for which you are employed and your annual salary. _____
_____

3. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $106,447.20, (60% of the Governor's salary as of 7/1/07) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes ___No __

4. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes ___No __

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment services in the previous 2 years.

Yes ___No __

If your answer is yes, please answer each of the following questions.

1. Is your spouse or any minor children currently an officer or employee of the Capitol Development Board or the Illinois Toll Highway Authority? Yes ___No __

2. Is your spouse or any minor children currently appointed to or employed by any agency of the State of Illinois? If your spouse or minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $106,447.20, (60 % of the Governor's salary as of 7/1/07) provide the name of your spouse and/or minor children, the name of the State agency for which he/she is employed and his/her annual salary. _____
_____

3. If your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $106,447.20, (60% of the salary of the Governor as of 7/1/07) are you entitled to receive (i) more then 71/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes ___No __

4. If your spouse or any minor children are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor?

Yes ___No __

(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years. Yes ___No __

(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___No __

(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United States of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years. Yes ___No __

(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___No __

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government.

Yes ___No __

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___ No __

(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections.
Yes ___ No __

(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections.
Yes ___ No __

APPLICABLE STATEMENT

This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page. Under penalty of perjury, I certify the contents of this disclosure to be true and accurate to the best of my knowledge.

Completed by: ☐ _____ _____
Signature of Individual or Authorized Officer Date

NOT APPLICABLE STATEMENT

Under penalty of perjury, I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.

This Disclosure Form A is submitted on behalf of the SUBCONTRACTOR listed on the previous page.

☐ _____ _____
Signature of Authorized Officer Date

RETURN WITH SUBCONTRACT

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form B
Subcontractor: Other Contracts & Procurement Related Information Disclosure

Subcontractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Act (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for bids in excess of $10,000, and for all open-ended contracts.

DISCLOSURE OF OTHER CONTRACTS, SUBCONTRACTS, AND PROCUREMENT RELATED INFORMATION

1. Identifying Other Contracts & Procurement Related Information. The SUBCONTRACTOR shall identify whether it has any pending contracts, subcontracts, including leases, bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency: Yes ___ No __
If "No" is checked, the subcontractor only needs to complete the signature box on the bottom of this page.

2. If "Yes" is checked. Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

THE FOLLOWING STATEMENT MUST BE CHECKED

☐ _____ _____
Signature of Authorized Officer Date

Illinois Department of Transportation

NOTICE TO BIDDERS

1. **TIME AND PLACE OF OPENING BIDS.** Sealed proposals for the improvement described herein will be received by the Department of Transportation at the Harry R. Hanley Building, 2300 South Dirksen Parkway, in Springfield, Illinois until 10:00 o'clock a.m., June 11, 2010. All bids will be gathered, sorted, publicly opened and read in the auditorium at the Department of Transportation's Harry R. Hanley Building shortly after the 10:00 a.m. cut off time.

2. **DESCRIPTION OF WORK**. The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

   Contract No. 60828
   COOK County
   Section 1999-161-I
   Route FAI 90/94
   District 1 Construction Funds

Rehabilitation of Pump Station 26 along FAI Routes 90/94 (Dan Ryan Expressway) at Roosevelt Road and Union Avenue near UIC in Chicago.

3. **INSTRUCTIONS TO BIDDERS**. (a) This Notice, the invitation for bids, proposal and letter of award shall, together with all other documents in accordance with Article 101.09 of the Standard Specifications for Road and Bridge Construction, become part of the contract. Bidders are cautioned to read and examine carefully all documents, to make all required inspections, and to inquire or seek explanation of the same prior to submission of a bid.

   (b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.

4. **AWARD CRITERIA AND REJECTION OF BIDS**. This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the rules, Invitation for Bids and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to readvertise the proposed improvement, and to waive technicalities.

By Order of the
Illinois Department of Transportation

Gary Hannig,
Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2010

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS and frequently used RECURRING SPECIAL PROVISIONS.

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 1-1-07) (Revised 1-1-10)

SUPPLEMENTAL SPECIFICATIONS

RECURRING SPECIAL PROVISIONS

The following RECURRING SPECIAL PROVISIONS indicated by an "X" are applicable to this contract and are included by reference:

TABLE OF CONTENTS

STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction," adopted January 1, 2007; the latest edition of the “Manual on Uniform Traffic Control devices for Streets and Highways”, and the “Manual of Test Procedures for Materials”, in effect on the date of invitation for bids, and the "Supplemental Specifications and Recurring Special Provisions" indicated on the "Check Sheet" included herein which apply to and govern FAI 90/94 (Dan Ryan Expressway), Section 1999-161-I, Cook County, Contract 60828 and in case of conflict with any part or parts of said specifications, this Special Provisions shall take precedence and shall govern.

The Engineer that is referred to in this Special Provisions is the Director of Highways of the Illinois Department of Transportation or an authorized representative limited to the particular construction duty.

FAI 90/94
Pump Station No. 26
County: Cook
Contract No. 60828

GENERAL LOCATION OF IMPROVEMENT

The existing IDOT Pump Station No. 26 is located approximately 125 feet north of the centerline of West Roosevelt Road, between South Union Avenue to the west and the Southbound I-90/94 (Dan Ryan Expressway) to the east, in the City of CHICAGO, COOK COUNTY.

DESCRIPTION OF IMPROVEMENT

This improvement includes the mechanical, electrical, architectural and structural rehabilitation of IDOT Pump Station No. 26 together with site improvements.

The site improvements include, but are not limited to, the construction of a truck parking area and an exterior electrical transformer area, requiring, but not limited to, excavation, retaining wall, steel railings, reinforced concrete pavement, chain link fences and gates, bollards, storm sewers, sidewalks, transformer platform, concrete curbs and gutters, HMA shoulders, concrete encased conduits, relocation of a HAR antenna and landscaping work and all incidental and collateral work necessary to complete the project as shown on the plans and as described herein.

The rehabilitation of the IDOT Pump Station No. 26 building and equipment includes, but is not limited to, partial demolition and material removal, concrete work, structural steel, reinforcement bars, glass block and masonry work, doors and frame, metal works, single ply roofing, sheet metal work, and painting as specified herein.

Further, the improvement shall include mechanical work consisting of removal of existing pumps including motors, fabricated metal, bowls, and impellers and heating and ventilating equipment, piping for recirculation system and electrical distribution, control, instrumentation, intrusion, lighting, equipment, conduit and wiring, all in the existing pump station and electrical work including a new electric service to the facility, incorporating new exterior transformers, and modification of the existing Supervisory and Data Acquisition (SCADA) System.

The Contractor shall furnish, install, maintain and subsequently remove all temporary pumps, piping, electric service and controls to maintain the specified station pumping capacity during all rehabilitation work under this Contract.

STAGING AND SEQUENCES OF CONSTRUCTION

Construction Staging: The Contractor shall be responsible for and include all work for implementing and maintaining and construction staging as may be required and as described in the Contract Documents and indicated on the Drawings to maintain the specified station pumping capability through the rehabilitation work under this Contract. Operation of pumps shall be maintained as described under Division 15, Mechanical, and Division 16, Electrical, and in order to complete all construction by the completion date specified in the Contract Documents and as approved by the Engineer.

The Contractor shall confine his construction operations within the limits of work indicated on the Drawings. In the event the Contractor requires additional area or areas for his construction operations, he shall be responsible for leasing such additional area or areas. No additional payment will be made for leasing additional area or areas. This expense shall be deemed as included in prices in the Contract.

The Contractor shall prepare and submit to the Engineer for approval his proposed sequence of operations for the rehabilitation of the Pump Station. The submittal shall include all details and descriptions for the work under this Contract including, but not limited to, maintenance of electric service to existing and new pumps; maintenance of pumping capacity as specified in the Contract Documents; protection of existing and new equipment during all rehabilitation work; demolition sequence; reconstruction sequence; the proposed construction schedule indicating critical path the Contractor proposes to purse on all work under this Contract; and all matters relating to this Contract. The submittal shall be a form acceptable to the State and shall be subject to approval by the State.

COMPLETION DATE

The Contractor shall schedule his operation so as to complete all work for the rehabilitation of Pump Station No. 26 on or before June 30, 2012. This completion is based upon an expedited work schedule.

FAILURE TO COMPLETE THE WORK ON TIME
Effective: September 30, 1985 Revised: January 1, 2007

Should the Contractor fail to complete the work on or before the completion date as specified in the Special Provision for "Completion Date Plus Working Days", or within such extended time as may have been allowed by the Department, the Contractor shall be liable to the Department in the amount of $1,100.00, not as a penalty but as liquidated damages, for each calendar day or a portion thereof of overrun in the contract time or such extended time as may have been allowed.

In fixing the damages as set out herein, the desire is to establish a certain mode of calculation for the work since the Department's actual loss, in the event of delay, cannot be predetermined, would be difficult of ascertainment, and a matter of argument and unprofitable litigation. This said mode is an equitable rule for measurement of the Department's actual loss and fairly takes into account the loss of use of the roadway if the project is delayed in completion. The Department shall not be required to provide any actual loss in order to recover these liquidated damages provided herein, as said damages are very difficult to ascertain. Furthermore, no provision of this clause shall be construed as a penalty, as such is not the intention of the parties.

A calendar day is every day shown on the calendar and starts at 12:00 midnight and ends at the following 12:00 midnight, twenty-four hours later.

PRE-BID SITE INSPECTION OF PUMP STATION

Pump Station No. 26 will be open for Contractor's inspection on May 26, 2010 between 9:00 A.M. to 12:00 P.M. local time. A representative of the State will be on hand during this stated time period. In the event the date or time is not suitable, an alternative inspection date and time can be arranged with Mr. Naser Gholer of IDOT's Bureau of Traffic Operations, at (847) 221-3089.

CONTRACTOR COOPERATION

The attention of the Contractor is directed to the fact that other contracts are or may be in force that adjoins the limits of this project. The Contractor shall cooperate with the other contractors in the phasing and performance of his work so as not to delay, interrupt or hinder the progress or completion of work being performed by the other contractors.

No additional compensation will be allowed this Contractor for compliance with the above requirements, nor for any delays or inconvenience resulting from the activities of the other contractors.

PROGRESS SCHEDULE

Time is of the essence in this Contract. It may be necessary for the Contractor to work longer hours, use additional crews, and work during weekends in order to complete the work within the required time limit.

The Contractor shall submit a Critical Path Method (CPM) Progress Schedule for the Engineer's approval before the work can be started.

In the event the Contractor falls more than three (3) days behind the approved progress schedule, the Contractor shall work seven (7) days a week at extended hours in order to meet the specified Completion Date.

The Contractor will not be allowed any extra compensation for working longer hours or using extra shifts; and working on weekends or during holidays; working during winter months, etc., to meet the specified Completion Date.

MAINTENANCE OF ROADWAYS
Effective: September 30, 1985 Revised: November 1, 1996

Beginning on the date that work begins on this project, the Contractor shall assume responsibility for normal maintenance of all existing roadways within the limits of the improvement. This normal maintenance shall include all repair work deemed necessary by the Engineer, but shall not include snow removal operations. Traffic control and protection for maintenance of roadways will be provided by the Contractor as required by the Engineer.

If items of work have not been provided in the contract, or otherwise specified for payment, such items, including the accompanying traffic control and protection required by the Engineer, will be paid for in accordance with Article 109.04 of the Standard Specifications.

UTILITY COORDINATION – CITY OF CHICAGO
Effective: September 30, 1985 Revised: November 1, 1996

The City of Chicago is to make adjustments to their street lighting and/or traffic signal facilities. The Contractor shall coordinate his work and cooperate with the City of Chicago in these adjustments.

This coordination and cooperation by the Contractor will not be paid for separately but shall be considered included in the costs of the contract.

STATUS OF UTILITIES TO BE ADJUSTED
Effective: January 30, 1987 Revised: July 1, 1994

Utility companies involved in this project have provided the following estimated dates:

Name of Utility	Type	Location	Estimated Dates for Start and Completion of Relocation or Adjustment
Commonwealth Edison	Installation of New Transformers	Transformer Area North of Building	Construction Period

Commonwealth Edison	Installation of Cable	Parking Lot North of Building	Construction Period
Commonwealth Edison	Removal of Existing Transformers	Pump Station Electrical Vault	Construction Period

The above represents the best information available to the Department and is included for the convenience of the bidder. The applicable portions of Articles 105.07 and 107.31 of the Standard Specifications shall apply.

ADVANCED PUBLIC NOTIFICATION

The Contractor shall provide notice to the public a minimum of 14 days in advance of any work that requires the closure of lanes or ramps through the use of a changeable message sign or temporary information signing.

WORK ZONE TRAFFIC CONTROL (LUMP SUM PAYMENT)

Specific traffic control plan details and Special Provisions have been prepared for this contract. This work shall include all labor, materials, transportation, handling and incidental work necessary to furnish, install, maintain and remove all traffic control devices required as indicated in the plans and as approved by the Engineer.

Method of Measurement: All traffic control (except traffic control pavement marking) indicated on the traffic control plan details and specified in the Special Provisions will be measured for payment on a lump sum basis. Traffic control pavement markings will be measured per foot (meter).

Basis of Payment: All traffic control and protection will be paid for at the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

TRAFFIC CONTROL PLAN
Effective: September 30, 1985 Revised: January 1, 2007

Traffic Control shall be according to the applicable sections of the Standard Specifications, the Supplemental Specifications, the "Illinois Manual on Uniform Traffic Control Devices for Streets and Highways", any special details and Highway Standards contained in the plans, and the Special Provisions contained herein.

Special attention is called to Article 107.09 of the Standard Specifications and the following Highway Standards, Details, Quality Standard for Work Zone Traffic Control Devices, Recurring Special Provisions and Special Provisions contained herein, relating to traffic control.

The Contractor shall contact the District One Bureau of Traffic at least 72 hours in advance of beginning work.

STATE HIGHWAY STANDARDS:

Number	Description
701101-01	Off-Road Operations, Multi-Lane, 15' to 24" from Pavement Edge
701106-01	Off Road Operations, Multi-Lane, More than 15' Away
701401-03	Lane Closure, Multi-Lane, for Speeds ≥ 45 MPH
701426-02	Lane Closure, Multi-Lane, Intermittent or Moving Operations, For Speeds ≥ 45 MPH
701701-04	Urban Lane Closure, Multi-Lane Intersection
701801-03	Lane Closure Multi-Lane, 1W or 2W, Crosswalk or Sidewalk Closure For Speeds < 45 MPH
702001-05	Traffic Control Devices

DISTRICT ONE STANDARDS:

Number	Description
TC- 10	Traffic Control and Protection for Side Roads, Intersections & Driveways
TC- 18	Signing for Flagging Operations at Work Zone Openings
TC- 22	Temporary Information Signing

PLANS

Traffic Control Notes, Sheet G-3

SUPPLEMENTAL SPECIFICATIONS:

Section	Description
701	Work Zone Traffic Control and Protection

RECURRING SPECIAL PROVISIONS:

Check Sheet No.	Title
24	Work Zone Public Information Signs

SPECIAL PROVISIONS:

Maintenance of Roadways
Traffic Control Plan
Failure to Open Lanes to Traffic
Traffic Control for Work Zone Areas
Temporary Information Signing
Changeable Message Signs

BDE SPECIAL PROVISIONS:

Personal Protective Equipment
Equipment Rental Rates
Reflective Sheeting on Channelizing Devices

Basis of Payment. Traffic control work on Union Avenue shall be paid for at the contract unit price for TRAFFIC CONTROL AND PROTECTION (SPECIAL). Traffic control work on FAI-90/94 shall be paid for at the contract unit price for TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS).

FAILURE TO OPEN TRAFFIC LANES TO TRAFFIC
Effective: March 22, 1996 Revised: February 9, 2005

Should the Contractor fail to completely open and keep open all the traffic lanes to traffic in accordance with the limitations specified under the Special Provisions for "Keeping the Expressway Open to Traffic", the Contractor shall be liable to the Department for the amount of:

One Lane Blocked = $ 2,000
Two Lanes Blocked = $ 5,000

Not as a penalty but as liquidated and ascertained damages for each and every 15 minute interval or a portion thereof that a lane is blocked outside the allowable time limitations. Such damages may be deducted by the Department from any monies due the Contractor. These damages shall apply during the contract time and during any extensions of the contract time.

TRAFFIC CONTROL FOR WORK ZONE AREAS
Effective: 9/14/95 Revised: 1/1/07

Work zone entry and exit openings shall be established daily by the Contractor with the approval of the Engineer. All vehicles including cars and pickup trucks shall exit the work zone at the exit openings. All trucks shall enter the work zone at the entry openings. These openings shall be signed in accordance with the details shown elsewhere in the plans and shall be under flagger control during working hours.

The Contractor shall plan his trucking operations into and out of the work zone as well as on to and off the expressway to maintain adequate merging distance. Merging distances to cross all lanes of traffic shall be no less than 1/2 mile. This distance is the length from where the trucks enter the expressway to where the trucks enter the work zone. It is also the length from where the trucks exit the work zone to where the trucks exit the expressway. The stopping of expressway traffic to allow trucks to change lanes and/or cross the expressway is prohibited.

Failure to comply with the above requirements will result in a Traffic Control Deficiency charge. The deficiency charge will be calculated as outlined in Article 105.03 of the Standard Specifications. The Contractor will be assessed this daily charge for each day a deficiency is documented by the Engineer.

CHANGEABLE MESSAGE SIGNS

This item shall be as contained in the Standard Specifications for "Portable Changeable Message Signs" except as follows:

Two (2) signs will be required for this contract.

TEMPORARY INFORMATION SIGNING
Effective: November 13, 1996 Revised: January 2, 2007

Description.
This work shall consist of furnishing, installing, maintaining, relocating for various states of construction and eventually removing temporary informational signs. Included in this item may be ground mount signs, skid mount signs, truss mount signs, bridge mount signs, and overlay sign panels which cover portions of existing signs.

Materials.
Materials shall be according to the following Articles of Section 1000 - Materials:

	Item	Article/Section
a.)	Sign Base (Notes 1 & 2)	1090
b.)	Sign Face (Note 3)	1091
c.)	Sign Legends	1092
d.)	Sign Supports	1093
e.)	Overlay Panels (Note 4)	1090.02

Note 1. The Contractor may use 5/8 inch (16 mm) instead of 3/4 inch (19 mm) thick plywood.
Note 2. Type A sheeting can be used on the plywood base.
Note 3. All sign faces shall be Type A except all orange signs shall meet the requirements of Article 1106.01.
Note 4. The overlay panels shall be 0.08 inch (2 mm) thick.

GENERAL CONSTRUCTION REQUIREMENTS

Installation.
The sign sizes and legend sizes shall be verified by the Contractor prior to fabrication.

Signs which are placed along the roadway and/or within the construction zone shall be installed according to the requirements of Article 701.14 and Article 720.04. The signs shall be 7 ft (2.1 m) above the near edge of the pavement and shall be a minimum of 2 ft (600 mm) beyond the edge of the paved shoulder. A minimum of two (2) posts shall be used.

The attachment of temporary signs to existing sign structures or sign panels shall be approved by the Engineer. Any damage to the existing signs due to the Contractor's operations shall be repaired or signs replaced, as determined by the Engineer, at the Contractor's expense.

Signs which are placed on overhead bridge structures shall be fastened to the handrail with stainless steel bands. These signs shall rest on the concrete parapet where possible. The Contractor shall furnish mounting details for approval by the Engineer.

Method Of Measurement.
This work shall be measured for payment in square feet (square meters) edge to edge (horizontally and vertically).

All hardware, posts or skids, supports, bases for ground mounted signs, connections, which are required for mounting these signs will be included as part of this pay item.

Basis Of Payment.
This work shall be paid for at the contract unit price per square foot (square meter) for TEMPORARY INFORMATION SIGNING.

SITE WORK

Description: Site work (work outside of the Pump Station Building) includes the construction of a new truck parking area and an exterior electrical transformer area requiring, not but limited to, the site related pay code items listed in the Summary of Quantities (Sheet No. G-4) associated with excavation, mechanically stabilized earth retaining walls, steel railings, reinforced concrete pavement, concrete entrance driveways, concrete sidewalks, concrete structures, gates, fences, bollards, storm sewers, manhole, catch basin, trench backfill, pipe underdrains, removal and replacement of concrete curbs and gutters, removal and replacement of bituminous shoulders, concrete encased conduits, removal and relocation of a HAR antenna, landscaping work and other site work as indicated on the Drawings, and as described in the IDOT Standard Specifications for Road and Bridge Construction (adopted January 1, 2007) the Recurring Supplemental Specifications, the Special Provisions, and as directed by the Engineer.

General: It shall be the responsibility of the Contractor to inspect the site to verify existing conditions and dimensions in the field and make necessary approved adjustments prior to construction or ordering of materials. Such variations shall not be cause for additional compensations or a change in the scope of work.

The site work shall include all labor, materials, tools, equipment and incidentals required for a completely finished and operational site.

Related Work: Work within the Pump Station Building itself will be paid for under the following Pay Code Items: Pump Station General Work, Pump Station Electrical Work, Pump Station Mechanical Work, Pump Station Scada Equipment, Complete Spare Main Pump Assembly, Complete Spare Low Flow Pump Assembly, Electric Service Connection.

Coordination with Commonwealth Edison: Work to be provided and installed by Commonwealth Edison (ComEd) is defined in the Project Electrical Specifications and Drawings. It shall be the responsibility of the Contractor to coordinate schedules and construction requirements with ComEd to assure uninterrupted and effective and proper construction of this project. For that part of the work that is to be constructed by the Contractor in accordance with the specific ComEd Standard Drawings and ComEd Standard Specifications referenced in the contract documents, it shall be the responsibility of the Contractor to familiarize himself with said Standard Drawings and Standard Specifications, and if adjustments are required, to make necessary approved adjustments prior to construction or ordering of materials. Such variations shall not be cause for additional compensations or a change in the scope of work.

Material and Construction: The materials and construction methods shall conform to the applicable provisions of the IDOT Standard Specifications for Road and Bridge Construction, the Project Special Provisions, Specifications and Drawings and to the applicable ComEd Standard Drawings and ComEd Standard Specifications.

Method of Measurement. The completed work, accepted by the Engineer, will be measured for payment under the applicable provisions of the IDOT Standard Specifications for Road and Bridge Construction in specific and in general as described under Section 109 "Measurement and Payment" of the IDOT Standard Specifications for Road and Bridge Construction.

Basis of Payment. The above specified work shall be paid for at the contract unit prices described under the applicable provisions of the IDOT Standard Specifications for Road and Bridge Construction in specific and in general as described under Section 109 "Measurement and Payment" of the IDOT Standard Specifications for Road and Bridge Construction.

CLEANING AND PAINTING STEEL RAILING NO.1

Description: This work shall consist of the cleaning and preparation of the surfaces of the existing steel railing to the north and south of the Pump Station 26 building and as shown on the plans. The cleaning and painting of the steel railing north of the building shall not begin until steel railing removal is completed as shown on the plans.

The material and construction methods shall conform to the applicable provisions of Section 506 of the IDOT Standard Specifications for Road and Bridge Construction.

Method of Measurement: Payment will be made at a lump sum price for CLEANING AND PAINTING STEEL RAILING NO.1, which shall constitute the cleaning and painting of the entire surface of the steel railing after sections of railing at the north end are removed as shown on the plans, for each location indicated.

Basis of Payment: This work will be paid for at the contract unit price of lump sum for CLEANING AND PAINTING STEEL RAILING NO.1, for each location indicated..

STRUCTURAL REPAIR OF CONCRETE

This work consists of removing and disposing of all deteriorated concrete and replacing it with new concrete at the locations specified on the plans and as directed by the Engineer. The concrete shall have a minimum compressive strength as specified on the plans but not less than that specified for class SI concrete. This work shall also include the construction of necessary formwork and scaffolding and installing supplemental reinforcement bars and expansion bolts as directed by the Engineer.

The materials and construction methods shall conform to the applicable provisions of Sections 503 and 508 of the Standard Specifications. The coarse aggregate for Class SI concrete shall be gradation CA 16 only, the cement factor shall be a minimum 395 kg/ cu m (6.65 cwt/ cu yd), and a high range water-reducing admixture shall be used to obtain a 5-7 in. slump.

Construction Methods. The areas to be repaired shall have all loose, unsound concrete removed completely by the use of an electric chisel or other mechanical tools approved by the Engineer. All reinforcing bars within the repair area shall be undercut to a depth that will permit a minimum of 1" of plastic concrete under the reinforcing bars. When removing the existing concrete the Contractor shall provide a 1" deep saw cut along the outside edges of the repair area.

Existing reinforcement bars shall be cleaned by sandblasting. After cleaning, all exposed reinforcement shall be carefully evaluated to determine if replacement or additional reinforcement bars are required.

Reinforcing bars that have been cut or have lost 25% or more of their original cross sectional area shall be supplemented by new inkind reinforcement bars. New bars shall be lapped a minimum of 32 bar diameters to existing bars. An approved “squeeze type” mechanical bar splicer capable of developing in tension at least 125 percent of the yield strength of the existing bar shall be used when it is not feasible to provide the minimum bar lap. No welding of bars will be permitted. The furnishing and replacing of supplemental reinforcement bars shall be included in this item.

The formwork shall provide a smooth and uniform concrete finish most nearly matching the existing surface of the concrete structures. Formwork shall be completely mortar tight and closely fitted where they adjoin the existing concrete surface to prevent leakage. Air vents may be provided to reduce voids and improve surface appearance. The Contractor shall use exterior mechanical vibration, as approved by the Engineer, to release air pockets that may be entrapped.

Prior to placing the new concrete the Contractor shall prepare the surface of the existing concrete against which the new concrete is placed by sand, air or water blasting. The surface shall be free of oil, dirt and loose concrete. Just prior to concrete placement the surface shall be thoroughly wetted to a saturated surface dry condition or as directed by the Engineer.

Curing shall be done according to the applicable portions of Article 1020.13 of the Standard Specifications and as directed by the Engineer.

All areas of repair, under this item shall have a minimum concrete thickness of 1 inch.

The Contractor shall anchor the new concrete to the existing concrete with 3/4" diameter expansion hook bolts for all overhead repair areas and wherever the depth of concrete removal is greater than 8". The expansion hook bolts shall be spaced at 15" maximum centers both vertically and horizontally. The furnishing and placing of the expansion hook bolts shall be included in this item.

At all locations, where the removal of deteriorated concrete reaches a total depth including all sides greater than 12" or half the depth of the member, the Bureau of Bridges and Structures shall be contacted for structural evaluation.

Method of Measurement. The completed formed concrete repair, accepted by the Engineer, will be measured and the formed surface area computed in square feet.

Basis of Payment. The above specified work shall be paid for at the contract unit prices per square meter (square foot) for STRUCTURAL REPAIR OF CONCRETE (DEPTH GREATER THAN 5") and/or STRUCTURAL REPAIR OF CONCRETE (DEPTH EQUAL TO OR LESS THAN 5") which prices shall include all labor and materials necessary to complete the work in place.

CHAIN LINK FENCE AND GATES

Description. This work shall consist of fabricating, furnishing and erecting Chain Link Fence Gate and Accessories at the locations shown in the contract plans. This work shall conform to the applicable portions of Section 664 of the Standard Specifications and with applicable portions of IDOT Highway Standard Drawing 664001-24, and as modified herein and on the project drawings.

General Requirements: All chain link gates and chain link fences with posts that are to be mounted to concrete foundations at grade shall be nominally 8 feet high which shall consist of:
7' high Chain Link Fences with one foot vertical post extensions containing three strands of barbed wire;
7' high Chain Link Gates with one foot vertical post extensions containing three strands of barbed wire.

All Chain Link Fences with posts to be attached the top of the existing concrete retaining wall (top of existing wall is approximately 1'-6" above grade) shall be fabricated and erected so that the tops of the Chain Link Fence attached to the walls and the tops of the barbed wire extensions are set at the same elevation as at the tops of the new chain link gates and new grade mounted fences.

From the schedules on IDOT Highway Standard Drawing 664001-024:
Line Posts shall be Pipe Type A, 1.90 inch outside diameter, 2.72 lb./ft.
Terminal Posts shall be Pipe Type A, 2.375 inch outside diameter,3.65 lb./ft.
Horizontal Braces shall be Pipe Type A ,1.66 inch outside diameter, 2.27 lb./ft.

In addition, all Chain Link Fence designs shall be modified to include:
Top Rails Pipe Type A, 1.66 inch outside diameter, 2.27 lbs./ft.

Fence posts and gate posts that are to be installed upon the existing transformer vault roof immediately north of the Pump Station Building and fence posts that are to be installed on top of the existing concrete retaining wall shall be provided with base plates and anchor rods, details of which are to be submitted to the Engineer for approval prior to ordering materials.

It shall be the Contractor's responsibility to ensure that there will be no gap within the proposed fencing, or between where the proposed fencing terminates and the existing fencing remains in place.

All Chain Link Gates must incorporate hardware to prevent gates from swinging outward from the site toward Union Avenue west of the fence alignment. Hinges shall allow gates to swing 180 degrees inward toward the site. Gates shall have keepers that engage automatically when the gate is swung to the open positions as indicated on the project drawings.

Gate Posts for Chain Link Gates 9 feet wide and greater shall be minimum 4.00 inch outside diameter, 8.65 lb./ft. posts, or stronger based upon design and recommendation of the gate manufacturer.

All Gate Posts shall be of sufficient strength so that the total deflection of the gate frame and the gate post at the end of the gate leaf shall not exceed 2% of the gate leaf width.

Gates over 9 feet wide shall be as designed by the gate manufacturer, with approval by the Engineer. Gate frames shall be shall be constructed with materials of the size and type recommended by the gate manufacturer, not less than 1.900 inch outside diameter, Schedule 40 pipe. All welded areas shall be covered with a rust preventative coating. All hardware used, including supports, fittings and latches, shall be of adequate design and strength to provide satisfactory operation of the gates. Interior bracing shall be as recommended by the manufacturer.

Gates shall be properly braced and trussed to prevent sagging, buckling and weaving, and shall be covered with the same fabric as the fence. Vertical members of the gates shall carry the top 3 strands of barbed wire. Fixed end ratchet bands shall be furnished for fastening the barbed wire. Gates to be furnished with all necessary fittings and hardware. Submit locking mechanisms, latches and keying arrangements to IDOT for approval prior to ordering any materials. All Chain Link Double Gates are to be provided with plunger rods and receptacles for the rods embedded into the concrete pavement in accordance with gate manufacturers recommendations.

Shop Drawings: Prior to fabrication or ordering of materials, the Contractor shall submit detailed shop drawings as described in Article 505.03 of the Standard Specifications to the Engineer for approval; including but not limited to materials, fittings, attachments, anchors and accessories required for complete assembly of the chain link fences and gates.

Materials. Fabric shall conform to Article 1006.27 of the Standard Specifications, 2 inch mesh with 0.148 inch diameter wire meeting the requirements of AASHTO M181 Fabric type shall match fabric type of the existing adjacent chain link fence, with approval by the Engineer.

Base Plates shall be structural steel conforming to the requirements of AASHTO M270 Grade 36 and Article 1006.04 of the Standard Specifications.

Barbed Wire shall be steel, ASTM A121, Chain Link Fence Grade, Class 3 coating, three-strand 0.099 inch minimum diameter (12-1/2 gage) steel wire with 0.080 inch minimum diameter (14 gage), four-point barbs spaced at 5 inches maximum centers. Ends of barbs shall be cut on bias.

Installation The Contractor shall locate the posts according to the spacing shown in the Contract Plans. Posts shall be set vertical and in true alignment. It shall be the responsibility of the Contractor to inspect the site during the construction phase (after the construction of the new openings in the existing concrete retaining wall) to verify conditions and dimensions prior to fabrication or ordering of materials. Widths of gates indicated on the Drawings are nominal widths; actual widths must be field verified and adjusted as required with respect to actual openings and required clearances for operation and locking.

Anchor rods to be drilled and grouted into the existing concrete retaining wall shall be Capsule or Adhesive Cartridge type anchors rods approved by IDOT. The Contractor shall install these anchorages in pre-drilled holes in strict accordance with the manufacturer's recommendations and procedures. Prior to installation of drill-in anchors, the Contractor shall use a metal detector to identify locations of the existing reinforcement bars to assure that existing reinforcement bars will not be damaged.

Concrete Foundations for Gate Posts for 10' wide Gates and Gate Posts for 12' wide Gates that are to be located adjacent to the existing concrete retaining wall shall be constructed as detailed in the Project Drawings.

Protective Electrical Ground: Protective Electrical Grounding of the chain link fence and gates shall be as indicated on the Project Electrical Drawings and Specifications). The Contractor shall coordinate the chain link fence and gate work with the work required for the protective electrical grounding.

Guarantee: A Guarantee shall be furnished for all materials, installation, and workmanship to be free of any defects for a period of one year from the date of acceptance, unless noted otherwise in the contract documents. Any defect in installation or workmanship shall be repaired, and defective materials shall be replaced during the guarantee period without any cost to the owner.

Basis of Payment. Payment for work under these items shall include, but not be limited to furnishing all materials, fabricating and installing the complete fences and gates including all posts, base plates, fittings, chain link fabric, anchorage, gate frames, hardware, barbed wire, excavation for concrete foundations for posts, concrete foundations for posts, shop and fabrication drawings, protective electrical grounding and all incidentals as specified herein, installed and accepted, be paid for as follows:

CHAIN LINK FENCE, 7' (SPECIAL), as indicated in the Plans, will be paid for at the contract unit price per foot measured from center of end post to center of end post, excluding the length occupied by the gates.

CHAIN LINK GATES, SINGLE WITH BARBED WIRE of the type specified, as indicated in the Plans, will be paid for at the contract unit price per each gate, properly adjusted and left in perfect working order.

CHAIN LINK FENCE WITH BARBED WIRE, POSTS ATTACHED TO STRUCTURE, as indicated in the Plans, will be paid for at the contract unit price per foot measured from center of end post to center of end post.

CHAIN LINK GATES, DOUBLE WITH BARBED WIRE of the type specified, as indicated in the Plans, the will be paid for at the contract unit price per each double gate, properly adjusted and left in perfect working order.

BACKFILLING STORM SEWER UNDER ROADWAY
Effective: September 30, 1985 Revised: July 2, 1994

For storm sewer constructed under the roadway, backfilling methods two and three authorized under the provisions of Article 550.07 of the Standard Specifications will not be allowed.

CONDUIT ENCASED, REINFORCED CONCRETE

Description: This item shall consist of forming. placing and finishing reinforced concrete duct banks which include rigid metal conduit, spacers, and reinforcement bars, and also forming, placing and finishing reinforced concrete duct banks which include PVC Conduit, Rigid Galvanized Steel Conduit, spacers, and reinforcement bars, as detailed and noted on the drawings and as specified herein.

General: It shall be the responsibility of the Contractor to inspect the site both prior to construction and during construction to verify conditions and dimensions in the field and make necessary approved adjustments prior to construction or ordering of materials. Such variations shall not be cause for additional compensations or a change in the scope of work.
The work shall include all labor, materials, tools, equipment and incidentals required for a completely finished and operational CONDUIT ENCASED, REINFORCED CONCRETE duct banks of the diameter, type and quantity specified.

Construction: Construction of the duct banks shall be in conformance with Commonwealth Edison (ComEd) requirements as specified and detailed on the Drawings, and shall be in conformance with Section 810 of the IDOT Standard Specifications for Road and Bridge Construction. In case of a discrepancy between Commonwealth Edison requirements and IDOT Standard Specifications, Commonwealth Edison requirements shall govern.

The Engineer shall inspect the duct banks and verify location of reinforcement bars, spacers, and conduit joints prior to placement of concrete. The Contractor shall be responsible for coordinating the Engineers inspection and obtaining his approval.

Trenching for all CONDUIT ENCASED, REINFORCED CONCRETE will not be paid for as a separate item, but shall be considered as included in the contract unit price bid for the item involved and no additional compensation will be allowed.

Coordination with Commonwealth Edison: Work to be provided and installed by Commonwealth Edison (ComEd) is defined in the Project Electrical Specifications and Drawings. It shall be the responsibility of the Contractor to coordinate schedules and construction requirements with ComEd to assure uninterrupted and effective and proper construction of this project. For that part of the work that is to be constructed by the Contractor in accordance with the specific ComEd Standard Drawings and ComEd Standard Specifications referenced in the contract documents, it shall be the responsibility of the Contractor to familiarize himself with said ComEd Standard Drawings and ComEd Standard Specifications, and if adjustments are required, to make necessary approved adjustments prior to construction or ordering of materials. Such variations shall not be cause for additional compensations or a change in the scope of work.

Trench and backfill for all CONDUIT ENCASED, REINFORCED CONCRETE shall be in accordance with Commonwealth Edison requirements and shall not be paid for separately but shall be included in the BACKFILL cost of the conduit encased reinforced concrete duct bank.

Commonwealth Edison will provide and install all electrical cables and wiring running from the existing transformer vault to the proposed transformers to be located at the north end of the new truck parking area.

Material and Construction: The materials and construction methods shall conform to the applicable provisions of the ComEd Standard Drawings and ComEd Standard Specifications referenced in the contract documents and the applicable provisions of the IDOT Standard Specifications for Road and Bridge Construction referenced in the contract documents.

Method of Measurement. The completed work, accepted by the Engineer and accepted by ComEd, will be measured for payment in feet in place as described in Article 810.04 of the IDOT Standard Specifications for Road and Bridge Construction in specific and in general as described under Section 109 “Measurement and Payment” of the IDOT Standard Specifications for Road and Bridge Construction.

Basis of Payment. The above specified work shall be paid for at the contract unit price per foot for CONDUIT ENCASED, REINFORCED CONCRETE, 1 – 5” DIA & 6 – 4” DIA, RGC and for CONDUIT ENCASED, REINFORCED CONCRETE, 1 – 5” DIA & 6 – 4” DIA, PVC, which shall be payment in full for the work described herein.

Trench backfill will be not be measured or paid for separately.

TRENCH AND BACKFILL FOR ELECTRICAL WORK

Revise the first sentence of Article 819.03(a) of the Standard Specifications to read:

> "Trench. Trenches shall have a minimum depth of 760 mm (30 in.) or as otherwise indicated on the plans, and shall not exceed 300 mm (12 in.) in width without prior approval of the Engineer."

Revise Article 1066.05 of the Standard Specifications to read:

> "Underground Cable marking Tape. The tape shall be 150 mm (6 in.) wide; consisting of 0.2 mm (8 mil) polyethylene according to ASTM D882, and ASTM D2103.
>
> The tape shall be red with black lettering or red with silver lettering reading 'CAUTION – ELECTRICAL LINE BURIED BELOW'.
>
> The tape shall have reinforced metallic detection capabilities consisting of a woven reinforced polyethylene tape with a metallic core or backing."

TEMPORARY FENCE

Description: This work shall consist of furnishing and installing the temporary fence as noted on the plans, at locations as required for full and restrict public access to the project site during construction and mobilization, in accordance with the IDOT Standard Specifications, and as specified herein and in a manner approved by the Engineer.

The cost of removal or relocation of portions of the temporary fence for temporary access or for construction staging purposes will not be paid for separately, but is to be included in the cost for TEMPORARY FENCE.

The temporary fence shall be a highly visible orange snow fence, minimum 4 feet high measured from the ground elevation and constructed of high density polyethylene. The temporary fence shall surround the work area and installed using plastic or wood lathe in soil areas and approved supports in pavement areas. Supports shall be adequate to maintain the fence in a vertical position for the project duration. The Contractor shall repair or replace the temporary fence if damaged. Maintaining the temporary fence shall not be paid for separately but is included in the cost for the temporary fence.

Method of Measurement: TEMPORARY FENCE will be measured for payment in feet. The length shall be measured along the top horizontal railing member through all posts and gaps.

Basis of Payment: Temporary fence will be paid for at the contract unit price per foot for TEMPORARY FENCE.

CLEANING EXISTING DRAINAGE STRUCTURES
Effective: September 30, 1985 Revised: January 1, 2007

All existing storm sewers, pipe culverts, manholes, catch basins and inlets shall be considered as drainage structures insofar as the interpretation of this Special Provision is concerned. When specified for payment, the location of drainage structures to be cleaned will be shown on the plans.

All existing drainage structures which are to be adjusted or reconstructed shall be cleaned in accordance with Article 602.15 of the Standard Specifications. This work will be paid for in accordance with Article 602.16 of the Standard Specifications.

All other existing drainage structures which are specified to be cleaned on the plans will be cleaned according to Article 602.15 of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price each for DRAINAGE STRUCTURES TO BE CLEANED, and at the contract unit price per foot (meter) for STORM SEWERS TO BE CLEANED.

OFF-STREET PARKING FOR WORKERS

The Contractor and all employees working on this project will not be allowed to park their vehicles and equipment on I-90/94 shoulder, frontage roads or streets. The Contractor shall provide off-street parking facilities for all vehicles and equipment.

The cost to comply with this requirement will not be paid for separately, but shall be considered as included in the contract unit prices of the contract, and no additional compensation will be allowed.

STRUCTURAL REPAIR OF CONCRETE
Effective: March 15, 2006 Revised: May 11, 2009

Description. This work shall consist of structurally repairing concrete.

Materials. Materials shall be according to the following.

Item	Article/Section
(a) Portland Cement Concrete (Note 1)	1020
(b) R1 or R2 Mortar (Note2)	
(c) Normal Weight Concrete (Note 3)	
(d) Shotcrete (High Performance) (Note 4)	
(e) Reinforcement Bars	1006.10
(f) Anchor Bolts	1006.09
(g) Water	1002
(h) Curing Compound (Type I)	1022
(i) Cotton Mats	1022.02
(j) Protective Coat	1023.01
(k) Epoxy (Note 5)	1025
(l) Mechanical Bar Splicers (Note 6)	

Note 1. The concrete shall be Class SI, except the cement factor shall be a minimum 6.65 cwt/cu. yd. (395 kg/cu. m), the coarse aggregate shall be a CA 16, and the strength shall be a minimum 4000 psi (27,500 kPa) compressive or 675 psi (4650 kPa) flexural at 14 days. A high range water-reducing admixture shall be used to obtain a 5-7 in. (125-175 mm) slump, but the cement factor shall not be reduced. This cement factor restriction shall also apply if a water-reducing admixture is used.

Note 2. The R1 or R2 mortar shall be from the Department's approved list of Packaged, Dry, Rapid Hardening, Cementitious Materials for Concrete Repairs with coarse aggregate added. The amount of coarse aggregate added to the R1 or R2 Mortar shall be per the manufacturer's recommendations. The coarse aggregate gradation shall be CA 16 from an Aggregate Gradation Control System source or a packaged aggregate meeting Article 1004.02 with a maximum size of 1/2 in. (12.5 mm). The R1 or R2 Mortar and coarse aggregate mixture shall comply with the air content and strength requirements for Class SI concrete as indicated in Note 1. Mixing shall be per the manufacturer's recommendations, except the water/cement ratio shall not exceed the value specified for Class SI concrete as indicated in Note 1. A high range water-reducing admixture shall be used to obtain a 5-7 in. (125-175 mm) slump.

Note 3. The packaged concrete mixture shall be from the Department's approved list of Packaged, Dry, Formed, Concrete Repair Mixtures. The materials and preparation of aggregate shall be according to ASTM C 387. Proportioning shall be according to ASTM C 387, except the minimum cement factor shall be 6.65 cwt/cu. yd. (395 kg/cu. m). Cement replacement with fly ash or ground granulated blast-furnace slag shall be according to Section 1020. The coarse aggregate shall be a maximum size of 1/2 in. (12.5 mm). The packaged concrete mixture shall comply with the air content and strength requirements for Class SI concrete as indicated in Note 1. Mixing shall be per the manufacturer's recommendations, except the water/cement ratio shall not exceed the value specified for Class SI concrete as indicated in Note 1. A high range water-reducing admixture shall be used to obtain a 5-7 in. (125-175 mm) slump.

Note 4. A packaged, pre-blended, and dry combination of materials, for the wet-mix shotcrete method shall be provided according to ASTM C 1480. An accelerator is prohibited, except the shotcrete may be modified at the nozzle with a non-chloride accelerator for overhead applications. The shotcrete shall be Type FA, Grade FR, and Class I. The fibers shall be Type III synthetic according to ASTM C 1116.

The 7 and 28 day compressive strength requirements in ASTM C 1480 shall not apply. Instead the shotcrete shall obtain a minimum compressive strength of 4000 psi (27,500 kPa) at 14 days.

The packaged shotcrete shall be limited to the following proportions:

The cement and finely divided minerals shall be 6.05 cwt/cu. yd. (360 kg/cu. m) to 7.50 cwt/cu. yd. (445 kg/cu. m), and the cement shall not be below 4.70 cwt/cu. yd. (279 kg/cu. m).

Class F fly ash is optional and the maximum shall be 15 percent by weight (mass) of cement.

Class C fly ash is optional and the maximum shall be 20 percent by weight (mass) of cement.

Ground granulated blast-furnace slag is optional and the maximum shall be 25 percent by weight (mass) of cement.

Microsilica is required and shall be a minimum of 5 percent by weight (mass) of cement, and a maximum of 10 percent. As an alternative to microsilica, high-reactivity metakaolin may be used at a minimum of 5 percent by weight (mass) of cement, and a maximum of 10 percent.

Fly ash shall not be used in combination with ground granulated blast-furnace slag. Class F fly ash shall not be used in combination with Class C fly ash. Microsilica shall not be used in combination with high-reactivity metakaolin. A finely divided mineral shall not be used in combination with a blended hydraulic cement, except for microsilica or high-reactivity metakaolin.

The water/cement ratio shall be a maximum of 0.42.

The air content as shot shall be 4.0 – 8.0 percent.

Note 5. In addition ASTM C 881, Type IV, Grade 2 or 3, Class A, B, or C may be used.

Note 6. Mechanical bar splicers shall be from the approved list of Mechanical Reinforcing Bar Splicers / Coupler Systems, and shall be capable of developing in tension at least 125 percent of the yield strength of the existing reinforcement bar.

Equipment. Equipment shall be according to Article 503.03 and the following.

Chipping Hammer – The chipping hammer for removing concrete shall be a light-duty pneumatic or electric tool with a 15 lb. (7 kg) maximum class or less.

Blast Cleaning Equipment – Blast cleaning equipment for concrete surface preparation shall be the abrasive type, and the equipment shall have oil traps.

Hydrodemolition Equipment – Hydrodemolition equipment for removing concrete shall be calibrated, and shall use water according to Section 1002.

High Performance Shotcrete Equipment – The batching, mixing, pumping, hose, nozzle, and auxiliary equipment shall be for the wet-mix shotcrete method, and shall meet the requirements of ACI 506R.

Construction Requirements

General. The repair methods shall be either formed concrete repair or shotcrete. The repair method shall be selected by the Contractor with the following rules.

(a) Rule 1. For formed concrete repair, a subsequent patch to repair the placement point after initial concrete placement will not be allowed. As an example, this may occur in a vertical location located at the top of the repair.
(b) Rule 2. Formed concrete repair shall not be used for overhead applications.
(c) Rule 3. Shotcrete shall not be used for column repairs greater than 4 in. (100 mm) in depth, or any repair location greater than 8 in. (205 mm) in depth. The only exception to this rule would be for a horizontal application, where the shotcrete may be placed from above in one lift.
(d) Rule 4. If formed concrete repair is used for locations that have reinforcement with less than 0.75 in. (19 mm) of concrete cover, the concrete mixture shall contain fly ash or ground granulated blast-furnace slag at the maximum cement replacement allowed.

Temporary Shoring or Cribbing. When a temporary shoring or cribbing support system is required, the Contractor shall provide details and computations, prepared and sealed by an Illinois licensed Structural Engineer, to the Department for review and approval. Whenever possible the support system shall be installed prior to starting the associated concrete removal. If no system is specified, but during the course of removal the need for temporary shoring or cribbing becomes apparent or is directed by the Engineer due to a structural concern, the Contractor shall not proceed with any further removal work until an appropriate and approved support system is installed.

Concrete Removal. The Contractor shall provide ladders or other appropriate equipment for the Engineer to mark the removal areas. Repair configurations will be kept simple, and squared corners will be preferred. The repair perimeter shall be sawed a depth of 1/2 in. (13 mm) or less, as required to avoid cutting the reinforcement. Any cut reinforcement shall be repaired or replaced at the expense of the Contractor. If the concrete is broken or removed beyond the limits of the initial saw cut, the new repair perimeter shall be recut. The areas to be repaired shall have all loose, unsound concrete removed completely by the use of chipping hammers, hydrodemolition equipment, or other methods approved by the Engineer. The concrete removal shall extend along the reinforcement bar until the reinforcement is free of bond inhibiting corrosion. The outermost layer of reinforcement bar within the repair area shall be undercut to a depth of 3/4 in. (19 mm) or the diameter of the reinforcement bar, whichever value is larger. The underlying transverse reinforcement bar shall also be undercut as previously described, unless the reinforcement is not corroded, and the reinforcement bar is encased and well bonded to the surrounding concrete.

If sound concrete is encountered before existing reinforcement bars are exposed, further removal of concrete shall not be performed unless the minimum repair depth is not met.

The repair depth shall be a minimum of 1 in. (25 mm). The substrate profile shall be ± 1/16 in. (± 1.5 mm). The perimeter of the repair area shall have a vertical face.

If a repair is located at the ground line, any excavation required below the ground line to complete the repair shall be included in this work.

The Contractor shall have a maximum of 14 calendar days to complete each repair location with concrete or shotcrete, once concrete removal has started for the repair.

The Engineer shall be notified of concrete removal that exceeds 6 in. (150 mm) in depth, one fourth the cross section of a structural member, more than half the vertical column reinforcement is exposed in a cross section, more than 6 consecutive reinforcement bars are exposed in any direction, within 1.5 in. (38 mm) of a bearing area, or other structural concern. Excessive deterioration or removal may require further evaluation of the structure or installation of temporary shoring and cribbing support system.

Surface Preparation. Prior to placing the concrete or shotcrete, the Contractor shall prepare the repair area and exposed reinforcement by blast cleaning. The blast cleaning shall provide a surface that is free of oil, dirt, and loose material.

If a succeeding layer of shotcrete is to be applied, the initial shotcrete surface and remaining exposed reinforcement shall be free of curing compound, oil, dirt, loose material, rebound (i.e. shotcrete material leaner than the original mixture which ricochets off the receiving surface), and overspray. Preparation may be by lightly brushing or blast cleaning if the previous shotcrete surface is less than 36 hours old. If more than 36 hours old, the surface shall be prepared by blast cleaning.

The repair area and perimeter vertical face shall have a rough surface. Care shall be taken to ensure the perimeter sawcut is roughened. Just prior to concrete or shotcrete placement, saturate the repair area with water to a saturated surface-dry condition. Any standing water shall be removed.

Concrete or shotcrete placement shall be done within 3 calendar days of the surface preparation or the repair area shall be prepared again.

Reinforcement. Exposed reinforcement bars shall be cleaned of concrete and corrosion by blast cleaning. After cleaning, all exposed reinforcement shall be carefully evaluated to determine if replacement or additional reinforcement bars are required.

Reinforcing bars that have been cut or have lost 25 percent or more of their original cross sectional area shall be supplemented by new in kind reinforcement bars. New bars shall be lapped a minimum of 32 bar diameters to existing bars. A mechanical bar splicer shall be used when it is not feasible to provide the minimum bar lap. No welding of bars shall be performed.

Intersecting reinforcement bars shall be tightly secured to each other using 0.006 in. (1.6 mm) or heavier gauge tie wire, and shall be adequately supported to minimize movement during concrete placement or application of shotcrete.

For reinforcement bar locations with less than 0.75 in. (19 mm) of cover, protective coat shall be applied to the completed repair. The application of the protective coat shall be according to Article 503.19, 2nd paragraph, except blast cleaning shall be performed to remove curing compound.

The Contractor shall anchor the new concrete to the existing concrete with 3/4 in. (19 mm) diameter hook bolts for all repair areas where the depth of concrete removal is greater than 8 in. (205 mm) and there is no existing reinforcement extending into the repair area. The hook bolts shall be spaced at 15 in. (380 mm) maximum centers both vertically and horizontally, and shall be a minimum of 12 in. (305 mm) away from the perimeter of the repair. The hook bolts shall be installed according to Section 584.

Repair Methods. All repair areas shall be inspected and approved by the Engineer prior to placement of the concrete or application of the shotcrete.

(a) Formed Concrete Repair. Falsework shall be according to Article 503.05. Forms shall be according to Article 503.06. Formwork shall provide a smooth and uniform concrete finish, and shall approximately match the existing concrete structure. Formwork shall be mortar tight and closely fitted where they adjoin the existing concrete surface to prevent leakage. Air vents may be provided to reduce voids and improve surface appearance. The Contractor may use exterior mechanical vibration, as approved by the Engineer, to release air pockets that may be entrapped.

The concrete for formed concrete repair shall be a Class SI Concrete, or a packaged R1 or R2 Mortar with coarse aggregate added, or a packaged Normal Weight Concrete at the Contractor's option. The concrete shall be placed and consolidated according to Article 503.07. The concrete shall not be placed when frost is present on the surface of the repair area, or the surface temperature of the repair area is less than 40 °F (4 °C). All repaired members shall be restored as close as practicable to their original dimensions.

Curing shall be done according to Article 1020.13.

If temperatures below 45°F (7°C) are forecast during the curing period, protection methods shall be used. Protection Method I according to Article 1020.13(d)(1), or Protection Method II according to Article 1020.13(d)(2) shall be used during the curing period.

The surfaces of the completed repair shall be finished according to Article 503.15.

(b) Shotcrete. Shotcrete shall be tested by the Engineer for air content according to Illinois Modified AASHTO T 152. Obtain the sample in a damp, non-absorbent container from the discharge end of the nozzle.

For compressive strength of shotcrete, a 18 x 18 x 3.5 in. (457 x 457 x 89 mm) test panel shall be shot by the Contractor for testing by the Engineer. A steel form test panel shall have a minimum thickness of 3/16 in. (5 mm) for the bottom and sides. A wood form test panel shall have a minimum 3/4 in. (19 mm) thick bottom, and a minimum 1.5 in. (38 mm) thickness for the sides.

The test panel shall be cured according to Article 1020.13 (a) (3) or (5) while stored at the jobsite and during delivery to the laboratory. After delivery to the laboratory for testing, curing and testing shall be according to ASTM C 1140.

The method of alignment control (i.e. ground wires, guide strips, depth gages, depth probes, and formwork) to ensure the specified shotcrete thickness and reinforcing bar cover is obtained shall be according to ACI 506R. Ground wires shall be removed after completion of cutting operations. Guide strips and formwork shall be of dimensions and a configuration that do not prevent proper application of shotcrete. Metal depth gauges shall be cut 1/4 in. (6 mm) below the finished surface. All repaired members shall be restored as close as practicable to their original dimensions.

For air temperature limits when applying shotcrete in cold weather, the first paragraph of Article 1020.14(b) shall apply. For hot weather, shotcrete shall not be applied when the air temperature is greater than 90°F (32°C). The applied shotcrete shall have a minimum temperature of 50°F (10°C) and a maximum temperature of 90°F (32°C). The shotcrete shall not be applied during periods of rain unless protective covers or enclosures are installed. The shotcrete shall not be applied when frost is present on the surface of the repair area, or the surface temperature of the repair area is less than 40°F (4°C). If necessary, lighting shall be provided to provide a clear view of the shooting area.

The shotcrete shall be applied according to ACI 506R, and shall be done in a manner that does not result in cold joints, laminations, sandy areas, voids, sags, or separations. In addition, the shotcrete shall be applied in a manner that results in maximum densification of the shotcrete. Shotcrete which is identified as being unacceptable while still plastic shall be removed and re-applied.

The nozzle shall normally be at a distance of 2 to 5 ft. (0.6 to 1.5 m) from the receiving surface, and shall be oriented at right angles to the receiving surface. Exceptions to this requirement will be permitted to fill corners, encase large diameter reinforcing bars, or as approved by the Engineer. For any exception, the nozzle shall never be oriented more than 45 degrees from the surface. Care shall be taken to keep the front face of the reinforcement bar clean during shooting operations. Shotcrete shall be built up from behind the reinforcement bar. Accumulations of rebound and overspray shall be continuously removed prior to application of new shotcrete. Rebound material shall not be incorporated in the work.

Whenever possible, shotcrete shall be applied to the full thickness in a single layer. The maximum thickness shall be 4 in. (100 mm) unless the shotcrete is applied from above on a horizontal surface, or a thicker application is approved by the Engineer. When two or more layers are required, the minimum number shall be used and shall be done in a manner without sagging or separation. A flash coat (i.e. a thin layer of up to 1/4 in. (6 mm) applied shotcrete) may be used as the final lift for overhead applications.

Prior to application of a succeeding layer of shotcrete, the initial layer of shotcrete shall be prepared according to the surface preparation and reinforcement bar cleaning requirements. Upon completion of the surface preparation and reinforcement bar treatment, water shall be applied according to the surface preparation requirements unless the surface is moist. The second layer of shotcrete shall then be applied within 30 minutes.

Shotcrete shall be cut back to line and grade using trowels, cutting rods, screeds or other suitable devices. The shotcrete shall be allowed to stiffen sufficiently before cutting. Cutting shall not cause cracks or delaminations in the shotcrete. For depressions, cut material may be used for small areas. Rebound material shall not be incorporated in the work. For the final finish, a wood float shall be used to approximately match the existing concrete texture. All repaired members shall be restored as close as practicable to their original dimensions.

Contractor operations for curing shall be continuous with shotcrete placement and finishing operations. The Engineer may require modification of operations to ensure satisfactory results are obtained. Cotton mats shall be applied according to Article 1020.13(a)(5) except the exposed layer of shotcrete shall be covered within 10 minutes after finishing, and wet curing shall begin immediately. As an alternative to this method, Type I curing compound shall be applied according to Article 1020.13(a)(4) within 10 minutes and moist curing with cotton mats shall begin within 3 hours. For overhead applications where the final shotcrete layer has been applied, the Contractor has the option to use Type I curing compound in lieu of the cotton mats. Note 5 of the Index Table in Article 1020.13 shall apply to the membrane curing method. The curing compound shall be applied according to Article 1020.13(a)(4).

When a shotcrete layer is to be covered by a succeeding shotcrete layer within 36 hours, the repair area shall be protected with intermittent hand fogging, or wet curing with either burlap or cotton mats shall begin within 10 minutes. Intermittent hand fogging may be used only for the first hour. Thereafter, wet curing with burlap or cotton mats shall be used until the succeeding shotcrete layer is applied. Intermittent hand fogging may be extended to the first hour and a half if the succeeding shotcrete layer is applied by the end of this time.

The curing period shall be for 7 days, except when there is a succeeding layer of shotcrete. In this instance, the initial shotcrete layer shall be cured until the surface preparation and reinforcement bar treatment is started.

If temperatures below 45°F (7°C) are forecast during the curing period, protection methods shall be used. Protection Method I according to Article 1020.13(d)(1), or Protection Method II according to Article 1020.13(d)(2) shall be used during the curing period

Inspection of Completed Work. The Contractor shall provide ladders or other appropriate equipment for the Engineer to inspect the repaired areas. After curing but no sooner than 28 days after placement of concrete or shooting of shotcrete, the repair shall be examined for conformance with original dimensions, cracks, voids, and delaminations. Sounding for delaminations will be done with a hammer or by other methods determined by the Engineer.

The repaired area shall be removed and replaced, as determined by the Engineer, for nonconformance with original dimensions, surface cracks greater than 0.01 in. (0.25 mm) in width, map cracking with a crack spacing in any direction of 18 in. (0.45 m) or less, voids, or delaminations.

If a nonconforming repair is allowed to remain in place, cracks 0.01 in. (0.25 mm) or less shall be repaired with epoxy according to Section 590. For cracks less than 0.007 in. (2 mm), the epoxy may be applied to the surface of the crack.

Voids shall be repaired according to Article 503.15.

Publications and Personnel Requirements. The Contractor shall provide a current copy of ACI 506R to the Engineer a minimum of one week prior to start of construction.

The shotcrete personnel who perform the work shall have current American Concrete Institute (ACI) nozzlemen certification for vertical wet and overhead wet applications, except one individual may be in training. This individual shall be adequately supervised by a certified ACI nozzlemen as determined by the Engineer. A copy of the nozzlemen certificate(s) shall be given to the Engineer.

Method of Measurement. This work will be measured for payment in place and the area computed in square feet (square meters). For a repair at a corner, both sides will be measured.

Basis of Payment. This work will be paid for at the contract unit price per square foot (square meter) for STRUCTURAL REPAIR OF CONCRETE (DEPTH GREATER THAN 5 IN. (125 MM), STRUCTURAL REPAIR OF CONCRETE (DEPTH EQUAL TO OR LESS THAN 5 IN. (125 MM).

When not specified to be paid for elsewhere, the work to design, install, and remove the temporary shoring and cribbing will be paid for according to Article 109.04.

With the exception of reinforcement damaged by the Contractor during removal, the furnishing and installation of supplemental reinforcement bars, mechanical bar splicers, hook bolts, and protective coat will be paid according to Article 109.04.

RECLAIMED ASPHALT PAVEMENT FOR NON-POROUS EMBANKMENT AND BACKFILL
Effective: April 1, 2001 Revised: January 1, 2007

Add the following sentence to Article 1004.05 (a) of the Standard Specifications:

> "Reclaimed Asphalt Pavement (RAP) may be used as aggregate in Non-porous Granular Embankment and Backfill. The Rap material shall be reclaimed asphalt pavement material resulting from the cold milling or crushing of an existing hot-mix bituminous concrete pavement structure, including shoulders. RAP containing contaminants such as earth, brick, concrete, sheet asphalt, sand, or other materials identified by the Department will be unacceptable until the contaminants are thoroughly removed.

Add the following sentence to Article 1004.05 (c)(2) of the Standard Specifications:

> "One hundred percent of the RAP when used shall pass the 3 inch (75 mm) sieve. The RAP shall be well graded from coarse to fine. RAP that is gap-graded or single-sized will not be accepted."

EPOXY COATING ON REINFORCEMENT (DISTRICT ONE)
Effective: January 1, 2007

For work outside the limits of bridge approach pavement, all references in the Highway Standards and Standard Specifications for reinforcement, dowel bars, tie bars and chair supports for pavement, shoulders, curb, gutter, combination curb and gutter and median shall be epoxy coated, unless noted on the plan.

FINE AGGREGATE FOR HOT- MIX ASPHALT (HMA) (D-1)
Effective: May 1, 2007 Revised: May 1, 2009

Add the following to the gradation tables of Article 1003.01(c) of the Standard Specifications:

FINE AGGREGATE GRADATIONS					
Grad No.	Sieve Size and Percent Passing				
	3/8	No. 4	No. 8	No. 16	No. 200
FA 22	100	6/	6/	8±8	2±2

FINE AGGREGATE GRADATIONS (metric)					
	Sieve Size and Percent Passing				
Grad No.	9.5 mm	4.75 mm	2.36 mm	1.16 mm	0.075 mm
FA 22	100	6/	6/	8±8	2±2

6/ For the fine aggregate gradations FA 22, the aggregate producer shall set the midpoint percent passing and a range of ± 10% shall be applied. The midpoint shall not be changed without Department approval.

Revise Article 1003.03 (c) of the Standard Specifications to read:

"Gradation. The fine aggregate gradation for all HMA shall be FA1, FA 2, FA 20, FA 21 or FA 22. When Reclaimed Asphalt Pavement (RAP) is incorporated in the HMA design, the use of FA 21 Gradation will not be permitted.

TEMPERATURE CONTROL FOR CONCRETE PLACEMENT (DISTRICT ONE)
Effective: May 1, 2007

Delete the second and third sentences of the second paragraph of Article 1020.14(a) of the Standard Specifications.

USE OF RAP (DIST 1)
Effective: January 1, 2007 Revised: July 1, 2009

In Article 1030.02(g) of the Standard Specifications, delete the last sentence of the first paragraph in (Note 2).

Revise Section 1031 of the Standard Specifications to read:

"**SECTION 1031. RECLAIMED ASPHALT PAVEMENT**

1031.01 Description. Reclaimed asphalt pavement (RAP) results from the cold milling or crushing of an existing hot-mix asphalt (HMA) pavement. The Contractor shall supply written documentation that the RAP originated from routes or airfields under federal, state, or local agency jurisdiction. The contractor can also request that a processed pile be tested by the Department to determine the aggregate quality as described in Article 1031.04, herein.

1031.02 Stockpiles. The Contractor shall construct individual, sealed RAP stockpiles meeting one of the following definitions. No additional RAP shall be added to the pile after the pile has been sealed.

Stockpiles shall be sufficiently separated to prevent intermingling at the base. Stockpiles shall be identified by signs indicating the type and size as listed below (i.e. “Homogenous Surface”).

Prior to milling or removal of an HMA pavement, the Contractor may request the District to provide verification of the existing mix composition to clarify appropriate stockpile.

(a) Homogeneous. Homogeneous RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures and represent: 1) the same aggregate quality, but shall be at least C quality; 2) the same type of crushed aggregate (either crushed natural aggregate, ACBF slag, or steel slag); 3) similar gradation; and 4) similar asphalt binder content. If approved by the Engineer, combined single pass surface/binder millings may be considered “homogenous” with a quality rating dictated by the lowest coarse aggregate quality present in the mixture.

(b) Conglomerate 5/8. Conglomerate 5/8 RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least C quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate 5/8 RAP shall be processed prior to testing by crushing to where all RAP shall pass the 5/8 in. (16 mm) or smaller screen.

(c) Conglomerate 3/8. Conglomerate 3/8 RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least B quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate 3/8 RAP shall be processed prior to testing by crushing to where all RAP shall pass the 3/8 in (9.5 mm) or smaller screen.

(d) Conglomerate Variable Size. Conglomerate variable size RAP shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least B quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate variable size RAP shall be processed prior to testing by crushing and screening to where all RAP is separated into various sizes. All the conglomerate variable size RAP shall pass the 3/4 in. (19 mm) screen and shall be a minimum of two sizes.

(e) Conglomerate “D” Quality (DQ). Conglomerate DQ RAP stockpiles shall consist of RAP from Class I, Superpave (High or Low ESAL), HMA (High or Low Esal), or equivalent mixtures. The coarse aggregate in this RAP may be crushed or round but shall be at least D quality. This RAP may have an in consistent gradation and/or asphalt binder content.

(f) Non-Quality. RAP stockpiles that do not meet the requirements of the stockpile categories listed above shall be classified as “Non-Quality”.

RAP containing contaminants, such as earth, brick, sand, concrete, sheet asphalt, bituminous surface treatment (i.e. chip seal), pavement fabric, joint sealants, etc., will be unacceptable unless the contaminants are removed to the satisfaction of the Engineer. Sheet asphalt shall be stockpiled separately.

1031.03 Testing. When used in HMA, the RAP shall be sampled and tested either during or after stockpiling.

For testing during stockpiling, washed extraction samples shall be run at the minimum frequency of one sample per 500 tons (450 metric tons) for the first 2000 tons (1800 metric tons) and one sample per 2000 tons (1800 metric tons) thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons (3600 metric tons).

For testing after stockpiling, the Contractor shall submit a plan for approval to the District proposing a satisfactory method of sampling and testing the RAP pile either in-situ or by restockpiling. The sampling plan shall meet the minimum frequency required above and detail the procedure used to obtain representative samples throughout the pile for testing.

Before extraction, each field sample shall be split to obtain two samples of test sample size. One of the two test samples from the final split shall be labeled and stored for Department use. The Contractor shall extract the other test sample according to Department procedure. The Engineer reserves the right to test any sample (split or Department-taken) to verify Contractor test results.

(a) Testing Conglomerate 3/8 and Conglomerate Variable Size. In addition to the requirements above, conglomerate 3/8 and variable size RAP shall be tested for maximum theoretical specific gravity (G_{mm}) at a frequency of one sample per 500 tons (450 metric tons) for the first 2000 tons (1800 metric tons) and one sample per 2000 tons (1800 metric tons) thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons (3600 metric tons).

(b) Evaluation of Test Results. All of the extraction results shall be compiled and averaged for asphalt binder content and gradation and, when applicable G_{mm}. Individual extraction test results, when compared to the averages, will be accepted if within the tolerances listed below.

Parameter	Homogeneous/ Conglomerate	Conglomerate "D" Quality
1 in. (25 mm)		± 5 %
3/4 in. (19mm)		
1/2 in. (12.5mm)	± 8 %	± 15 %
No. 4 (4.75 mm)	± 6 %	± 13 %
No. 8 (2.36 mm)	±5 %	
No. 16 (1.18 mm)		± 15 %
No. 30 (600 μm)	± 5. %	
No. 200 (75 μm)	± 2.0 %	± 4.0 %
Asphalt Binder	± 0.4 % 1/	± 0.5 %
Gmm Gmm	±0.02 % 2/ ±0.03 % 3/	

1/ The tolerance for conglomerate 3/8 shall be ± 0.3 %.

2/ Applies only to conglomerate 3/8. When variation of the G_{mm} exceeds the $\pm$ 0.02 % tolerance, a new conglomerate 3/8 stockpile shall be created which will also require an additional mix design.

3/ Applies only to conglomerate variable size. When variation of the G_{mm} exceeds the $\pm$ 0.03 tolerance, a new conglomerate variable size stockpile shall be created which will also require an additional mix design.

If more than 20 percent of the individual sieves are out of the gradation tolerances, or if more than 20 percent of the asphalt binder content test results fall outside the appropriate tolerances, the RAP shall not be used in HMA unless the RAP representing the failing tests is removed from the stockpile. All test data and acceptance ranges shall be sent to the District for evaluation.

With the approval of the Engineer, the ignition oven may be substituted for extractions according to the Illinois Test Procedure, "Calibration of the Ignition Oven for the Purpose of Characterizing Reclaimed Asphalt Pavement (RAP)".

1031.04 Quality Designation of Aggregate in RAP. The quality of the RAP shall be set by the lowest quality of coarse aggregate in the RAP stockpile and are designated as follows.

(a) RAP from Class I, Superpave (High ESAL), or HMA (High ESAL) surface mixtures are designated as containing Class B quality coarse aggregate.

(b) RAP from Superpave (Low ESAL)/HMA (Low ESAL) IL-19.0L binder and IL-9.5L surface mixtures are designated as Class D quality coarse aggregate.

(c) RAP from Class I, Superpave (High ESAL), or HMA (High ESAL) binder mixtures, bituminous base course mixtures, and bituminous base course widening mixtures are designated as containing Class C quality coarse aggregate.

(d) RAP from bituminous stabilized subbase and BAM shoulders are designated as containing Class D quality coarse aggregate.

Aggregate Quality Testing of RAP:

The processed pile shall have a maximum tonnage of 5,000 tons (4500 metric tons). The pile shall be crushed and screened with 100 percent of the material passing the 3/4 in. (19mm) sieve. The pile shall be tested for AC content and gradation and shall conform to all requirements of Article 1031.03 Testing, herein. Once the uniformity of the gradation and AC content has been established, the Contractor shall obtain a representative sample with district oversight of the sampling. This sample shall be no less than 50 lbs (25 kg) and this sample shall be delivered to a Consultant Lab, prequalified by the Department for extraction testing according to Illinois Modified AASHTO T 164. After the AC has been extracted, the Consultant Lab shall submit the test results along with the recovered aggregate to the District Office. The cost for this testing shall be paid directly by the Contractor. The District will forward the sample to the BMPR Aggregate Lab for MicroDeval Testing, according to Illinois Modified AASHTO T 327. A maximum loss of 15.0 percent will be applied for all HMA applications.

1031.05 Use of RAP in HMA. The use of RAP in HMA shall be as follows.

(a) Coarse Aggregate Size. The coarse aggregate in all RAP shall be equal to or less than the nominal maximum size requirement for the HMA mixture to be produced.
(b) Use in HMA Surface Mixtures (High and Low ESAL). RAP stockpiles for use in HMA surface mixtures (High and Low ESAL) shall be either homogeneous or conglomerate 3/8 or variable size in which the coarse aggregate is Class B quality or better.
(c) Use in HMA Binder Mixtures (High and Low ESAL), HMA Base Course, and HMA Base Course Widening. RAP stockpiles for use in HMA binder mixtures (High and Low ESAL), HMA base course, and HMA base course widening shall be homogeneous, conglomerate 5/8, or conglomerate 3/8, conglomerate variable size, in which the coarse aggregate is Class C quality or better.
(d) Use in Shoulders and Subbase. RAP stockpiles for use in HMA shoulders and stabilized subbase (HMA) shall be homogeneous, conglomerate 5/8, conglomerate 3/8, conglomerate variable size, or conglomerate DQ.
(e) The use of RAP shall be a contractor's option when constructing HMA in all contracts. When the Contractor chooses the RAP option, the percentage of RAP shall not exceed the amounts indicated in the table for a given N Design.

Maximum Mixture RAP Percentage

HMA Mixtures [1/ 3/]		Maximum % Rap	
Ndesign	Binder/Leveling Binder	Surface	Polymer Modified
30	30/40 [2/]	30	10
50	25/40 [2/ 4/]	15/25 [2/]	10 [4/]
70	25/30 [2/]	10/20 [2/]	10
90	10/15 [2/]	10/15 [2/]	10
105	10/15 [2/]	10/15 [2/]	10

1/ For HMA Shoulder and Stabilized Sub-Base (HMA) N-30, the amount of RAP shall not exceed 50% of the mixture.

2/ Value of Max % RAP If 3/8 Rap or conglomerate variable size RAP is utilized.

3/ When RAP exceeds 20% the AC shall be PG58 -22. However, when RAP exceeds 20% and is used in full depth HMA pavement the AC shall be PG58 -28.

4/ Polymerized Leveling Binder, IL-4.75 is 15 %

1031.06 HMA Mix Designs. At the Contractor's option, HMA mixtures may be constructed utilizing RAP material meeting the above detailed requirements.

RAP designs shall be submitted for volumetric verification. If additional RAP stockpiles are tested and found that no more than 20 percent of the results, as defined under "Testing" herein, are outside of the control tolerances set for the original RAP stockpile and HMA mix design, and meets all of the requirements herein, the additional RAP stockpiles may be used in the original mix design at the percent previously verified.

1031.07 HMA Production. The coarse aggregate in all RAP used shall be equal to or less than the nominal maximum size requirement for the HMA mixture being produced.

To remove or reduce agglomerated material, a scalping screen, crushing unit, or comparable sizing device approved by the Engineer shall be used in the RAP feed system to remove or reduce oversized material. If material passing the sizing device adversely affects the mix production or quality of the mix, the sizing device shall be set at a size specified by the Engineer.

If the RAP control tolerances or QC/QA test results require corrective action, the Contractor shall cease production of the mixture containing RAP and either switch to the virgin aggregate design or submit a new RAP design. When producing mixtures containing conglomerate 3/8 or conglomerate variable size RAP, a positive dust control system shall be utilized.

HMA plants utilizing RAP shall be capable of automatically recording and printing the following information.

(a) Drier Drum Plants

(1) Date, month, year, and time to the nearest minute for each print.

(2) HMA Mix number assigned by the Department

(3) Accumulated weight of dry aggregate (combined or individual) in tons (metric tons) Accumulated weight of dry aggregate (combined or individual) in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton)

(4) Accumulated dry weight of RAP in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton)

(5) Accumulated mineral filler in revolutions, tons (metric tons), etc. to the nearest 0.1 unit.

(6) Accumulated asphalt binder in gallons (liters), tons (metric tons), etc. to the nearest 0.1 unit.

(7) Residual asphalt binder in the RAP material (per size) as a percent of the total mix to the nearest 0.1 unit.

(8) Aggregate and RAP moisture compensators in percent as set on the control panel (Required when accumulated or individual aggregate and RAP are printed in wet condition).

(b) Batch Plants

(1) Date, month, year, and time to the nearest minute for each print.
(2) HMA mix number assigned by the Department.
(3) Individual virgin aggregate hot bin batch weights to the nearest pound (kilogram)
(4) Mineral filler weight to the nearest pound (kilogram).
(5) Individual RAP Aggregate weight to the nearest pound (kilogram).
(6) Virgin asphalt binder weight to the nearest pound (kilogram)
(7) Residual asphalt binder of each RAP size material as a percent of the total mix to the nearest 0.1 percent.

The printouts shall be maintained in a file at the plant for a minimum of one year or as directed by the Engineer and shall be made available upon request. The printing system will be inspected by the Engineer prior to production and verified at the beginning of each construction season thereafter.

1031.08 RAP in Aggregate Surface Course and Aggregate Shoulders. The use of RAP in aggregate surface course and aggregate shoulders shall be as follows.

(a) Stockpiles and Testing. RAP stockpiles may be any of those listed in Article 1031.02, except "Other". The testing requirements of Article 1031.03 shall not apply.
(b) Gradation. One hundred percent of the RAP material shall pass the 1 1/2 in. (37.5 mm) sieve. The RAP material shall be reasonably well graded from coarse to fine. RAP material that is gap-graded or single sized will not be accepted."

SEDIMENT CONTROL, DRAINAGE STRUCTURE INLET FILTER CLEANING

Description. This work shall consist of cleaning sediment from each assembled inlet filter. The Engineer will designate the need for cleaning based on the rate of debris and silt collected at each inlet filter location.

Cleaning of the inlet filter shall consist of inspecting and cleaning (includes removal and proper disposal of debris and silt that has accumulated in the filter fabric bag) by vactoring, removing and dumping or any other method approved by the Engineer.

Method of Measurement. Cleaning of the inlet filter shall be measured for payment each time that the cleaning work is performed at each of the inlet filter locations.

Basis of Payment. The work will be paid for at the contract unit price per each for SEDIMENT CONTROL, DRAINAGE STRUCTURE INLET FILTER CLEANING.

LEAD BASED PAINT ABATEMENT

Description. This work shall consist of abating all lead based paint used on pipes, doors, walls, floors and other surfaces in the work that will be affected by this modification work.

General This work is to be performed in accordance with the applicable portions of section 506 of the Standard Specifications.

Basis of Payment. The work will be paid for at the contract lump sum price for REMOVAL AND DISPOSAL OF LEAD BASED PAINT, at the location specified.

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1A - SUMMARY OF WORK

1. GENERAL:

1.1 General Work

1.1.1 The requirements of the Special Provisions and Division 1, General Requirements, shall apply to all Pump Station General Work.

1.1.2 The pay item, PUMP STATION, GENERAL WORK shall apply to work performed on the Pump Station No. 26 Building and shall include, but not be limited to, the following:

(a) All pump station building maintenance during construction as described and specified in Division 1, General Requirements.

(b) (Deleted)

(c) All general demolition work as described in Section 2A, Demolition for Rehabilitation of Building.

(d) All grout as indicated on the Drawings and as specified in Section 3B, Grout.

(e) All unit masonry work consisting of glass block work and glazed brickwork as indicated on the Drawings and as specified in Section 4A, Unit Masonry.

(f) All metal work as indicated on the Drawings and as specified in Division 5, Metals.

(g) All insulation work as indicated on the Drawings and as specified in Section 7A, Board Insulation.

(h) All roofing work as indicated on the Drawings and as specified in Section 7B, Modified Bitumen Roofing.

(i) All sheet metal work at roofing as indicated on the Drawings and as specified in Section 7C, Sheet Metal Flashing and Trim.

(j) All sealant work as indicated on the Drawings and as specified in Section 7D, Joint Sealants.

(k) All doors and hardware as indicated on the Drawings and as specified in Section 8B, Doors and Hardware, and in Section 8C, Steel Doors and Frames

(l) All painting as indicated on the Drawings and as specified in Section 9A, Painting.

(m) The station identification plate, shop desk, bulletin board, staff gauges, first aid kit, and fire extinguishers, as indicated on the Drawings and as specified in Section 10A, Specialties.

(n) All Furnishing and Erecting of Structural Steel required for work on the Pump Station No. 26 Building as indicated on the Drawings and as specified in Section 5A, Structural Steel.

(o) All Concrete work required for work on the Pump Station No. 26 Building as indicated on the Drawings and as specified in Section 3A, Cast-in-Place Concrete.

(p) All Reinforcement Bars required for work on the Pump Station No. 26 Building as indicated on the Drawings and as specified in Section 3A, Cast-in- Place Concrete.

(q) All Carpentry work as indicated on the drawings and as specified in Section 6A, Rough Carpentry

1.1.3 (Deleted)

1.1.4 The following items of general work on the Pump Station Building as indicated on the drawings and as specified under the respective Sections of the Standard Specifications shall be included in the contract lump sum price for the item, PUMP STATION, GENERAL WORK

(a)	Concrete Removal:	Section 501
(b)	Class SI Concrete:	Section 503
(c)	Furnishing and Erecting Structural Steel	Section 505
(d)	Reinforcement Bars:	Section 508

1.1.5 Work NOT included in the “Pump Station, General Work” Pay Item:

(a) All site work relating to the construction of the truck parking area and the exterior electrical transformer area requiring, but not limited to, excavation, internally reinforced earth retaining walls, steel railings, reinforced concrete pavement, concrete entrance driveways, gates and fences, storm sewers, pipe underdrains, removal and replacement of bituminous shoulders, removal and replacement of concrete curbs and gutters, construction of concrete encased conduit, removal and relocation of a HAR antenna, and landscaping work as indicated on the Drawings and as described in the IDOT Standard Specifications for Road and Bridge Construction and as described in the in the Special Provisions. Work performed for the site will be paid for under the separate pay items included in the contract documents.

(b) All Traffic Control and Protection work required for this project as described in the Special Provisions and the IDOT Standard Specifications for Road and Bridge Construction and as indicated on the Drawings. Traffic Control and Protection will be paid for under the separate pay items included in the contract documents.

(c) The pay Item ENGINEERS FIELD OFFICE TYPE A, the pay item MOBILIZATION, and the pay item TRAINEES. These items will be paid for under the separate pay items included in the contract documents.

1.2 Description: Mechanical

1.2.1 The requirements of the Special Provisions and Division 1, General Requirements, shall apply to all Pump Station, Division 15, Mechanical Work.

1.2.2 The Pump Station, Mechanical Work shall include, but not be limited to, furnishing and installing the following:

(a) Removal of existing piping and appurtenances and replace with new piping and appurtenances as indicated on the Drawings and as specified in all contract Documents. Refer to Section 15C Piping and Appurtenances for pipe fitting requirements.

(b) Removal of existing pumps, pump columns, piping and fittings as indicated on the Drawings.

(c) New storm water pumps, complete with all appurtenances.

(d) Removal of existing ventilation system including, but not limited to, exhaust fans, supply units, duct work and all appurtenances.

(e) New ventilation system including, but not limited to, exhaust fans, supply units, duct work, louvers, controls and all appurtenances.

(f) Removal and disposal of existing bar screen.

(g) New mechanical trash rack and trash rake, complete with all appurtenances.

(h) New flow recirculation system including, but not limited to, knife gate valve, slide gate, piping, actuators and all appurtenances.

(i) New miscellaneous mechanical items consisting of cable support, stilling well and trash bin.

(j) All hoist and trolley work as indicated on the Drawings and as specified in Section 14A Hoist and Trolley.

1.2.3 COMPLETE SPARE LOW FLOW PUMP ASSEMBLY shall be paid for at the Contract lump sum as specified in the applicable requirements of the Special Provisions and Division 1, General Requirements and all requirements under Division 16, Electrical.
(Main spare pump specified in Specification 15D).

1.2.4 COMPLETE SPARE MAIN PUMP ASSEMBLY shall be paid for at the Contract lump sum as specified in the applicable requirements of the Special Provisions and Division 1, General Requirements and all requirements under Division 16, Electrical.
(Main spare pump specified in Specification 15D).

1.3 Description: Electrical

1.3.1 The requirements of the Special Provisions and Division 1, General Requirements, shall apply to all Pump Station Electrical Work.

1.3.2 The pump Station Electrical Work shall include, but not be limited to, furnishing and installing the following:

(a) All demolition work as described in Section 16A and as indicated on the Contract Drawings.

(b) Disconnection and removal the existing electric service, including all metering.

(c) Installation and connection a new electric service including all metering in accordance with Commonwealth Edison Requirements.

(d) Installation of two additional East sections to the existing MCC, installation of two new and modification of five existing compartments in the existing North and South sections of MCC.

(e) Disconnect switches and motor starters with associated wiring.

(f) Modification of Control and SCADA panels.

(g) New lighting fixtures, lighting panel board and wiring devices.

(h) Installation of new power, control and signal wires and cables.

(i) New conduit and raceway system.

(j) New electric heaters, complete.

(k) Combustible gas detectors, smoke detectors and modification of intrusion alarm system.

(l) Branch wiring and conduit for main pumps, low flow pump, mechanical trash rack, unit heaters, discharge slide gate actuator, recirculation knife gate valve actuator, ventilation system, SCADA panel and other electrical equipment as shown on the Drawings.

(m) Relocation HAR, AEGIS and SCADA Radio Cabinets with associated wiring.

(n) Installation of new cable and conduit for relocated HAR antenna.

(o) Testing.

1.3.3 Electric utility service connection shall be paid under pay item ELECTRIC UTILITY SERVICE CONNECTION.

1.3.4 Modifications of the existing SCADA panel shall be paid under pay item PUMP STATION SCADA EQUIPMENT.

1.3.5 All removal and disposal of existing lead based paint as indicated on the drawings and as specified in Section 9B, Removal and Disposal of Lead Based Paint, shall be paid under pay item REMOVAL AND DISPOSAL OF LEAD BASED PAINT.

1.4 Scope of Work

1.4.1 It is the intent of these Special Provisions, together with the Contract Drawings and referenced Standard Specifications to define the work required for rehabilitation of the pump station and to maintain operations of the facility during rehabilitation. No portion of the work required to provide a coordinated complete installation may be omitted even though not expressly specified or indicated.

1.4.2 These Special Provisions for work on Pump Station 26 are presented as various listed Divisions. In general, these Special Provisions (Divisions) address the requirements for work items that are listed as pay items and as described under the various Divisions.

1.5 Pump Station Maintenance during Construction

1.5.1 From the first day the Contractor begins work at the site until the day of final acceptance by the Engineer, the Contractor shall be fully responsible for maintenance of the pump station. Maintenance shall be in full compliance with the District 1 Electrical Maintenance Contract, FY 2010/2011 or the most recent contract from the date of BID.

1.5.2 Prior to the starting of work, the Contractor shall notify the Engineer and arrange for a preconstruction inspection. At the preconstruction inspection, the facility and its equipment shall be examined and defective or missing items shall be repaired by the State's Electrical Maintenance Contractor or shall otherwise be noted. A record of inspection shall be furnished to the Engineer.

1.5.3 Emergency Service Requirements:

The Contractor shall be responsible for providing 24-hour, 7 days a week emergency response to pumping station alarms. Upon notification of a pump station alarm, the Contractor shall dispatch emergency service personnel to the station immediately and shall arrive at the station within one (1) hour of the receipt of the alarm. All necessary emergency repairs required to restore the pump station to its normal operating condition shall be done by the Contractor immediately.

Emergency service personnel shall remain at the station to monitor the situation until the alarm(s) are cleared or otherwise notified by the IDOT engineer.

(a) The IDOT COMCENTER shall be immediately notified by the Contractor whenever an "Entry Alarm", "Water on Pavement Alarm" or "High Water on Pavement Alarm" are received. The IDOT COMCENTER shall be notified with the following information: number of pumps running, water depth in wet well, depth of water on pavement and if the drainage inlets are clogged.

(b) Failure to respond or meet the emergency service requirements of a pumping station alarm, the Contractor shall be liable to the Department in the amount paid to other subcontractors hired by the State to perform the necessary alarm response.

1.5.4 Routine Maintenance Requirements:

Ongoing maintenance activities are required to maintain the pumping station for proper roadway drainage. Routine maintenance inspections of all equipment (existing or new installation) shall be conducted by the Contractor. Routine maintenance items shall be done at intervals and as outlined in the District 1 Electrical Maintenance Contract, Article 15.0 "Routine Patrol Requirements".

(a) Failure to meet the routine maintenance requirements of the pumping station, the Contractor shall be liable to the Department in the amount paid to other subcontractors hired by the State to perform the necessary routing maintenance.

1.5.5 The Contractor shall ensure that two sets of construction lock and entry keys for all construction facilities are provided to the IDOT engineer and IDOT Bureau of Electrical Operations (two sets each).

1.5.6 The Contractor during construction shall maintain all surrounding landscaping. All grass areas shall be mowed and maintained at a maximum two (2) inch height. Snow plowing of the facility shall be provided no more than two working days after a snowfall of one (1) inch or more.

1.5.7 All maintenance requirements listed above and within apply to the existing pumping station and all new facilities installed under this contract and specified herein.

1.5.8 If it become necessary to perform maintenance work beyond the scope of the Contract or routine maintenance/patrol, as outlined in the Electrical Maintenance Contract, the Contractor shall be reimbursed the exact amount of the pay item as outlined in the Electrical Maintenance Contract plus an additional administrative cost equal to five (5) percent of the first $10,000 and one (1) percent of any amount over $10,000 of the total approved costs of such work.

If the item is not covered under the Electrical Maintenance Contract, extra work shall be paid as outlined in the Standard Specifications for Road and Bridge Construction.

1.5.9 This work shall be paid as part of the Contract lump sum price for PUMP STATION GENERAL WORK, which shall be payment in full for the work described herein.

1.6 Continuous Operation

1.6.1 The facility shall remain in continuous operation during construction. Brief shutdown periods may be permitted to facilitate construction needs when approved by the Engineer. The Contractor shall submit to the Engineer all requests for a brief shut-down, indicating detailed written description of all particulars such as date, time of day, length of shut-down and all related details. If the shutdown includes the wet pit, the Contractor shall submit a plan to the Engineer that details how the Contractor will protect the work area while maintaining the ability to pump the drainage. The work required to meet this requirement shall be included at no additional cost.

1.6.2 Continuous operating integrity shall require coordination of construction activities and the need for temporary arrangements. Prior to starting work, the Contractor shall submit a detailed sequenced plan of work, for review and approval by the Engineer.

1.6.3 Continuous operation may require that some of the existing electrical equipment is disconnected, relocated and reconnected as temporary systems.

1.6.4 Continuous operation shall require temporary pumping arrangements. Existing station specified pumping capacity 227.1 m^3/m (60,000 gpm) shall be maintained. All necessary temporary pumping provisions and arrangements shall be made to maintain the above specified pumping capacity of the pumping station.

1.6.5 Continuous operation will require that new pumps and piping be installed sequentially. The new pumps shall not be installed until the entire above grade building structure, which shall include but not be limited to the roofing and the motor control center, is completed and accepted for pump installation by the Engineer. In addition, the wet pit shall be thoroughly cleaned to the satisfaction of the Engineer prior to the installation of the new pumps. Temporary pumping provisions, if any, shall not be removed until the new pumps are installed and accepted by the Engineer or otherwise approved for removal by the Engineer.

1.7 Protection of Drainage Facilities during Construction

1.7.1 Unless otherwise noted in the Contract Drawings, the existing drainage facilities shall remain in use during the period of rehabilitation.

1.7.2 Locations of existing drainage structures and sewers as indicated on the Contract Drawings are approximate. Prior to commencing work, the Contractor, at his own expense, shall determine the exact location of the existing structures that are within the proposed construction site.

1.7.3 All drainage structures are to be kept free from any debris resulting from construction operations. All work and material necessary to prevent accumulation of debris in the drainage structures will be considered as incidental to the Contract. Any accumulation of debris in the drainage structure resulting from construction operations shall be removed at the Contractor's expense and no extra compensation will be allowed.

1.8 Submittals

1.8.1 Except as specified elsewhere herein, materials and equipment shall be in conformance with the requirements of Section 106 of the Standard Specifications.

1.8.2 Materials and equipment shall be the products of established and reputable manufacturers and shall be suitable for the service required. Unless otherwise specifically indicated, all materials and equipment shall be new. The Contractor is obligated to conduct his own search into the timely availability of the specified equipment and materials to ensure that they are in strict conformance with the contract documents and that delivery schedules are compatible with project time constraints. Materials or equipment items, which are similar or identical, shall be the product of the same manufacturer. The cost of submittals, certifications, any required samples, and similar costs shall not be separately paid for but shall be included in the pay item bid price for the respective material or work.

1.8.3 All equipment, products and materials incorporated in the work shall be submitted for approval.

1.8.4 Specific submittals required for individual elements of work are specified in the individual Specification sections. Except as otherwise indicated in Specification sections, requirements specified herein shall be complied with for each indicated type of submittal. Procedures concerning items such as listing of manufacturers, suppliers, subcontractors, construction progress schedule, schedule of Shop Drawing submissions, bonds, payment applications, insurance certificates, and schedule of values are specified elsewhere.

1.8.5 Work-Related Submittals

(a) Substitution or "Or Equal" Items include material or equipment CONTRACTOR requests ENGINEER to accept, after Bids are received, as substitute for items specified or described in Specifications by using name of a proprietary item or name of particular supplier.

(b) Shop Drawings include technical data and drawings specially prepared for this Project, including fabrication and installation drawings, diagrams, actual performance curves, data sheets, schedules, templates, patterns, reports, instructions, design mix formulas, measurements, and similar information not in standard printed form. Standard information prepared without specific reference to the Project is not considered a Shop Drawing.

(c) Product Data include standard printed information on manufactured products and systems that has not been specially prepared for this Project, including manufacturer's product specifications and installation instructions, catalog cuts, standard wiring diagrams, printed performance curves, mill reports, and standard color charts.

(d) Samples include both fabricated and manufactured physical examples of materials, products, and units of work, partial cuts of manufactured or fabricated work, swatches showing color, texture, and pattern, and units of work to be used for independent inspection and testing. Mock-ups are special forms of samples, which are too large or otherwise inconvenient for handling in manner specified for transmittal of sample submittals.

(e) Miscellaneous Submittals are work-related submittals that do not fit in the previous categories, such as guarantees, warranties, certifications, experience records, maintenance agreements, Operating and Maintenance Manuals, workmanship bonds, survey data and reports, physical work records, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, and similar information, devices, and materials applicable to the Work.

1.8.6 Scheduling

(a) A preliminary schedule of shop drawings and samples submittals shall be submitted for approval, in duplicate.

(b) Each submittal shall be prepared and transmitted to ENGINEER sufficiently in advance of scheduled performance of related work and other applicable activities.

(c) Within 60 days of the contract award, the Contractor shall submit, for approval, complete manufacturer's product data (for standard products and components) and detailed shop drawings (for fabricated equipment).

Submittals need not include all project equipment and materials in one submittal; however, the submittals for the equipment and materials for each individual pay item shall be complete in every respect. Partial submittals may be returned without review. The Contractor may request, in writing, permission to make a partial submittal; the Engineer will evaluate the circumstances of the request and may accept to review such partial submittal. However, no additional compensation or extension of time will be allowed for extra costs or delays incurred due to partial or late submittals.

1.8.7 Each submittal shall be accompanied by a transmittal containing the following information:

(a) Contractor's Name

(b) Supplier's Name

(c) Manufacturer's Name

(d) Date of submittal and dates of previous submittals containing the same material

(e) Project Route/Name

(f) Section

(g) Submittal and transmittal number

(h) Contract identification

(i) Identification of equipment and material with equipment identification numbers, motor numbers, and Specification section number

(j) Variations from Contract Documents and any limitations which may impact the Work.

(k) Drawing sheet and detail number as appropriate.

Multi-part submittal forms will be provided by the department to the Contractor to facilitate the submittal and review process. The Contractor shall complete all submittal information on the form and shall sign the submittal as indicated

1.8.8 Exceptions, Deviations, and Substitutions

(a) In general, exceptions to and deviations from the requirements of the Contract Documents will not be allowed. It is the CONTRACTOR's responsibility to note any deviations from Contract requirements at the time of submittal and to make any requests for deviations in writing.

In general, substitutions must demonstrate that the proposed substitution is superior to the equipment or material required by the Contract Documents. No exceptions, deviations, or substitutions will be permitted without approval.

(b) Data for items to be submitted for review, as substitution shall be collected into one submittal for each item of material or equipment.

(c) Request shall be submitted with other scheduled submittals for the material or equipment allowing time for ENGINEER to evaluate the additional information required to be submitted. If CONTRACTOR requests to substitute for material or equipment specified but not identified in Specifications as requiring submittals, substitution submittal request shall be included in Submittal schedule and submitted as scheduled.

1.8.9 Shop Drawings

(a) Shop drawing information shall be newly prepared and submitted with graphic information at accurate scale. The name of manufacturer or supplier (firm name) shall be indicated. Dimensions shall be shown and clearly noted which are based on field measurement; materials and products that are included in the Work shall be identified; revision shall be identified. Compliance with standards and notation of coordination requirements with other work shall be indicated. Variations from Contract Documents or previous submittals shall be highlighted, encircled or otherwise indicated.

(b) The following information shall be included on each drawing or page:

1) Submittal date and revision dates.
2) Project name, division number and descriptions.
3) Detailed specifications section number and page number.
4) Identification of equipment, product or material.
5) Name of CONTRACTOR and Subcontractor.
6) Name of Supplier and Manufacturer.
7) Relation to adjacent structure or material.
8) Field dimensions, clearly identified.
9) Standards or Industry Specification references.
10) Identification of deviations from the Contract Documents.
11) CONTRACTOR's stamp, initialed or signed, dated and certifying to review of submittal, certification of field measurements and compliance with Contract.
12) Physical location and location relative to other connected or attached material at which the equipment or materials are to be installed.

(c) A 8-inch by 3-inch blank space shall be provided for CONTRACTOR and ENGINEER stamps.

(d) Three blue line or black line prints or two reverse sepia reproducible and 1 blue or black line print shall be submitted. One reproducible or one print will be returned.

(e) Materials, products or systems shall not be installed until copy of applicable product data showing only approved information is in possession of installer. One set of product data (for each submittal) shall be maintained at Project site. Five additional copies shall be marked with the date of approval and forwarded to the ENGINEER for use in field and for OWNER'S records.

1.8.10 Product Data

(a) Required product data shall be collected into a single submittal for each element of work or system. Where product data has been printed to include information on several similar products, some of which are not required for use on Project or are not included in submittal, copies shall be marked to clearly show such information is not applicable.

(b) Where product data must be specially prepared for required products, materials or systems, because standard printed data are not suitable for use, data shall be submitted as a Shop Drawing and not as product data.

(c) Submittal is for information and record, and to determine that products, materials, and systems comply with Contract Documents. Submittal shall be final when returned by ENGINEER marked "Approved".

(d) Four submittal copies, in addition to the number the Contractor requires returned, including those required for RECORD DRAWINGS, shall be submitted to the Engineer. An additional two submittal copies shall be submitted to the Design Engineer:

IDOT
201 West Center Court
Schaumburg, Illinois 60196-1076
Attn: Mark Jenkins

(e) Materials, products or systems shall not be installed until copy of applicable product data showing only approval information is in possession of installer. One set of product data (for each submittal) shall be maintained at Project site, available for reference by ENGINEER and others.

1.8.11 Samples

(a) Where possible, samples shall be physically identical with proposed materials or products to be incorporated into the Work. Where variations in color, pattern or texture are inherent in material or product represented by sample, multiple units (not less than 3 units) shall be submitted showing approximate limits of variations.

(b) A full set of optional samples shall be provided where ENGINEER's selection required. Samples shall be prepared to match ENGINEER's selection where so indicated.

(c) Each sample shall include generic description, source or product name and manufacturer, limitations, and compliance with standards.

(d) Samples for ENGINEER's visual review and final check of coordination of these characteristics with other related elements of work shall be of general generic kind, color, pattern, and texture.

(e) At CONTRACTOR's option, and depending upon nature of anticipated response from ENGINEER, initial submittal of samples may be either preliminary or final submittal.

A preliminary submittal, consisting of a single set of samples, is required where specifications indicate ENGINEER's selection of color, pattern, texture or similar characteristics from manufacturer's range of standard choices is necessary. Preliminary submittals will be reviewed and returned with ENGINEER's "Action" marking.

Three sets of samples shall be submitted in final submittal, one set will be returned.

(f) The returned final set of samples shall be maintained at Project site, in suitable condition and available for quality control comparisons throughout course of performing work.

Returned samples intended or permitted to be incorporated in the Work are indicated in Specification sections, and shall be in undamaged condition at time of use.

1.8.12 Mock-ups and similar samples specified in Specification sections are recognized as special type of samples. Requirements for sample submittal shall be complied with to greatest extent possible. Transmittal forms shall be processed to provide record of activity.

1.8.13 Miscellaneous Submittals

(a) Inspection and Test Reports

1) Each inspection and test report shall be classified as either "Shop Drawings" or "product data", depending on whether report is specially prepared for Project or standard publication of workmanship control testing at point of production. Inspection and test reports shall be processed accordingly.

(b) Guarantees, Warranties, Maintenance Agreements, and Workmanship Bonds

1) Refer to Specification sections and section Guarantees and Warranties of this Division for specific requirements. Submittal is final when returned by ENGINEER marked "Approved" or "Approved as Noted".

2) In addition to copies desired for CONTRACTOR's use, 2 executed copies shall be furnished. Two additional copies shall be provided where required for maintenance data.

(c) Certifications

1) Refer to Specification sections for specific requirements on submittal of certifications. Seven copies shall be submitted. Certifications are submitted for review of conformance with specified requirements and information. Submittal shall be final when returned by ENGINEER marked "Approved".

2) Where certifications are specified, the information submitted for approval shall incorporate certification information. When a certification can be made prior to manufacture, the certification shall be included with initial submittal information. When certification is possible only after manufacture, the initial submittal information shall include a statement of intent to furnish the certification after equipment approval and manufacture. Certifications involving inspections and/or tests shall be complete with all test data presented in a neat, descriptive format, with all test data, applicable dates, times, and persons responsible.

(d) Tools

1) Spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units shall be submitted.

2) Special tools are considered to be those tools which, because of their limited use, are not normally available but which are necessary for maintenance of particular equipment.

3) For each type of equipment provided under this CONTRACT, a complete set of all special tools shall be furnished including grease guns and other lubricating devices, which may be needed for the adjustment, operation, maintenance, and disassembly of such equipment. Tools shall be of high grade, smooth forged alloy tool steel. Grease guns shall be of the lever type.

4) One or more neat and substantial steel wall cases or cabinets shall be furnished and erected with flat key locks and clips or hooks to hold each special tool in a convenient arrangement.

1.8.14 Operation and Maintenance Manuals

(a) Operation and Maintenance Manuals shall be submitted in accordance with Subsection 1.12, Operation and Maintenance Manuals, in this Section.

1.8.15 Contractor's Stamp

(a) Prior to submittal, the Contractor shall review the submittal material and shall affix his stamp of approval, with comments as applicable, signed by a responsible representative, to each appropriate submittal item. In the case of Subcontractor's submittals, both the Subcontractor and the General Contractor shall review and stamp the submittal. Submittals that are not approved or approved-as-noted by the Contractor shall not be submitted to the Engineer. The Contractor shall not give an approved-as-noted status to submittals having incompleteness or major corrective notations, as this will only delay the ultimate approval process.

(b) The receipt of submittal information from the Contractor will be construed as the Contractor's assurance that he has reviewed the submittal information and attests to the submittal's accuracy and conformance to the requirements of the contract documents. Submitted information shall be complete and in sufficient detail to demonstrate compliance with all requirement of the contract documents, including fitting in the space provided and meeting all salient features of the specifications.

1.8.16 Submittal information must be particularly detailed in every respect. Product data shall present information to demonstrate the complete nature of the product, including dimensions, wiring diagrams, operating information, and the like. Shop drawings shall be extremely detailed and shall include all appropriate dimensions, fabrication details, component bill of material, information relative to mounting, detailed wiring, finish, and the like. Wiring diagrams shall include both schematic and point-to-point representations, complete with references to circuiting as indicated on the Contract Drawings as well as terminal points of component devices.

1.8.17 Unless required elsewhere, submittals shall be distributed to subcontractors, suppliers, governing authorities, and others as necessary for proper performance of work.

1.8.18 Except for submittals for record and similar purposes, where action and return on submittals are required or requested, ENGINEER will review each submittal, mark with appropriate action, and return. Where submittal must be held for coordination, ENGINEER will also advise CONTRACTOR without delay. ENGINEER will stamp each submittal with uniform, self-explanatory action stamp, appropriately marked with submittal action.

1.8.19 Where submittals are marked "Approved", Work covered by submittal may proceed PROVIDED IT COMPLIES WITH CONTRACT DOCUMENTS. Acceptance of Work will depend upon that compliance.

1.8.20 When submittals are marked "Approved as Noted" or "Approved Subject to Corrections Marked", Work covered by submittal may proceed provided it complies with both ENGINEER's notations or corrections on submittal and with Contract Documents. Acceptance of Work will depend on that compliance. Resubmittal is not required.

1.8.21 When submittals are marked "Examined and Returned for Correction or Disapproved", Work covered by submittal shall not proceed. Work covered by submittal shall not be used at Project site or elsewhere where Work is in progress. The submittal shall be revised or a new submittal shall be prepared in accordance with ENGINEER's notations in accordance with Resubmittal Preparation procedures specified in this section. The submittal shall be resubmitted without delay and repeated if necessary to obtain different action marking.

1.8.22 (Deleted)

1.8.23 Any need for more than one resubmission, or any other delay in ENGINEER's review of submittals, will not entitle CONTRACTOR to extension of the Contract Time.

1.8.24 Coordination

(a) Preparation and processing of submittals shall be coordinated with performance of the work, other submittals and related activities such as substitution requests, testing, purchasing, fabrication, delivery, and similar activities that require sequential activity.

(b) Submission of different units of interrelated work shall be coordinated so that one submittal will not be delayed by ENGINEER's need to review a related submittal. ENGINEER may withhold action on any submittal requiring coordination with other submittals until related submittals are forthcoming.

1.8.25 Unless otherwise indicated, guarantees as specified herein shall be included with the submittal information of all applicable equipment and materials. Incompleteness, inaccuracy, or lack of coordination shall be grounds for rejection. The Contractor shall clearly understand no equipment or material shall be installed prior to approval and that any equipment or material installed prior to approval is subject to removal from the right-of-way solely at the Contractor's expense.

1.9. Resubmittal Preparation

1.9.1 Resubmittal Preparation shall comply with the requirements described in subsection 1.8, Submittal, of this section. In addition, it shall be identified on the transmittal form that the submittal is a resubmission.

1.9.2 Any corrections or changes in submittals required by ENGINEER's notations shall be made on returned submittal.

1.9.3 On the transmittal or on a separate page attached to CONTRACTOR's resubmission transmittal, all notations or questions indicated by ENGINEER on ENGINEER's transmittal form shall be answered or acknowledged in writing. Each response shall be identified by question or notation number established by ENGINEER. If CONTRACTOR does not respond to each notation or question, resubmission will be returned without action by ENGINEER until CONTRACTOR provides a written response to all ENGINEER's notations or questions.

1.9.4 Variations or revisions from previously reviewed submittal, other than those called for by ENGINEER, shall be identified on transmittal form. ENGINEER's responsibility for variations or revisions is established in Section 6.25.3 and 6.27 of the General Conditions.

1.10 Record Drawings

1.10.1 One record copy of all Contract Documents, reference documents and all technical documents submitted in good order shall be kept and maintained at the site. On Mylar tracing media, and using drafting symbols and standards consistent with the original documents, Contract Drawings shall be annotated in red to show all changes made during the construction period. Annotated drawings are to be made available to ENGINEER for reference at all times.

1.10.2 At completion of the CONTRACT and before final payment is made, one set of clearly readable, reproducible Contract Drawings reflecting all changes made during construction shall be delivered to the ENGINEER. The drawings shall each be stamped "RECORD DRAWING", and shall be marked with the contractor's stamp, the date, and the signature of the contractor's representative. Refer to individual sections for addition requirements.

1.10.3 The Record Drawings must be submitted and must be acceptable to the Engineer prior to final acceptance.

1.11 Guarantees and Warranties

1.11.1 All equipment shall be furnished complete with the manufacturer's standard trade guarantee or warranty, applicable to the Illinois Department of Transportation, from the date of final acceptance. Such guarantee shall accompany submittal shop drawings and product data.

1.11.2 Prior to final payment, the original and one copy of all bonds, warranties, guarantees and similar documents, including those customarily provided by manufacturers and suppliers which cover a period greater than the one year correction period shall be delivered to the OWNER.

1.12 Operation and Maintenance Manuals

1.12.1 Four copies of an Operation and Maintenance Manual shall be furnished to the ENGINEER for all equipment and associated control systems furnished and installed.

1.12.2 Prior to the Work Reaching 50 Percent Completion, one copy of the manual shall be submitted to the ENGINEER for approval with all specified material. The approval copies shall be submitted with the partial payment request for the specified completion. Within 30 days after the ENGINEER's approval of the submittal, the remaining 3 copies of the manual shall be furnished to the ENGINEER. Space shall be provided in the manual for additional material. Any missing material for the manual shall be submitted prior to requesting certification of substantial completion.

1.12.3 Each copy of the manual shall consist of the following and shall be prepared and arranged as follows:

(a) A section of an equipment data summary (see sample form at end of section) for each item of equipment.

(b) A section of an equipment preventive maintenance data summary (see sample form at end of section) for each item of equipment.

(c) A section of the equipment manufacturer's operating and maintenance instructions. Operating instructions include equipment start-up, normal operation, shutdown, emergency operation and troubleshooting. Maintenance instructions include equipment installation, calibration and adjustment, preventive and repair maintenance, lubrication, troubleshooting, parts list and recommended spare parts.

(d) List of electrical relay settings and control and alarm contact settings.

(e) Electrical interconnection wiring diagram for equipment furnished including all control and lighting systems.

(f) One valve schedule giving valve number, location, fluid, and fluid destination for each valve installed. All valves in the same piping systems shall be grouped together in the schedule. A sample of the valve numbering system shall be obtained from the ENGINEER.

(g) All O&M Manual material shall be on 8-1/2 inch by 11 inch commercially printed or typed forms or an acceptable alternative format.

1.12.4 Each manual shall be organized into sections paralleling the equipment specifications. Each section shall be identified using heavy section dividers with reinforced holes and numbered plastic index tabs. The data shall be compiled in high quality heavyweight, hard cover binders with piano-style metal hinges or in an alternate approved format. Large drawings and other materials that would be opened or removed for reading shall be provided with heavy clear plastic pouches within the binders. The number of binders shall be as required to hold all required material without over-filling. Various sections, as appropriate shall have suitable dividers. All volumes shall be labeled. All loose data shall be punched for binding. Composition and printing shall be arranged so that punching does not obliterate any data. The project title, and manual title, as furnished and approved by the ENGINEER shall be printed on the cover and binding edge of each manual.

1.12.5 All operating and maintenance material that comes bound by the equipment manufacturer shall be left in its original bound state. The appropriate sections of the CONTRACTOR's O&M manual shall be cross-referenced to the manufacturers' bound manuals.

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STORMWATER PUMP STATION NO. 26

Operation and Maintenance Manual

Equipment Data Summary

Equipment Name: Specification Reference:

Manufacturer

Name:

Address:

Telephone:

Number Supplied: Location/Service:

Model No: Serial No:

Type:

Size/Speed/Capacity/Range (as applicable):

Power Requirement (Phase/Volts/Hertz):

Local Representative

Name:

Address:

Telephone:

NOTES:

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

STORMWATER PUMP STATION NO. 26

Operation and Maintenance Manual

Preventive Maintenance Summary

Equipment Name: Location: O&M Manual Reference

Manufacturer:

Address:

Telephone:

Model No: Serial No:

Maintenance Task	Lubricant/Part	D	W	M	Q	SA	A

NOTES:

1.12.6 Binders shall be labeled Volume 1, 2, and so on, where more than one binder is required. The table of contents for the entire set, identified by volume number, shall be included in each binder.

1.13 Storage of Equipment and Materials

1.13.1 All materials and equipment shall be protected from wear and damage both before and after delivery to the job site.

1.13.2 Unless specifically permitted by the Engineer, all equipment such as pumps, fans, electrical apparatus, valve operators, SCADA equipment, and the like shall be stored indoors out of exposure to the weather. Items having electrical parts, such as motors, electronic panels, and the like, shall be kept in heated storage, at a temperature to prohibit the accumulation of condensation on the equipment. Where equipment is provided with integral space/strip heaters, (such as the motor control center), these heaters shall be energized as soon as the equipment is present at the job site and they shall remain energized from temporary circuits until final permanent energization is attained.

1.13.3 Unless otherwise specifically permitted by these specifications or as allowed by the Engineer, all materials for use on the project shall be stored indoors out of exposure to the weather. Such materials would include ductwork, doors and frames, louvers, grating, slate roofing, building hardware, windows and glass block, wire and cable, conduit, and piping. Certain materials such as building steel, exterior hatch covers, fencing, and the like which will be applied exposed to the weather, may be stored outdoors in a safe manner as approved. Note the specified requirements for the storage of building masonry in Section 4A.

1.14 Protection of the Work

1.14.1 All work shall be protected from damage by vandals, the weather, or other sources until final acceptance by the Owner. Such protection shall include temporary fencing or other barriers, if necessary, to restrict access to the work. Open pits, doors, hatches, etc. shall be covered, closed and locked. No additional compensation will be granted and no additional time will be allowed due to delays caused by failure to adequately protect the work from damage. In addition, the Contractor shall make the worksite safe at the end of each work day, leaving no attractive nuisance hazards and no open electrical boxes and the like.

1.14.2 Clean-Up and Public Safety

The work site shall be maintained in a clean condition, free of hazards to the work force and the public, all in conformance with the requirements of Article 107 of the Standard Specifications.

Special care shall be taken to see that electrical systems are not left in an exposed or otherwise hazardous condition. All electrical boxes, cabinets, pole handholes, etc., which contain wiring, either energized or non-energized, shall be closed or have their cover in place and shall be locked when possible, during off-work hours.

1.15 Standards of Workmanship

1.15.1 All work shall be performed to the highest standard of each respective trade. The work shall demonstrate all due care and attention so that all specified requirements are met and that the end product is a first-rate installation.

1.15.2 The Contractor shall comply with the requirements of Sections 105 and 108 of the Standard Specifications, and any Supplements thereto shall, in addition, comply with the requirements for control of work specified herein.

1.16 Quality Control

1.16.1 Submittals:

All submittals, including the following, shall be provided as specified in this Section.

Authoritative evidence in the form of Certificates of Manufacture shall be furnished to the ENGINEER to show that the materials and equipment to be used in the Work have been manufactured and tested in conformity with the Contract Documents. Copies of the results of physical tests that have been made directly on the product or on similar products of the manufacturer shall be included where necessary.

1.16.2 At all times during the progress of the Work and until the date of final completion, afford the OWNER and ENGINEER every reasonable, safe, and proper facility for inspecting the Work at the site. The observation and inspection of any work will not relieve the CONTRACTOR of any obligations to perform proper and satisfactory work as specified. Work rejected due to faulty design, inferior, or defective materials, poor workmanship, improper installation, excessive wear, or nonconformity with the requirements of the Contract Documents, shall be replaced with satisfactory work at no additional cost to the OWNER. Finished or unfinished work found not to be in strict accordance with the Contract shall be replaced as directed even though such work may have been previously approved and payment made therefore.

1.16.3 The OWNER and the OWNER's Authorized Representatives have the right to reject materials and workmanship that are defective or require correction. Rejected work and materials shall be promptly removed from the site.

1.16.4 Failure or neglect on the part of the OWNER or the OWNER's Authorized Representatives to condemn or reject bad or inferior work or materials does not imply an acceptance of such work or materials. Neither is it to be construed as barring the OWNER or the OWNER's Authorized Representatives at any subsequent time from recovering damages or a sum of money needed to build anew all portions of the Work in which inferior work or improper materials were used.

1.16.5 Should it be considered necessary or advisable by the OWNER or the OWNER's Authorized Representatives, at any time before final acceptance of the Work, to make examinations of portions of the Work already completed, by removing or tearing out such portions, all necessary facilities, labor, and material to make such an examination shall be promptly furnished. If such Work is found to be defective in any respect, the CONTRACTOR shall pay for all expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the cost of examination and restoration of the Work will be considered a change in the Work to be paid for in accordance with applicable provisions of the Contract.

1.16.6 Proper operation of equipment during tests and instruction periods shall be the full responsibility of the CONTRACTOR. The CONTRACTOR shall make no claim for damage that may occur to equipment prior to the time when the OWNER accepts the Work.

1.16.7 If at any time prior to the expiration of any applicable warranties or guarantees, equipment is rejected by the OWNER, all sums of money received for the rejected equipment on progress certificates or otherwise on account of the Contract lump sum prices shall be repaid to the OWNER. Upon the receipt of the sum of money, OWNER will execute and deliver a bill of sale of all its rights, title, and interest in and to the rejected equipment. The equipment shall not be removed from the premises of the OWNER until the OWNER obtains, from other sources, equipment to take the place of that rejected. The OWNER hereby agrees to obtain other equipment within a reasonable time and the CONTRACTOR agrees that the OWNER may use the equipment furnished by the CONTRACTOR without rental or other charge until the other new equipment is obtained.

1.16.8 Notice shall be given in writing to the ENGINEER sufficiently in advance of the commencement of manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. When required, notice shall include a request for inspection, the date of commencement, and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, ENGINEER will arrange to have a representative present at such times during the manufacture or testing as may be necessary to inspect the materials, or will notify CONTRACTOR that the inspection will be made at a point other than the point of manufacture or testing, or that the inspection will be waived.

These provisions shall be complied with before shipping any materials. Such inspection will not constitute a release from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

1.16.9 Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or IEEE, except as may otherwise be stated herein.

1.16.10 Personnel shall be provided to assist the ENGINEER in performing the following periodic observation and associated services.

(a) Soils: Observe and test excavations, placement and compaction of soils. Determine suitability of excavated material. Observe subgrade soils and foundations.

(b) Concrete: Observe forms and reinforcement; observe concrete placement; witness air entrainment tests, facilitate concrete cylinder preparation and assist with other tests performed by ENGINEER.

(c) Masonry: Sample and test mortar, bricks, blocks and grout; inspect brick and block samples and sample panels; inspect placement of reinforcement and grouting.

1.16.11 When specified in Divisions 2 through 16 of the Contract Documents, an independent laboratory testing facility shall be provided to perform required testing. The laboratory shall be qualified as having performed previous satisfactory work. Prior to use, such qualifications shall be submitted to the ENGINEER for approval.

1.16.12 Cooperate with the ENGINEER and laboratory testing representatives. At least 24 hours notice shall be given prior to when specified testing is required. Labor and materials, and necessary facilities shall be provided by the CONTRACTOR at the site as required by the ENGINEER and the testing laboratory.

1.16.13 Equipment test procedures shall be coordinated and demonstrated as specified in the Contract Documents or as otherwise required during the formal tests.

1.16.14 Test procedures and requirements for pipelines and other testing shall conform to that specified in the appropriate Specification Sections.

1.16.15 Where transcripts or certified test reports are required by the Contract Documents, the following requirements shall be met:

For all required transcripts, certified test reports, certified copies of the reports of all tests required in referenced specifications or specified in the Contract Documents, submit and obtain approval of the ENGINEER before delivery of materials or equipment.

All testing shall be performed in an approved independent laboratory or the manufacturer's laboratory. Reports of shop equipment tests shall be submitted for approval within thirty days of testing. Transcripts or test reports are to be accompanied by a notarized certificate in the form of a letter from the manufacturer or supplier certifying that tested material or equipment meets the specified requirements and the same type, quality, manufacture and make as specified. The certificate shall be signed by an officer of the manufacturer or the manufacturer's plant manager.

1.16.16 At the option of the ENGINEER, or where not otherwise specified, a notarized Certificate of Compliance shall be submitted for approval. The Certificates may be in the form of a letter stating the following:

(a) Manufacturer has performed all required tests

(b) Materials to be supplied meet all test requirements

(c) Tests were performed not more than one year prior to submittal of the certificate

(d) Materials and equipment subjected to the tests are of the same quality, manufacture and make as those specified

(e) Identification of the materials

1.16.17 Initial inspection and testing of materials furnished under this Contract will be performed by the OWNER or his authorized Representatives or inspection bureaus without cost to the CONTRACTOR, unless otherwise expressly specified. If subsequent testing is necessary due to failure of the initial tests or because of rejection for noncompliance, the OWNER shall be reimbursed by the CONTRACTOR for expenditures incurred in making such tests.

1.16.18 Except as expressly provided elsewhere herein, all the costs of shop and field tests of equipment and other tests specifically called for in the Contract Documents shall be included in the Contract Price.

1.16.19 Materials and equipment submitted by the CONTRACTOR as the equivalent to those specifically named in the Contract may be tested by the OWNER for compliance. The OWNER shall be reimbursed for expenditures incurred in making such tests on materials and equipment that are rejected for noncompliance.

1.16.20 The OWNER shall be reimbursed for the costs of any job site inspection between the hours of 7:00 p.m. and 6:00 a.m. and any work on Saturdays, Sundays or Holidays.

1.16.21 The OWNER shall be reimbursed for all costs associated with Witness Tests that exceed 5 Calendar Days per kind of equipment.

1.16.22 As soon as conditions permit, all labor and materials and services to perform preliminary field tests of all equipment shall be furnished as provided under this Contract. If the preliminary field tests disclose that any equipment furnished and installed under this Contract does not meet the requirements of the Contract Documents, all changes, adjustments and replacements required shall be made prior to the acceptance tests.

1.16.23 Upon completion of the Work and prior to final payment, all equipment, piping and appliances installed under this Contract shall be subjected to specified acceptance tests to demonstrate compliance with the Contract Documents.

1.16.24 All labor, fuel, energy, water and other materials, equipment, instruments and services necessary for all acceptance tests shall be furnished by the CONTRACTOR.

1.16.25 Field tests shall be conducted in the presence of the ENGINEER. The field tests shall demonstrate that under all conditions of operation each equipment item:

(a) Has not been damaged by transportation or installation

(b) Has been properly installed

(c) Has no mechanical defects

(d) Is in proper alignment

(e) Has been properly connected

(f) Is free of overheating of any parts

(g) Is free of all objectionable vibration

(h) Is free of overloading of any parts

(i) Operates as intended

1.16.26 Work or portions of work shall be operated for a minimum of 100 hours or 14 days continuous service, whichever comes first. Test on those systems that require load produced by weather (heating or cooling) exercise shall be conducted only when weather will produce proper load.

1.16.27 If the acceptance tests reveal defects in material or equipment, or if the material or equipment in any way fails to comply with the requirements of the Contract Documents, such deficiencies shall be promptly corrected.

Failure or refusal to correct the deficiencies, or if the improved materials or equipment, when tested again, fail to meet the guarantees or specified requirements, the OWNER, notwithstanding its partial payment for work and materials or equipment, may reject said materials or equipment and may order the CONTRACTOR to remove the defective work from the site at no addition to the Contract Price, and replace it with material or equipment which meets the Contract Documents.

1.16.28 If it is ascertained by testing or inspection that the material or equipment does not comply with the Contract, said material or equipment shall not be delivered, or if delivered it shall be promptly removed from the site or from the Work and replaced with acceptable material without additional cost to the OWNER. All obligations under the terms and conditions of the Contract shall be fulfilled even though the OWNER or the OWNER's Authorized Representatives fail to ascertain noncompliance or notify the CONTRACTOR of noncompliance.

1.17 Cutting and Patching

1.17.1 Cutting of concrete slabs, walls, and members shall be performed without over-cutting at corners or elsewhere. No structural members shall be removed, cut or otherwise modified without approval and any such work shall be done in a manner as directed by the ENGINEER.

1.17.2 Cutting and patching shall be performed in a neat and workmanlike manner, consistent with the best practices of the appropriate trade. All patching shall be done in a manner consistent with the building material being patched.

1.17.3 All cutting, fitting or patching of the Work that may be required to make the several parts thereof join shall be provided in accordance with the Contract Documents. Restoration shall be performed by competent workmen skilled in the trade.

1.17.4 All cutting and patching required to install improperly timed work or to remove samples of installed materials for testing shall be provided.

1.17.5 Except when the cutting or removal of existing construction is specified or indicated, any cutting or demolition which may affect the structural stability of the Work or existing facilities shall not be undertaken without the ENGINEER's concurrence.

1.17.6 Shoring, bracing, supports, and protective devices necessary to safeguard all work during cutting and patching operations shall be provided.

1.17.7 All materials shall be cut and removed to the extent shown or as required to complete the Work. Materials shall be removed in a careful manner with no damage to adjacent facilities. Materials, which are not salvageable from the site, shall be removed.

1.17.8 All work affected by cutting operations shall be restored with new materials or with salvaged materials acceptable to the ENGINEER to obtain a finished installation with the strength, appearance, and functional capacity required. If necessary, entire surfaces shall be patched and refinished.

1.18 Definition of Terms

1.18.1 Abbreviations

Wherever the following abbreviations are used in these Special Provisions or on the Plans, they are to be construed the same as the respective expressions represented:

AASHTO *American Association of State Highways and Transportation Officials*

ANSI *American National Standards Institute*

ASME *American Society of Mechanical Engineers*

ASTM *American Society for Testing and Materials*

AWG *American Wire Gauge*

ICEA *Insulated Power Cable Engineers Association*

IEEE *Institute of Electrical and Electronic Engineers*

IES *Illuminating Engineering Society of North America*

NEC *National Electrical Code*

NEMA *National Electrical Manufacturer's Association*

NESC *National Electrical Safety Code*

UL *Underwriters' Laboratories*

ACI *American Concrete Institute*

FM *Factory Mutual*

SSPC *Steel Structures Painting Council*

1.18.2 Standard Specifications

Where used in these Special Provisions, this term shall mean the "Standard Specifications for Road and Bridge Construction", published by the Illinois Department of Transportation dated January 1, 2007.

1.18.3 Specifications

Where used in these Special Provisions, this term shall mean the complete body of specifications, including the Standard Specifications, these Special Provisions, and referenced specifications and standards. See article 101.43 of the Standard Specifications.

1.18.4 Supplements

Where used in these Special Provisions, this term shall mean the "Supplemental Specifications and Recurring Special Provisions" published by the Illinois Department of Transportation dated January 1, 2007.

1.18.5 Contract Documents

The complete body of agreements, specifications and drawings that define the contract work.

1.18.6 Provide

Where used in these Special Provisions, this term shall mean "furnish and install, complete, including any required connection and testing".

1.18.7 Owner

Where used in these Special Provisions, this term shall mean The State of Illinois.

1.18.8 Engineer

See Article 101.16 of the Standard Specifications.

1.19 Referenced Specifications and Standards

1.19.1 The referenced specifications and standards are incorporated, by reference, in these Special Provisions and shall apply to the work as though fully written herein:

(a) *STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION*, a publication of the Illinois Department of Transportation.

(b) *SUPPLEMENTAL SPECIFICATIONS AND RECURRING SPECIAL PROVISIONS*, a publication of the Illinois Department of Transportation.

(c) NATIONAL ELECTRICAL SAFETY CODE, a publication of American National Standards Institute.

(d) SAFETY CODE, a publication of the Illinois Department of Transportation.

(e) *AMERICAN NATIONAL STANDARD PRACTICE FOR ROADWAY LIGHTING, ANSI/IES RP-8*, published by Illuminating Engineering Society, approved by National Standards Institute.

(f) *ELECTRICAL MAINTENANCE CONTRACT*, State of Illinois. Department of Transportation, Division of Highways, District 1.

1.20 Schedule of Values

1.20.1 A Schedule of Values shall be submitted as payment basis for Pump Station General Work, Pump Station Electrical Work, and Pump Station Mechanical Work.

1.20.2 The Contractor shall submit a Schedule of Values, as specified herein, at least fifteen (15) days prior to submitting the first payment estimate and shall provide information as requested to substantiate the prices included in the Schedule of Values.

1.20.3 The Schedule of Values shall be approved by the Engineer and IDOT's District One, Bureau Electrical Operations, prior to any project payments.

1.20.4 Complete Schedule of Values

(a) The Schedule of Values shall be typewritten on 216 mm x 279 mm (8-1/2 inch by 11 inch) paper in a format approved by the Engineer.

(b) The Schedule of Values shall be used to determine the value of work completed for payment purposes. After review by the Engineer, the Contractor shall revise and resubmit the Schedule of Values as required.

(c) The Schedule of Values shall have each item further itemized by Specification Division as listed in the Specification index.

(d) For the item Pump Station General Work, Pump Station Electrical Work and Pump Station Mechanical Work, each item which has an installed value of over $10,000, a list of the costs for the major products or operations shall be indicated under each item. Round off figures to the nearest ten (10) dollars. The "value" for each item listed shall be the supplied, installed and operational start-up cost incurred to the Contractor for that item (overhead and profit included). No items shall be listed as calendar units (i.e. per month). The sum total of all items in the Schedule shall be equal to the payment item total.

1.21 Start-Up

1.21.1 Item to be checked on start-up include, but not limited to, the following:

(a) Demonstration of back-up float controls

(b) Gas detection calibration kit shall be always stored on site

(c) Demonstration of transfer switch operation and maintenance

(d) Check alarm operation SCADA and Aegis system

1.21.2 The contractor shall be prepared to demonstrate operation and maintenance procedures for all equipment installed.

2. PRODUCTS:

Not Used

3. EXECUTION:

Not Used

END OF THIS SECTION

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1B - MEASUREMENT AND PAYMENT

1. GENERAL:

1.1 Description

1.1.1 The work under this Contract for the rehabilitation of Pump Station No. 26 Building shall include all labor, materials, tools, equipment and incidentals and for performing all work required for the complete rehabilitation for a complete operational facility, as included in all Contract Documents and shall be as measured and paid for as described herein.

1.1.2 TREE REMOVAL (6 TO 15 UNITS DIAMETER) shall be paid for at the contract unit price per unit as specified Section 201 of the Standard Specifications.

1.1.3 EARTH EXCAVATION shall be paid for at the contract unit price per cubic yard as specified Section 202 of the Standard Specifications.

1.1.4 FURNISHED EXCAVATION shall be paid for at the contract unit price per cubic yard as specified Section 204 of the Standard Specifications.

1.1.5 TRENCH BACKFILL shall be paid for at the contract unit price per cubic yard as specified Section 208 of the Standard Specifications.

1.1.6 TOPSOIL FURNISH AND PLACE, 4" shall be paid for at the contract unit price per square yard as specified Section 211 of the Standard Specifications.

1.1.7 SEEDING, CLASS 2A shall be paid for at the contract unit price per acre as specified Section 250 of the Standard Specifications.

1.1.8 NITROGEN FERTILIZER NUTRIENT shall be paid for at the contract unit price per pound as specified Section 250 of the Standard Specifications.

1.1.9 PHOSPHORUS FERTILIZER NUTRIENT shall be paid for at the contract unit price per pound as specified Section 250 of the Standard Specifications.

1.1.10 POTASSIUM FERTILIZER NUTRIENT shall be paid for at the contract unit price per pound as specified Section 250 of the Standard Specifications.

1.1.11 EROSION CONTROL BLANKET shall be paid for at the contract unit price per square yard as specified Section 251 of the Standard Specifications.

1.1.12 TEMPORARY EROSION CONTROL SEEDING shall be paid for at the contract unit price per pound as specified Section 280 of the Standard Specifications.

1.1.13 PERIMETER EROSION BARRIER shall be paid for at the contract unit price per foot as specified Section 280 of the Standard Specifications.

1.1.14 INLET FILTERS shall be paid for at the contract unit price per each as specified Section 280 of the Standard Specifications.

1.1.15 BITUMINOUS MATERIALS (PRIME COAT) shall be paid for at the contract unit price per ton as specified Section 406 of the Standard Specifications.

1.1.16 HOT-MIX ASPHALT REPLACEMENT OVER PATCHES shall be paid for at the contract unit price per ton as specified Section 406 of the Standard Specifications.

1.1.17 PORTLAND CEMENT CONCRETE PAVEMENT 10" (JOINTED) shall be paid for at the contract unit price per square yard as specified in Special Provision PORTLAND CEMENT CONCRETE PAVEMENT 10" (JOINTED).

1.1.18 PAVEMENT FABRIC shall be paid for at the contract unit price per square yard as specified Section 420 of the Standard Specifications.

1.1.19 PROTECTIVE COAT shall be paid for at the contract unit price per square yard as specified Section 420 of the Standard Specifications.

1.1.20 PORTLAND CEMENT CONCRETE DRIVEWAY PAVEMENT, 10 INCH, SPECIAL shall be paid for at the contract unit price per square yard as specified in Special Provision PORTLAND CEMENT CONCRETE DRIVEWAY PAVEMENT, 10 INCH, SPECIAL.

1.1.21 PORTLAND CEMENT CONCRETE SIDEWALK 5 INCH shall be paid for at the contract unit price per square foot as specified Section 424 of the Standard Specifications.

1.1.22 PORTLAND CEMENT CONCRETE SIDEWALK, SPECIAL shall be paid for at the contract unit price per square yard as specified in Special Provision PORTLAND CEMENT CONCRETE SIDEWALK, SPECIAL.

1.1.23 CURB REMOVAL shall be paid for at the contract unit price per foot as specified Section 440 of the Standard Specifications.

1.1.24 COMBINATION CURB AND GUTTER REMOVAL shall be paid for at the contract unit price per foot as specified Section 440 of the Standard Specifications.

1.1.25 SIDEWALK REMOVAL shall be paid for at the contract unit price per square foot as specified Section 440 of the Standard Specifications.

1.1.26 HOT-MIX ASPHALT REMOVAL OVER PATCHES, 4 1/2" shall be paid for at the contract unit price per square yard as specified Section 440 of the Standard Specifications.

1.1.27 PAVED SHOULDER REMOVAL shall be paid for at the contract unit price per square yard as specified Section 440 of the Standard Specifications.

1.1.28 CLASS C PATCHES, TYPE I, 12 INCH shall be paid for at the contract unit price per square yard as specified Section 442 of the Standard Specifications.

1.1.29 CLASS C PATCHES, TYPE II, 12 INCH shall be paid for at the contract unit price per square yard as specified Section 442 of the Standard Specifications.

1.1.30 HOT-MIX ASPHALT SHOULDERS, 10" shall be paid for at the contract unit price per square yard as specified Section 482 of the Standard Specifications.

1.1.31 CONCRETE REMOVAL shall be paid for at the contract unit price per cubic yard as specified Section 501 of the Standard Specifications.

1.1.32 STRUCTURE EXCAVATION shall be paid for at the contract unit price per cubic yard as specified Section 502 of the Standard Specifications.

1.1.33 CLEANING AND PAINTING STEEL RAILING NO. 1 shall be paid for at the contract unit price per lump sum as Specified in Special Provision CLEANING AND PAINTING STEEL RAILING NO. 1.

1.1.34 TEMPORARY SHEET PILING shall be paid for at the contract unit price per square foot as specified in Special Provision TEMPORARY SHEET PILING.

1.1.35 STORM SEWERS, CLASS A, TYPE 1, 30" shall be paid for at the contract unit price per foot as specified Section 550 of the Standard Specifications.

1.1.36 CONCRETE HEADWALL FOR PIPE DRAINS shall be paid for at the contract unit price per each as specified Section 601 of the Standard Specifications.

1.1.37 PIPE UNDERDRAINS 6" (SPECIAL) shall be paid for at the contract unit price per foot as specified in Special Provision PIPE UNDERDRAINS 6" (SPECIAL).

1.1.38 PIPE UNDERDRAINS FOR STRUCTURES 6" shall be paid for at the contract unit price per foot as specified in Special Provision PIPE UNDERDRAINS FOR STRUCTURES 6".

1.1.39 CATCH BASINS, TYPE A, 5'-DIAMETER, TYPE 1 FRAME, OPEN LID shall be paid for at the contract unit price per each as specified Section 602 of the Standard Specifications.

1.1.40 MANHOLES, TYPE A, 5'-DIAMETER, TYPE 1 FRAME, OPEN LID shall be paid for at the contract unit price per each as specified Section 602 of the Standard Specifications.

1.1.41 CONCRETE CURB, TYPE B shall be paid for at the contract unit price per foot as specified Section 606 of the Standard Specifications.

1.1.42 COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.12 shall be paid for at the contract unit price per foot as specified Section 606 of the Standard Specifications.

1.1.43 CHAIN LINK FENCE, 7' (SPECIAL) shall be paid for at the contract unit price per foot as specified in Special Provision CHAIN LINK FENCE AND GATES.

1.1.44 CHAIN LINK FENCE REMOVAL shall be paid for at the contract unit price per foot as specified in Special Provision CHAIN LINK FENCE REMOVAL.

1.1.45 TEMPORARY FENCE shall be paid for at the contract unit price per foot as specified in Special Provision TEMPORARY FENCE.

1.1.46 ENGINEER'S FIELD OFFICE, TYPE A shall be paid for at the contract unit price per calendar month as specified Section 670 of the Standard Specifications.

1.1.47 MOBILIZATION shall be paid for at the contract unit price per lump sum as specified Section 671 of the Standard Specifications.

1.1.48 TRAFFIC CONTROL AND PROTECTION, (SPECIAL) shall be paid for at the contract unit price of lump sum as specified in Special Provisions WORK ZONE TRAFFIC CONTROL and TRAFFIC CONTROL PLAN.

1.1.49 CHANGEABLE MESSAGE SIGN shall be paid for at the contract unit price calendar months sum as specified Section 701 of the Standard Specifications.

1.1.50 TRENCH AND BACKFILL FOR ELECTRICAL WORK shall be paid for at the contract unit price per foot as specified in Special Provision TRENCH AND BACKFILL FOR ELECTRICAL WORK.

1.1.51 PUMPING STATION SCADA EQUIPMENT shall consist of charges by the SCADA equipment suppliers for providing equipment and services to be paid to the suppliers by the Contractor as specified under the applicable requirements of Division 1, General Requirements, and Division 16, Electrical. For bidding purposes, this item shall be estimated at $70,000.00. The Contractor will be reimbursed the exact amount of the charges by the suppliers.

1.1.52 TEMPORARY INFORMATION SIGNING shall be paid for at the contract unit price per square foot as specified in Special Provision TEMPORARY INFORMATION SIGNING.

1.1.53 SEDIMENT CONTROL, DRAINAGE STRUCTURE INLET FILTER CLEANING shall be paid for at the contract unit price per each as specified in Special Provision SEDIMENT CONTROL, DRAINAGE STRUCTURE INLET FILTER CLEANING.

1.1.54 DRAINAGE RESTRICTOR shall be paid for at the contract unit price per each as specified in Special Provision DRAINAGE RESTRICTOR.

1.1.55 COMPLETE SPARE MAIN PUMP ASSEMBLY shall be paid for at the Contract lump sum as specified in the applicable requirements of the Special Provisions and Division 1, General Requirements and all requirements under Division 15, Mechanical.

1.1.56 STRUCTURAL REPAIR OF CONCRETE (DEPTH GREATER THAN 5 INCHES) shall be paid for at the contract unit price per square foot as specified in Special Provision STRUCTURAL REPAIR OF CONCRETE.

1.1.57 STRUCTURAL REPAIR OF CONCRETE (DEPTH EQUAL TO OR LESS THAN 5 INCHES) shall be paid for at the contract unit price per square foot as specified in Special Provision STRUCTURAL REPAIR OF CONCRETE.

1.1.58 PUMP STATION, GENERAL WORK shall include all work which is not listed as a specific pay item but which is required for compliance with the specifications and for a complete operational facility and shall be paid for at the Contract lump sum price as specified in the Special Provisions; Division 1, General Requirements; and the applicable requirements under the following: Division 2, Demolition; Section 3A, Cast-in- Place Concrete; Section 3B, Grout; Division 4, Masonry; Division 5, Metals, Division 6, Carpentry, Division 7, Thermal and Moisture Protection; Division 8, Doors and Windows; Division 9, Painting; Section 9A, Painting; Section 9B, Removal and Disposal of Lead Based Paint and Section 10A, Specialties (Miscellaneous General Work).

1.1.59 BOLLARDS shall be paid for at the contract unit price per each as specified in Special Provision BOLLARDS.

1.1.60 STORM SEWERS, DUCTILE IRON PIPE, 8" shall be paid for at the contract unit price per foot as specified in Special Provision STORM SEWERS, DUCTILE IRON PIPE, 8".

1.1.61 PUMP STATION ELECTRICAL WORK shall be paid for at the Contract lump sum as specified in the applicable requirements of the Special Provisions and Division 1, General Requirements and all requirements under Division 16, Electrical.

1.1.62 PUMP STATION MECHANICAL WORK shall be paid for at the Contract lump sum as specified in the applicable requirements of the Special Provisions and Division 1, General Requirements and all requirements under Division 10, Specialties, Division 14, Conveying Systems and Division 15, Mechanical, with the exception of spare pumps, covered in Paragraph 1.1.20 and 1.1.21, below.

1.1.63 TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS) shall be paid for at the contract unit price of lump sum as specified in Special Provisions TRAFFIC CONTROL PLAN and TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS).

1.1.64 TRAFFIC CONTROL SURVEILLANCE (EXPRESSWAYS) shall be paid for at the contract unit price of lump sum as specified in Special Provision TRAFFIC CONTROL SURVEILLANCE (EXPRESSWAYS).

1.1.65 ELECTRIC SERVICE CONNECTION shall consist of charges by the electric utility for both the temporary and permanent electrical service, if any, to be paid to the utility by the Contractor. For bidding purposes, this item shall be estimated at $15,000.00. The Contractor will be reimbursed the exact amount of the charges by the utility.

1.1.66 AGGREGATE SUBGRADE 12" shall be paid for at the contract unit price per square yard as specified in Special Provision AGGREGATE SUBGRADE 12".

1.1.67 DRAINAGE STRUCTURES TO BE CLEANED shall be paid for at the contract unit price per each as specified in Special Provision CLEANING EXISTING DRAINAGE STRUCTURES.

1.1.68 MECHANICALLY STABILIZED EARTH RETAINING WALL shall be paid for at the contract unit price per square foot as specified in Special Provision MECHANICALLY STABILIZED EARTH RETAINING WALLS.

1.1.69 COMPLETE SPARE LOW FLOW PUMP ASSEMBLY shall be paid for at the Contract lump sum as specified in the applicable requirements of the Special Provisions and Division 1, General Requirements and all requirements under Division 15, Mechanical

1.1.70 STEEL RAILING REMOVAL shall be paid for at the contract unit price per foot as specified in Special Provision STEEL RAILING REMOVAL.

1.1.71 FURNISHING AND ERECTING STEEL RAILING shall be paid for at the contract unit price per foot as specified in Special Provision FURNISHING AND ERECTING STEEL RAILING.

1.1.72 CHAIN LINK FENCE WITH BARBED WIRE, POSTS ATTACHED TO STRUCTURE shall be paid for at the contract unit price per foot as specified in Special Provision CHAIN LINK FENCE AND GATES.

1.1.73 CHAIN LINK GATES, 7'X4' SINGLE WITH BARBED WIRE shall be paid for at the contract unit price per each as specified in Special Provision CHAIN LINK FENCE AND GATES.

1.1.74 CHAIN LINK GATES, 7'X12' SINGLE WITH BARBED WIRE shall be paid for at the contract unit price per each as specified in Special Provision CHAIN LINK FENCE AND GATES.

1.1.75 CHAIN LINK GATES, 7'X10' DOUBLE WITH BARBED WIRE shall be paid for at the contract unit price per each as specified in Special Provision CHAIN LINK FENCE AND GATES.

1.1.76 CHAIN LINK GATES, 7'X12' DOUBLE WITH BARBED WIRE shall be paid for at the contract unit price per each as specified in Special Provision CHAIN LINK FENCE AND GATES.

1.1.77 CONDUIT ENCASED, REINFORCED CONCRETE, 1 - 5" DIA & 6 - 4" DIA, PVC shall be paid for at the contract unit price per foot as specified in Special Provision CONDUIT ENCASED, REINFORCED CONCRETE.

1.1.78 CONDUIT ENCASED, REINFORCED CONCRETE, 1 - 5" DIA & 6 - 4" DIA, RGC shall be paid for at the contract unit price per foot as specified in Special Provision CONDUIT ENCASED, REINFORCED CONCRETE.

1.1.79 RELOCATE EXISTING HAR ANTENNA AND FOUNDATION shall be paid for at the contract unit price per each as specified in Special Provision RELOCATE EXISTING HAR ANTENNA AND FOUNDATION.

1.1.80 REMOVAL AND DISPOSAL OF LEAD BASED PAINT shall be paid for at the contract unit price of lump sum as specified in Special Provision LEAD BASED PAINT ABATEMENT.

1.1.81 TRANSFORMER PLATFORM shall be paid for at the contract unit price per square yard as specified in Special Provision TRANSFORMER PLATFORM.

2. PRODUCTS:

Not Used

3. EXECUTION:

Not Used

END OF THIS SECTION

DIVISION 2 - DEMOLITION

SECTION 2A – DEMOLITION FOR REHABILITATION OF BUILDING

1. GENERAL:

1.1 Description

1.1.1 This section covers Demolition work within the Pump Station Building. The extent and location of the Demolition work shall be as indicated on the Drawings and as specified herein. The work includes the requirements for the removal, wholly or in part, and satisfactory disposal of all materials except materials approved by the Engineer may be reused in the work.

1.1.2 The Demolition work is included in the Drawings for guidance only to indicate typical general construction features of the various types of construction and shall not be constructed as definitive or adequate to supplement the actual on-site inspection by the Contractor.

1.2 Job Conditions

1.2.1 The Contractor represents that it has visited the site to become familiar with the quantity and character of all materials to be demolished. The Contractor agrees that the premises were made available prior to deadline for submission of Bids for whatever inspection and tests the Contractor deemed appropriate.

The Contractor assumes full responsibility for the proper disposal of all demolition materials.

1.3 Related Sections

1.3.1 Section 3A - Cast-In-Place Concrete

1.3.2 Section 5A - Structural Steel

1.4 Submittal

1.4.1 Submit under provisions of Section 1A.

1.4.2 Shop drawings: Indicate demolition and removal sequence and location of salvageable items.

1.5 Basis of Payment

1.5.1 Measurement

(a) The demolition work for concrete removal shall not be measured for payment.

(b) The demolition work for general work, structural steel work, mechanical work and electrical work shall not be measured for payment.

1.5.2 Payment

(a) The work specified under this Section and as required for the removal of concrete shall be included in the contract lump sum price for the Item, PUMP STATION GENERAL WORK.

(b) The work specified under this Section and as required for the removal of structural steel shall be included in the contract lump sum price for the Item, PUMP STATION GENERAL WORK.

(c) The work specified under this Section and as required for all general demolition work shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

(d) The work specified under this section and as required for all mechanical demolition work shall be included in the contract lump sum for the Item, PUMP STATION MECHANICAL WORK.

(e) The work specified under this Section and as required for all electrical demolition work shall be included in the Contract lump sum for the Item, PUMP STATION ELECTRICAL WORK.

2. PRODUCTS:

2.1 Materials, General

Products that are required to accomplish, or to be incorporated into, the work of this section shall be as selected by the Contractor, subject to the approval of the Engineer.

2.1.1 Salvage Items

(a) The existing glazed brick shall be salvaged for use in patching of masonry as specified under Division 4, Masonry.

(b) Refer to Division 15, Mechanical, and Division 16, Electrical, for information on the salvage of items under those respective Divisions.

3. EXECUTION:

3.1 Demolition

3.1.1 Demolition work to be included under the Item, PUMP STATION, GENERAL WORK shall include the removal and disposal of designated materials in areas as indicated on the Drawings and shall include, but not be limited to, the following:

(a) Metal windows complete with glass

(b) Doors and frames

(c) Masonry at existing exterior walls and at new door openings

(d) Metal fascia and coping

(e) Miscellaneous metals and structural steel

3.1.2 CONCRETE REMOVAL work to be included under the Item, PUMP STATION, GENERAL WORK shall be in accordance with the applicable requirements of Section 501 of the Standard Specifications and as specified herein.

(a) Concrete areas to be removed shall be saw cut to the full depth of the area at the perimeter, unless otherwise indicated on the Drawings.

(b) Concrete removal shall include reinforcing steel and other materials encountered.

(c) All materials removed under the Article shall become the property of the Contractor and shall be disposed of in a lawful manner.

(d) Clean all concrete from reinforcing steel that is to remain and protect same from damage.

3.1.3 All demolition work to be included under the Item PUMP STATION, MECHANICAL WORK shall be as indicated on the Drawings and as specified under Division 15, Mechanical.

3.1.4 All demolition work to be included under the Item PUMP STATION, ELECTRICAL WORK shall be as indicated on the Drawings and as specified under Division 16, Electrical.

3.1.5 The contractor shall maintain the operations of the Pump Station as specified under Division 1, General Requirements, during all demolition operations. All demolition shall be subject to approval of the Engineer.

3.1.6 The Contractor shall protect adjacent materials, equipment, areas and related construction during all demolition operations from all dirt, dust, debris or damage of any kind.

3.1.7 The demolition operations shall be coordinated with the Contractor's proposed sequence of construction and maintenance of pumping of storm water at the Pump Station.

3.1.8 At the completion of construction, all surfaces, including interior and exterior concrete and masonry shall be cleaned of all dirt, dust, graffiti and other marks. Surfaces designated to be painted shall be as specified under Section 9A, Finishes.

3.1.9 Adjacent materials designated to remain that are damaged by the Contractor due to his operations shall be replaced at no additional cost to the State.

(a) Special operations necessary for the removal of an existing structure or obstruction shall be subject to the approval of the State.

(b) The Contractor shall provide adequate temporary support for all structures to remain that are normally supported by structures to be demolished.

3.2 Disposal

3.2.1 General: All materials, except those indicated to be salvaged upon their demolition, shall become the property of the Contractor and shall be removed and promptly disposed of in a lawful manner away from the site.

3.2.2 Cleanup: After removal of designated areas of structure, clean and grade the area. There shall be no debris, rubble, or litter left at the site from any of the demolition operations and the site shall be clean.

END OF THIS SECTION

DIVISION 3 - CONCRETE

SECTION 3A - CAST-IN-PLACE CONCRETE

1. GENERAL:

1.1 Description:

1.1.1 The work shall include requirements for all Cast-In-Place Concrete, as shown and specified herein. The work shall also include requirements for Concrete Formwork for structural concrete, Concrete Reinforcement and Concrete Accessories.

1.1.2 Unless otherwise indicated, concrete material and work shall be in conformance with the requirements of the Standard Specifications for Road and Bridge Construction, adopted January 1, 2007, a publication of the Illinois Department of Transportation. Refer to Division 1 for additional requirements.

1.2 Submittals

1.2.1 Submit under provisions of Section 1A and Standard Specifications.

1.3 Quality Assurance

1.3.1 Under provisions of Standard Specifications.

1.4 Basis of Payment

1.4.1 Measurement

(a) The work specified for concrete shall be measured as specified in Article 503.21 of the Standard Specifications.

1.4.2 Payment

(a) The work specified under this Section shall be paid for at the contract unit price per cubic yard for CLASS SI CONCRETE, which price shall be considered as payment in full for this Item.

2. PRODUCTS:

2.1 Concrete Formwork

2.1.1 Forms shall be of wood or metal, as required, and supplied in sufficient quantities so that work can be properly accomplished.

2.1.2 Forms shall be constructed to slopes, lines and dimensions shown, plumb, straight and sufficiently tight to prevent leakage and so braced that no distortion or settling can take place during or after placing of concrete.

2.1.3 Forms shall conform to the requirements of Section 503 "Concrete Structures" of the Standard Specifications.

2.1.4 Metal Deck Form Used for Filling Rectangular Slab Openings with Concrete

(a) Metal deck form used for filling rectangular slab openings with concrete shall be composite floor deck type manufactured from steel conforming to ASTM A1008/A1008M or ASTM A653 with a minimum yield point (F_y) of 227 MPa (33 ksi).

(b) The depth and gage of floor deck shall be selected to limit the fiber stress to not more than 0.6 F_y (but not to exceed 248 MPa (36 ksi) under the construction loadings recommended by Steel Deck Institute (SDI). Deflection caused by the dead load of wet concrete and deck shall not exceed L/180 for any span or 3/4). Live load capacities shall be calculated in accordance with the SDI Composite Deck Design Handbook. The type and gage of the metal floor deck shall be selected to carry, by acting compositely with the concrete, a superimposed live load of 14.4 MPa (300 psf) without exceeding a deflection of 1/360 of the span. Deck shall be galvanized in conformance to the requirements of ASTM A653 coating class G60 or G90 or Federal Specification QQ-S-775e, class d or class e.

2.2 Concrete Reinforcing

2.2.1 General

(a) All steel reinforcement bars shall be plain deformed bars unless epoxy coated is noted on Drawings.

(b) All steel reinforcement bars, including epoxy coated bars, shall be deformed bars conforming to the requirements of AASHTO M-31M (M-31), M-42M (M-42) or M-53M (M-53) Grade 400 MPa (60 ksi), and the applicable portions of the Standard Specifications. Epoxy coated bars shall conform to the requirement of AASHTO M284. Submit one sample of 12 inch long steel reinforcement bars and one sample each reinforcement accessories. Materials shall meet the requirements of Section 508 and Section 1006 of the Standard Specifications.

(c) Reinforcing bars shown to be welded on Drawings shall be Designation ASTM A706, Grade 60.

(d) Welded wire fabric shall conform to the requirements of AASHTO M55.

(e) Minimum clearances for reinforcement bars shall be as shown on the Plans. Where clearances are not shown on the Plans, the minimum clearances shall be as specified in ACI-318-02 (Building Code Requirements for Reinforced Concrete).

2.3 Cast-In-Place Concrete

2.3.1 General

(a) Unless otherwise indicated, all regular concrete shall be Class SI with 14 days Compressive Strength of 24,129 KPa Section 1020 of the Standard Specifications.

Fly ash shall be stored at the concrete mixing plant separately from the cement. Fly ash and cement shall not be intermixed prior to being added to the concrete mix.

(b) Unless otherwise indicated, all cement shall be Portland Cement type I or II.

(c) The coarse aggregate gradations for all regular concrete (Class SI) shall be CA7 or CA 11.

(d) Concrete Proportions: Concrete proportions shall be selected to provide the required strength and durability and to provide workability and consistency so that the concrete can be worked into forms and around reinforcement without segregation or excessive bleeding.

Establish concrete proportions including the water-cementitious material ratio on the basis of field experience or trial mixtures with the materials to be used in accordance with Section 5.3 of ACI 318.

(e) The concrete mix design slumps shall be within the following limits:

Concrete Placement	(Class SI)
Normal	2 in. to 4 in.
Pumped	4 in. to 6 in.

3. EXECUTION:

3.1 Form

3.1.1 Form Installation

(a) Form surfaces shall be smooth and free from any imperfections that would cause objectionable roughness on the finished surface of the concrete.

(b) All forms for concrete shall be tied with rods or patented ties where the concrete is to be exposed. Ties within the forms shall be constructed so as to permit their removal in accordance with the requirements of Section 503.06 of the Standard Specifications. Ties which are left in place within water containing structures shall be provided with swaged washers or other suitable devices to prevent seepage or moisture along the ties. Use lugs, cones, washers or other devices which do not leave holes or depressions greater than 7/8-inch in diameter.

(c) All necessary inserts in formwork such as rods, bolts, anchorages, fillets, and other devices shall be installed as required.

(d) Forms shall not be treated with material that will adhere to or discolor the concrete.

(e) All sheeting, bracing and timbering shall be placed entirely outside of the neat lines of the structure, except that flanges or projections of steel shapes may extend into the concrete a distance not exceeding 2 inches. All sheeting shall be closely fitted to the excavation and no timber shall be left within the finished lines of the structure. The bracing shall be so arranged that no stress will be placed on any part of the sub-structure concrete until the concrete has developed sufficient strength to support safely the load thereon.

(f) For all exposed concrete edges a 3/4” chamfer strip shall be provided.

3.1.2 Form Removal

(a) Forms shall be removed in such manner and at such a time as to insure the complete safety of the structure. In no case shall the supporting forms or shoring be removed until the members have acquired sufficient strength to support safely their weight and load thereon. The results of suitable control tests shall be used as evidence that the concrete has attained the required strength.

(b) Removal of forms shall conform to Section 503.06 of the Standard Specifications.

3.2 Concrete Reinforcing

3.2.1 Reinforcing Installation

(a) Placing and fastening of reinforcement shall be as per Article 508 of Standard Specifications.

(b) The Contractor shall furnish to the Engineer complete bar bending details, bar lists, weights and detail drawings for the fabricating and placing of all reinforcement to be furnished under this contract. Such lists and drawings shall be prepared in accordance with the methods and standards of "Manual of Standard Practice for Detailing Reinforced Concrete Structures", issued by the American Concrete Institute (ACI 315, SP66), except as otherwise shown on the plans or ordered by the Engineer.

(c) Bar bending details, bar lists, weights and detail drawings furnished by the Contractor will be examined by the Engineer and it shall be understood by the Contractor that a responsible amount of time will be necessary for their examination before they can be approved or returned for correction. No reinforcement shall be fabricated until the bar bending details and detail drawings have been approved by the Engineer. The Contractor shall furnish to the Engineer, without extra charge therefore, copies of the approved bar bending details, bar lists and detail drawings in such number as the Engineer may require.

(d) Mechanical connections, where shown, shall be provided to develop at least 125 percent of the Specified Yield Strength of the bar in tension.

3.3 Cast-In-Place Concrete

3.3.1 Placing Concrete

(a) Concrete placement and consolidation shall comply with provisions of Section 503 of the Standard Specifications.

(b) Once concreting is started it shall be carried on as a continuous operation until the placing of the section between construction joints is completed. Sections containing "cold joints" will not be accepted and shall be removed and replaced at the Contractor's expense.

(c) Concreting in freezing weather shall comply with the provisions of Section 1020 of the Standard Specifications.

(d) Old concrete surfaces that will be in contact with the new concrete shall be coated with an epoxy bonding agent, Sika Chemical Co. Sikadur 32, Hi-Mod, or approved equal. Application shall be in strict conformity with the manufacturer's recommendations, with particular attention given to temperature requirements. This work will not be paid for separately, but shall be incidental to the contract unit price for Class SI Concrete, and no additional compensation will be allowed.

(e) All interior surfaces that will be exposed to view after completion of the work shall be given a normal finish in accordance with Section 503.16(a) of the Standard Specifications.

(f) All top slab surfaces exposed to the weather shall be finished to a true and even surface with floats and trowels. The final troweling shall be done with a steel trowel, leaving a smooth even surface. After the water sheen has disappeared, the surface shall be given a final finish by brushing with a whitewash brush. The brush shall be drawn across the slab with adjacent strokes slightly overlapping, producing a uniform, slightly roughened surface with parallel brush marks. All edges shall be rounded with an edging tool. .

(g) All concrete shall be cured for a minimum of 7 days in accordance with Section 1020.13, "Curing and Protection" of the Standard Specifications.

END OF THIS SECTION

DIVISION 3 - CONCRETE

SECTION 3B - GROUT

1. GENERAL:

1.1 Section Includes

1.1.1 Grout for equipment bases.

1.1.2 Grout for handrails and railings

1.1.3 Grout for pipe and conduit penetrations.

1.1.4 Grout for anchor bolts.

1.1.5 Grout for slide gate frame.

1.2 Related Sections

1.2.1 Section 3A - Cast-In-Place Concrete.

1.2.2 Section 4A - Unit Masonry System.

1.2.3 Section 5A - Structural Steel.

1.2.4 Section 5C - Handrails and Railings.

1.2.5 Section 5D - Grating and Floor Plates.

1.2.6 Section 14A - Monorail System, Hoist, and Trolley.

1.3 References

1.3.1 ASTM C109 - Compressive Strength of Hydraulic Cement Mortars (using 2" Cube Specimens).

1.3.2 ASTM C144 - Aggregate for Masonry Mortar.

1.3.3 ASTM C150 - Portland Cement.

1.3.4 ASTM C191 - Time of Setting of Hydraulic Cement by Vicat Needle.

1.3.5 ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.

1.3.6 ASTM C476 - Standard Specification for Grout for Masonry

1.3.7 ASTM C1019 - Standard Test Method for Sampling and Testing Grout

1.3.8 CRD-C-621 - Specification for Non-Shrink Grout.

1.4 Submittals

1.4.1 Reports: Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476 and test and evaluation reports to ASTM C1019.

1.4.2 Submit manufacturer's installation instructions under provisions of Division 1.

1.5 Tests

1.5.1 Testing of grout will be performed under provisions of Division 1.

1.6 Delivery, Storage and Handling

1.6.1 Grout materials from manufacturers shall be delivered in unopened containers.

1.6.2 Maintain packaged materials clean, dry and protected against dampness, freezing and foreign matter.

1.7 Environmental Requirements

1.7.1 Maintain materials and surrounding air temperatures to a minimum of 50^{o}F prior to, during and 48 hours after completion of the Work.

1.7.2 If manufacturer's requirements are more stringent, such requirements shall govern.

1.8 Basis of Payment

1.8.1 The work shall be paid as part of the Contract lump sum price for PUMP STATION GENERAL WORK which shall be payment in full for the work described herein.

2. PRODUCTS:

2.1 Materials

2.1.1 Each required material shall have one manufacturer throughout the use of that material on the Work.

2.2 Manufacturers - Non-Shrink, Non-Metallic, 100% Solid, High Strength Epoxy Grout

2.2.1 Sikadur 42, Grout-Pak by Sika Chemical Company.

2.2.2 Five Star Fluid Epoxy Grout by U.S. Grout Corporation.

2.2.3 Substitutions: Under provisions of Division 1.

2.3 Materials- Non-Shrink, Non-Metallic, Cementitious Grout

2.3.1 Pre-mixed, non-staining, cementitious grout requiring only the addition of water at the job site; conforming to the following:

(a) Non-shrink: No shrinkage (0.0%) and a maximum of 0.2% expansion in the hardened state when tested in accordance with CRD-C-621.

(b) Compressive Strength: A minimum 28-day compressive strength of 48.26 MPa (7,000 psi) when tested in accordance with ASTM C109.

(c) Setting Time: A minimum initial set time of 60 minutes when tested in accordance with ASTM C191.

(d) Composition: Shall not contain metallic, particles, chlorides or expansive cement.

2.4 Manufacturers - Non-Shrink, Non-Metallic, Cementitious Grout

2.4.1 Sika Grout 212 by Sika Chemical Company.

2.4.2 Masterflow 928 by Master Builders Company.

2.4.3 Sealtight 588 grout by W. R. Meadows, Inc.

2.4.4 Substitutions: Under provisions of Division 1.

2.5 Materials - Cement-Sand Grout

2.5.1 Use 1 part cement to 3 parts sand. Keep the water cement ratio below 0.45 and achieve a minimum 28-day compressive strength of 27,500 kPa (4,000 psi).

2.5.2 Cement: ASTM C150, Type 2.

2.5.3 Sand: ASTM C33.

2.5.4 Water: Clean, fresh, potable water free from injurious amounts of vegetable matter and mineral salts.

3. EXECUTION:

3.1 Inspection

3.1.1 Examine conditions under which grout is to be installed and notify Engineer in writing of unsatisfactory conditions or deficiencies that have been corrected.

3.2 Installation

3.2.1 Place grout as shown and in accordance with manufacturer's instructions. If manufacturer's instructions conflict with the Specifications, do not proceed until Engineer provides clarification.

3.2.2 Drypacking for vertical grouting behind vertical base plates.

3.2.3 Manufacturers of proprietary products shall make available upon 72 hours' notification the services of a qualified, full-time employee to aid in assuring proper use of the product under job conditions.

3.2.4 Placing grout shall conform to temperature and weather limitations in Section 3A.

3.2.5 Equipment Bases

(a) After shimming equipment to proper grade, securely tighten anchor bolts. Properly form around the base plates allowing sufficient room around the edges for placing the grout. Adequate depth between the bottom of the base plate and the top of concrete base must be provided to assure that the void is completely filled with the non-metallic cementitious grout.

(b) Non-shrink, non-metallic epoxy grout may be used with Engineer's specific review.

3.3 Schedule

3.3.1 Non-Shrink, Non-Metallic Cementitious Grout: anchor bolts, equipment bases, pipe supports, pipe and conduit penetration, slide gate frame, pipe thrust support structures.

3.3.2 Cement-Sand Grout: Pipe and conduit penetrations for non-water containing structure, masonry Work and repair of exposed concrete.

END OF THIS SECTION

DIVISION 4 - MASONRY SYSTEM

SECTION 4A - UNIT MASONRY

1. GENERAL:

1.1 Description

1.1.1 The scope of work under this Division shall include the furnishing and installing of all masonry units, grout and mortar, reinforcing steel, wall ties, flashing, and appurtenant work required to complete the masonry walls and partitions as shown on the Drawings and as specified herein. Refer to Division 1 for additional requirements.

1.1.2 The Contractor shall be responsible for ascertaining the extent of work by other trades which require coordination with this work and shall be responsible for the coordination thereof.

1.1.3 This work shall include the setting and incorporating into the masonry of all bolts, anchors, inserts, nailers, metal attachments, etc. as indicated on the Drawings, as specified herein, as furnished by others, and as located by others.

1.1.4 This work shall include the building in of all door and window frames, vents, louvers, conduits, pipes, etc. as shown on the Drawings and as furnished by and set by others.

1.2 Related Sections

1.2.1 Section 3A - Cast-In-Place Concrete

1.2.2 Section 5A - Structural Steel

1.3. Reference Standards

1.3.1 This work is subject to the requirements of the applicable portions of the following standards:

(a) "Building Code Requirements for Concrete Masonry Structures ACI-530-02/ASCE 5-02"; American Concrete Institute.

(b) "Specifications for Masonry Structures (ACI-530.1-02/ASCE 6-02).

(c) "Building Cost Requirements for Masonry (ANSI A41.1)"; American National Standards Institute.

(d) "Uniform Building Code", International Conference of Building Officials.

(e) ASTM C476: Grout for Masonry.

1.4 Submittals

1.4.1 Samples of glazed brick shall be submitted for color selection. As a minimum, samples shall include 5 bricks. Each sample shall be a plaque or strapped.

1.4.2 Material Submittals shall include manufacturer's certification of compliance for the type and grade of masonry units supplied.

1.5 Delivery and Storage

1.5.1 Deliver cements and lime to the site in unopened containers. Use one manufacturer's product for each type of material throughout the work. Do not use material that has, in the opinion of the Engineer, become unstable for good construction.

1.5.2 Store cementitious materials off the ground and completely cover with a windsafe waterproof covering.

1.5.3 Take special precautions during transit and storage of masonry units to protect them from staining or discoloration from any cause whatsoever and replace permanently discolored units, whether set in place or not. Stains which cannot be removed with clean water and fiber brushes shall be considered defects and pieces so stained shall not be used.

1.5.4 Stack masonry units on platforms and cover, or store in other approved manner that will protect them from contact with soil and from weather exposure.

1.6 Field Measurements

1.6.1 Verify that field measurements are as indicated on the Drawings.

1.7 Basis of Payment

1.7.1 The work shall be paid as part of the Contract lump sum price for PUMP STATION GENERAL WORK
which shall be payment in full for the work described herein.

2. PRODUCTS:

2.1 Concrete Block

2.1.1 Concrete block shall be hollow load bearing units and shall conform to ASTM C 90, Type 1, moisture controlled, normal weight and Section 1042 of the Standard Specifications. Provide units with a compressive strength of 20.68 MPa (3,000 pounds per square inch) over their net area.

Nominal modular size: 8 inch x 8 inch x 16 inch

Provide special units for 90 degree corners and lintels.

2.2 Glazed Brick

2.2.1 Ceramic glazed fire clay units conforming to ASTM C-1405, Grade S, Type 1 and 2, class exterior. Size and color shall match existing.

2.3 Mortar

2.3.1 Mortar shall be Type S and shall conform to ASTM C 270. The mortar shall have proportions of 1 part portland cement, 1/2 part hydrated lime and 4 parts sand by volume. A measuring box shall be used to attain the specified mix. Sand shall be measured in a loose, damp condition.

2.3.2 Mortar shall be freshly prepared and uniformly mixed and shall be of spreadable, workable consistency.

2.3.3 The mortar shall be retempered with water as required to maintain high plasticity. Retempering on mortar boards shall be done only by adding water within a basin formed with the mortar and the mortar worked into the water. Any mortar which has stiffened or which is unused after one and one-half hours from the initial mixing shall not be used.

2.3.4 The mortar ingredients shall be mixed in a batch mixer for not less than three minutes.

2.3.5 The use of fire clay, rock dust, dirt and other deleterious materials is prohibited.

2.4 Grout

2.4.1 Grout shall conform to ASTM C 476 and shall have a minimum strength of 20.68 MPa (3,000 psi) at 28 days.

2.4.2 Grout shall have proportions of 1 part portland cement 0.10 parts hydrated lime and 3 parts sand by volume.

2.5 Cement

Cement shall be Type 1 portland cement conforming to ASTM C 150. Plastic cement shall not be used.

2.6 Lime

Hydrated lime shall conform to ASTM C 207.

2.7 Aggregates

2.7.1 All aggregate for mortar and grout shall be sharp, clean, and well graded and free of injurious amounts of dust, lumps, shale, alkali, surface coatings and organic matter.

2.7.2 Aggregate for mortar shall conform to ASTM C 144.

2.7.3 Aggregate for grout shall conform to ASTM C 404 Size No. 2.

2.8 Water

2.8.1 Water shall be free of deleterious quantities of acids, alkalis and organic materials and shall come from a domestic supply.

2.9 Reinforcing Steel

2.9.1 Steel reinforcement bars shall conform to the requirements of AASHTO M-53M (M-53) Grade 400 MPa (60 Ksi), and the applicable portions of the Standard Specifications.

2.9.2 Reinforcement shall be clean and free from loose rust, scale, dirt, and any coatings that reduces bond.

2.11 Horizontal Joint Reinforcement and Metal Accessories:

2.10.1 Wire for joint reinforcement shall be zinc-coated cold-drawn steel and shall conform to ASTM A 82 and ASTM A 153, Class B2. As a minimum, longitudinal wires shall be 9 gauge (0.148") and cross wires shall be 12 gauge (0.106").

2.10.2 Manufacturer - Subject to compliance with requirements, provide horizontal joint reinforcement of one of the following, or an approved equal:

A. A. Wire Products Co.

2.10.3 Horizontal Joint Reinforcement and Metal Accessories shall be as follows:

(a) The width of the horizontal reinforcing shall be 2 inches less than the actual thickness of the wall or partition in which it is to be placed. Splicing of horizontal reinforcing, including corner and partition reinforcing, shall be done by providing a 8-inch overlapping of side rods.

(b) Corners shall be reinforced with Blok-Trus Corner-Lok, standard 9-gauge (0.148") S/R by 9-gauge (0.148") C/R. Intersection between walls and partitions shall be reinforced horizontally with Blok-Trus Partition-Lok, standard 9-gauge (0.148") S/R by 9-gauge (0.148") C/R, or equal, spaced at 16-inch centers vertically, in the same course as the wall reinforcing.

(c) Solid and hollow interior or exterior masonry walls shall be reinforced horizontally with Blok-Trus AA600, (AA610) Standard 9-gauge (0.148") S/R by 9-gauge (0.148") C/R or equal, spaced at 16-inch centers vertically.

2.11 Flashing

2.11.1 Flashing for collecting and diverting water within the walls shall be copper Type ETP or FRTP and shall conform to ASTM B 152.

2.11.2 Copper flashing for concealed applications shall be 30 kPa (10 ounce per square foot).

2.11.3 Copper flashing for exposed applications shall be 48 kPa (16 ounce per square foot).

2.12 Steel angles for use as lintels shall conform to the requirements as specified elsewhere herein under Division 5.

3. EXECUTION:

3.1 General

3.1.1 Masonry work shall not be started when the horizontal and vertical alignment of the foundation is out of plumb or line one inch or more.

3.1.2 The top surface of the concrete foundation shall be clean and free of laitance and the aggregate exposed before starting the masonry.

3.1.3 All masonry shall be laid true, level and plumb in accordance with the Drawings.

3.1.4 Proper masonry units shall be used to provide for all windows, doors, vents, bond beams, lintels, etc. as shown on the Drawings or otherwise required to provide a minimum of unit cutting.

3.1.5 Where masonry unit cutting is necessary, all cuts shall be neat and true and made by a masonry saw. Openings for other trades shall be neatly patched.

3.1.6 Unless otherwise indicated, the masonry units shall be laid in a running bond pattern. All bond patterns and special details shown on the drawings shall be accurately and uniformly executed.

3.1.7 All masonry units shall be sound, free of cracks or other defects that would interfere with the proper placing of the unit or impair the strength of construction.

3.1.8 The starting joint on foundations shall be laid with full mortar coverage on the bed joints, except that area where the grout occurs shall be free from mortar, so that the grout will be in contact with the foundation. The starter coarse shall be laid out dry to determine the extent to which they must be cut, or joint sizes varied, to accomplish accurate horizontal coursing.

3.1.9 Mortar joints shall be straight, clean, and uniform in thickness and shall be tooled joints. Unless otherwise indicated, both horizontal and vertical masonry joints shall be 3/8-inch nominal thickness.

3.1.10 Unless otherwise indicated, all face joints shall be tooled to provide a concave joint. Tooling shall be done when the mortar is partially set and still sufficiently plastic to bond. The tooling shall be done in a matter to provide strength and weather resistance. Unless otherwise indicated all concrete block joints shall be tooled. Where tooled joints are not possible, the joints shall be troweled flush.

3.1.11 Care shall be taken to prevent visible mortar and grout stains on all sides that will be exposed to view. In general, the walls shall be kept continually clean. Grout run over shall be cleaned immediately.

3.1.12 All surfaces, including sills, ledges, finished concrete, etc., shall be protected from mortar droppings or other damage during construction.

3.1.13 Flashing shall be placed on a thin bed of mortar with another thin bed of mortar on top of the flashing for the next masonry course.

3.1.14 Flashing shall be installed as indicated on the Drawings and as specified herein. Flashing shall be installed on surfaces that are relatively smooth and free of projections that may puncture and destroy the flashing effectiveness. Upturn ends of flashing to produce an end dam for positive drainage to weep holes.

3.1.15 Weep holes shall be provided at all flashing except at door and louver sills. The weep holes shall be made in the head joints immediately above the flashing. Weep holes shall be spaced on 16-inch centers and shall be provided with wicks made of 1/4-inch glass fiber rope. The wicks shall be left in place to prohibit the entrance of insects.

3.1.16 Horizontal reinforcing shall be laid on the webs of bond beam units.

3.1.17 Wire reinforcement shall be completely embedded in mortar or grout. Mortar joints with wire reinforcement shall be at least twice the thickness of the wire.

3.1.18 Install horizontal joint reinforcement 16 inches o.c. Place joint reinforcement in first horizontal joints above and below openings. Extend minimum 16 inches each side of opening. Place joint reinforcement continuous in first joint below top of walls.

3.1.19 As a minimum, wire reinforcement shall be lapped 8 inches at splices and shall contain at least one cross wire of each piece of reinforcement in the lap distance.

3.1.20 Reinforcement shall be in place before grouting starts. The grouting space shall be free from mortar droppings. All grout shall be puddled or vibrated in place.

3.1.21 Grouting at beams over openings shall be done in one continuous operation.

3.1.22 All cells containing reinforcement, anchor bolts, inserts, etc. shall be grouted solidly. Spaces around metal door frames and other built-in items shall be filled solidly with grout.

3.1.23 Beams and other structural members shall be anchored to the wall with anchor bolts or their equivalent. Anchors shall be fully, solidly embedded in place. Embedment shall not be less than 2/3 of wall thickness unless otherwise noted. Bearing pads shall be furnished below beams to prevent spalling of the masonry, if required.

3.1.24 Masonry shall not be erected when the ambient temperature is below 0 degrees C (32 degrees F) with a rising temperature, or below 4 degrees C (40 degrees F) with a falling temperature, or when there is a probability of such a condition existing within 48 hours, unless special provisions are made for heating the materials and protecting the work from freezing. Protection shall consist of heating and maintaining the temperature of the masonry materials at not less than 4 degrees C (40 degrees F) but not more than 71 degrees C (160 degrees F), and maintaining an air temperature above 4 degrees C (40 degrees F) on both sides of the masonry for not less than 72 hours. Work will not be permitted with or on frozen materials. Masonry work which has frozen before the mortar has set shall be removed and replaced. No brick or other units having a film of frost on their surfaces shall be laid in the walls.

3.1.25 One section of the walls shall not be carried up in advance of the others, unless specifically approved. Heights of masonry shall be checked with an instrument at each floor, and at sills and heads of openings, to maintain the level of the walls. Partitions shall extend from the floor to the bottom of the floor or roof construction above, unless otherwise indicated. Walls and partitions shall be structurally bonded or anchored to each other and to concrete walls, beams and columns. Nonload-bearing partitions and interior walls shall be securely anchored to the construction above and in a manner that provides lateral stability.

3.1.26 Unfinished work shall be stepped back for jointing with new work; toothing will not be permitted, except where specified. All loose mortar shall be removed and the exposed jointing thoroughly wetted for not less than 12 hours before laying new work.

3.1.27 Surfaces of masonry not being worked on shall be properly protected at all times during the construction operation. When rain or snow is imminent and the work is discontinued, the tops of exposed masonry walls and similar surfaces shall be covered with a strong waterproof membrane, well secured in place.

3.1.28 Concrete masonry units shall be cut and fit for placement of monorail and support beam. Coordinate with other sections of work to provide correct size, shape, and location.

3.2 Removal of Existing Masonry for Re-use

3.2.1 Existing masonry that is to be removed shall be salvaged for re-use. Proper care shall be taken to maintain the size and shape of the salvaged masonry. Existing masonry shall be raked back to allow for removal. All loose mortar shall be removed from salvaged masonry before re-use. Salvaged masonry shall not be used without prior approval from the Engineer.

3.2.2 Masonry shall be cut out with care in a manner to prevent damage to any adjacent remaining materials. Shore and support structure as necessary in advance of cutting out units. Cut away loose or unsound adjoining masonry to provide firm and solid bearing for new work. Install masonry work to match and align with existing, with joints and coursing true and level, faces plumb and in line.

3.3 Brickwork

3.3.1 Overburned or underburned, warped, spalled, cracked or broken brick shall not be used where exposed, but may be used as backup and where concealed. Where exposed, brick shall be selected when placing for the better face for stretchers, and the better end for headers. Clay or shale brick shall be tested daily on the job, prior to laying, to determine if they will require wetting. All joints between bricks shall be filled completely with mortar.

Bed joints shall be formed of a thick layer of mortar that shall be smoothed or furrowed lightly. Head joints shall be formed by applying to the brick to be laid a full coat of mortar on the entire end, or on the entire side, as the case requires, and then shoving the mortar-covered end or side of the brick tightly against the brick laid previously. The practice of buttering at the corners of brick and then throwing mortar or scrappings into the empty joints will not be permitted. Closure brick shall be laid with a bed joint and with head joints, and the brick shall be placed carefully without disturbing the brick previously laid. Dry or butt joints will not be permitted.

3.4 Concrete Masonry Units

3.4.1 All concrete masonry units shall be true, plumb and built to the thickness and bond pattern indicated. Special units shall be furnished and used where indicated and as specified. Cutting of units shall be avoided insofar as possible. Cutting at the site shall be done with a power-driven carborundum saw. Units shall not be wetted prior to use.

3.4.2 The first course of concrete masonry units shall be laid in a full bed of mortar for the full width of the unit. Bed joints of a concrete masonry unit shall be formed by applying the mortar to the entire top surfaces of the inner and outer face shells, and the head joints shall be formed by applying the mortar for a width of about 1 inch to the ends of the adjoining units laid previously. Mortar for joints shall be smooth, not furrowed, and of such thickness that it will be forced out of the joints as the units are being placed in position. Where anchors, bolts, reinforcing and ties occur within the cells of the units, such cells shall be filled with mortar or grout as the work progresses. Concrete brick shall be used for topping out walls under sloping slabs, distributing concentrated loads, backing brick headers, and elsewhere as indicated.

3.4.3 Concrete masonry lintels shall be installed over openings where steel lintels are not scheduled. Place 2-#3 reinforcing bars 1 inch from bottom web. Do not splice reinforcing bars. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position. Place and consolidate grout fill without displacing reinforcing. Allow masonry lintels to attain specified strength before removing temporary supports.

3.5 Clean-Up

3.5.1 All surplus material and debris shall be removed from the job site when the masonry work is completed. Any items defaced from the masonry work shall be cleaned.

3.5.2 Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units where intended. Provide new units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

3.5.3 After mortar is thoroughly set and cured, remove large mortar particles by hand with wooden paddles and non-metallic scrape holes or chisels.

3.5.4 Use bucket and brush hand cleaning method as described in BIA "Technical Note No. 20 Revised" to clean brick masonry made from clay or shale, except use detergent type masonry cleaner.

END OF THIS SECTION

DIVISION 5 - METALS

SECTION 5A - STRUCTURAL STEEL

1. GENERAL:

1.1 Section Includes

1.1.1 Structural steel framing members and support members.

1.1.2 Monorail hoist beam.

1.1.3 Baseplates.

1.1.4 Grouting under baseplates.

1.1.5 Unless otherwise indicated, structural steel material and work shall be in conformance with the requirements of Section 505 of the Standard Specifications for Road and Bridge Construction, adopted January 1, 2007, a publication of the Illinois Department of Transportation. Refer to Division 1 for additional requirements.

1.2 Related Sections

1.2.1 Section 3A - Cast-In-Place Concrete.

1.2.2 Section 3B - Grout.

1.2.3 Section 4A - Unit Masonry System.

1.2.4 Section 5B - Metal Fabrications.

1.2.5 Section 9A - Painting.

1.2.6 Section 14A - Monorail System, Hoist, and Trolley.

1.3 References

All reference standards shall be from the latest edition.

1.3.1 AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

1.3.2 ASTM A36 - Standard Specification for Carbon Structural Steel (for S, C, M, L Shapes, Bars, and Plates).

1.3.3 ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

1.3.4 ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.

1.3.5 ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.

1.3.6 ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

1.3.7 ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

1.3.8 ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

1.3.9 ASTM A385 - Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)

1.3.10 ASTM A500 - Cold-Formed Welded & Seamless Carbon Steel Structural Tubing in Round and Shapes.

1.3.10 ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

1.3.11 ASTM A992 – Steel for Structural Shapes (W and WT Shapes) for Use in Building Framing.

1.3.12 ASTM B6 - Zinc (slab zinc).

1.3.13 AWS A2.0 - Standard Welding Symbols.

1.3.14 AWS D1.1 - Structural Welding Code.

1.3.15 SSPC - Steel Structures Painting Council.

1.4 Design Requirements

1.4.1 Where final design of members and connections for any portion of the structure is not indicated, perform final design of such members and connections in accordance with AISC Specification and as Specified herein, at no additional cost.

1.4.2 Members and connections shall be designed by a structural engineer registered in the place of the project.

1.4.3 Unless otherwise indicated, design connections in accordance with American Institute of Steel Construction "Manual of Steel Construction, Allowable Stress Design, 9th Edition" to support half the total uniform load calculated from the table of "Allowable Uniform Loads for Beams Laterally Supported" for given shape, span and steel strength specified. If load in kips has been noted in parentheses near end of beam designation on Drawings, design connection at each end of that member for that load.

1.4.4 One-sided, or other types of eccentric connections not indicated, will not be permitted without prior approval.

1.5 Submittals

1.5.1 Shop Drawings

(a) Indicate profiles, sizes, spacing, and locations of structural members, openings, attachments and fasteners.

(b) Connections: Show connection details and submit all connection design calculations, sealed by a Professional Structural Engineer licensed in the place of the project.

(c) Indicate welded connections with AWS A2.0 welding symbols. Indicate net weld lengths and size. Distinguish between work to be performed in the shop and in the field.

(d) Review of shop drawings in no way affects the Contractor's responsibility for carrying out the Work to Contract Drawings and Specifications.

(e) Shop drawings shall be approved prior to fabrication.

(f) Copies of the contract drawings shall not be marked and submitted as shop drawings.

1.5.2 Manufacturer's Mill Certificate: Submit under provisions of Division 1 certifying that products meet or exceed specified requirements.

1.5.3 Welders' Certificates: Submit under provisions of Division 1 Manufacturer's Certificates, certifying welders employed on the Work, verifying AWS qualifications within the previous 12 months in the position in which they will be carrying out the welding.

1.5.4 Substitutions of sections or modifications of details and the reasons for these changes shall be submitted by letter with shop drawings for review by the Engineer. Changes in related portions of the Work shall be coordinated by the Contractor.

1.6 Quality Assurance

1.6.1 Fabricate structural steel members in accordance with AISC-Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

1.7 Qualifications

1.7.1 Fabricator: Company specializing in performing the work of this Section with minimum 5 years documented experience.

1.7.2 Erector: Company specializing in performing the work of this Section with minimum 5 years documented experience.

1.8 Field Measurements

1.8.1 Verify that field measurements are as shown on Drawings, shop drawings and as instructed by the manufacturer.

1.9 Basis of Payment

1.9.1 The work specified under this Section and as required shall be paid for at the Contract unit price per kilogram (pound) for FURNISHING AND ERECTING STRUCTURAL STEEL, which price be payment in full for all labor, materials, tools, equipment and incidentals required to complete this Item.

2. PRODUCTS:

2.1 Materials

2.1.1 Structural Steel Members (S, C, M, L Shapes, Bars, and Plates): ASTM A36.

2.1.2 Structural Tubing: ASTM A500, Grade B.

2.1.3 Pipe: ASTM A53, Grade B.

2.1.4 Bolts, Nuts, and Washers: ASTM A325, slip-critical type.

2.1.5 Anchor Bolts: ASTM A307, Grade A for headed anchor bolts. ASTM A36 for non-headed anchor bolts.

2.1.6 Structural Steel Members (W and WT Shapes): ASTM A992.

2.1.7 Welding Materials: AWS D1.1; type required for materials being welded.

Welding Electrodes:

(a) Shielded Metal-Arc: AWS A5.1 or AWS 5.5, E70XX

(b) Submerged-Arc: AWS A5.17, F7X-EXXX

(c) Gas Metal-Arc: AWS A5.18, E70S-X or E70U-1

(d) Flux Cored-Arc: AWS A5.20, E70-T-X (except 2, 3, 10,-GS)

2.1.8 Sliding Bearing Plates: ASTM A36.

2.1.9 Shop and Touch-Up Primer: One coat of No. 66 HI-BUILD Epoxoline; 2 mils thick as manufactured by Tnemec or approved equal.

2.1.10 Headed studs to conform to ASTM A108 with a minimum yield strength of 344.7 MPa (50,000 psi) and a minimum tensile strength of 413.6 MPa (60,000 psi). Studs to conform to requirements of AWS Code.

2.1.11 Materials shall meet the requirements of the Standard Specifications, Section 1006.

2.2 Fabrication

2.2.1 Fabricate all members as indicated on Drawings and as outlined in AISC.

2.2.2 Make connections as indicated. Weld shop connections. Bolt field connections. Use nuts and bolts conforming to requirements of ASTM A325 in slip-critical type connections for all bolted connections except column base anchor bolts to be ASTM A36 bolts.

2.2.3 Perform welding in accordance with AWS D1.1.

2.2.4 Bevels for field welds may be flame cut, provided such cutting is done automatically. Leave free of burrs and slag.

2.2.5 Grind flush web fillets at webs notched to receive backup plates for flange groove welds.

2.2.6 Flame cut edges of stiffener plates at field or shop for butt welds. Do not shear.

2.2.7 Accurately mill bearing ends of compression members.

2.2.8 Fabricating tolerances for finished parts shall comply with AISC Code of Standard Practice.

2.2.9 Cut, drill, or punch holes at right angles to surface of metal. Do not make or enlarge holes by burning. Make holes clean cut, without torn or ragged edges. Remove outside burrs resulting from drilling or reaming operations with a tool making a 1/16-inch bevel. Provide holes in members to permit connection of Work of other trades.

2.2.10 Make splices only where indicated.

2.2.11 All surfaces exposed in final position to have sharp edges and corners removed and all surfaces made smooth.

2.3 Finish

2.3.1 Prepare structural component surfaces in accordance with SSPC-SP6 - Commercial Blast Cleaning.

2.3.2 Shop prime structural steel members except members to be galvanized. Do not prime surfaces that will be field welded, contact surface for friction bolts, top surfaces of crane rails, top surface of bottom flange of monorails, welded studs, deformed bar anchors and steel encased in concrete.

2.3.3 Zinc used for hot-dip galvanizing coating shall conform to the Standard Specifications for Slab Zinc (Spelter) ASTM Designation B6 and shall be at least equal to the grade designated as "Prime Western". Thickness of coatings shall conform to ASTM Specifications A123, A153, and A385, as applicable for items coated.

2.3.4 Quality of galvanizing shall be rigidly controlled and it shall be understood that any defects as mentioned below shall be just grounds for rejection.

2.3.5 Galvanized steel shall have no bare spots unless small and suitable for patching, pimples showing excessive contamination, flux, ash inclusions, or blisters.

2.3.6 Where cutting existing galvanized metal Work or attaching to existing galvanized metal Work, such as by welding, the connection or bore edges shall be cold galvanized.

2.3.7 Structural and miscellaneous metal Work shall be galvanized when located on the exterior and on the interior where so indicated and/or specified.

2.3.8 Prime paint items in accordance with finish coat requirements.

2.3.9 Repair all damage to field-primed surfaces.

2.4 Source Quality Control and Tests

2.4.1 Testing and analysis of components will be performed under provisions of Division 1.

2.5 Monorail Hoist Beams

2.5.1 Coordinate monorail hoist beam, beam splice details, connection details and crane stop locations with hoist manufacturer for verification of compatibility with hoist system.

3. EXECUTION:

3.1 Examination

3.1.1 Verify that field conditions are acceptable and are ready to receive work.

3.2 Erection

3.2.1 Erect structural steel in compliance with AISC Code of Standard Practice and Specification.

3.2.2 Allow for erection loads, dead loads, wind loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

3.2.3 Field weld components indicated on Drawings and shop drawings.

3.2.4 Do not field cut or alter structural members without approval of Architect/Engineer.

3.2.5 After erection, prime welds, abrasions, and surfaces not shop primed.

3.2.6 Grout under baseplates.

3.2.7 High strength bolts shall be installed as specified in "Specifications for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts", as approved by the Research Council, unless otherwise specified or shown on the Drawings.

3.2.8 If calibrated wrench tightening is used, the field inspector shall verify the calibration of the wrenches at the start of each working day and at mid-day.

3.3 Erection Tolerances

3.3.1 Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

3.3.2 Maximum Offset From True Alignment: 1/4 inch.

3.4 Field Quality Control

3.4.1 Field inspection will be performed under provisions of Division 1.

END OF THIS SECTION

DIVISION 5 - METALS

SECTION 5B - METAL FABRICATIONS

1. GENERAL:

1.1 Section Includes

1.1.1 Shop fabricated and standard manufactured ferrous metal items, galvanized or prime painted as scheduled or aluminum.

1.1.2 Items include, but are not limited to brackets, supports, frames, ledge and shelf angles, ladders and fall prevention systems, access hatches, guard rail and chains.

1.1.3 Unless otherwise indicated, Metal Fabrications and work shall be in conformance with Section 505 of the requirements of the Standard Specifications for Road and Bridge Construction, adopted January 1, 2007, a publication of the Illinois Department of Transportation. Refer to Division 1 for additional requirements.

1.2 Related Sections

1.2.1 Section 3A - Cast-In-Place Concrete.

1.2.2 Section 4A - Unit Masonry System.

1.2.3 Section 5A - Structural Steel

1.2.4 Section 5C - Handrails and Railings.

1.2.5 Section 5E - Bolts, Anchor Bolts, Expansion Anchors and Concrete Inserts,

1.2.6 Section 9A - Painting.

1.3 References

All reference standards shall be the latest edition.

1.3.1 ASTM A36 - Structural Steel.

1.3.2 ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.

1.3.3 ASTM A123 - Zinc (Hot-Galvanized) Coatings on Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.

1.3.4 ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

1.3.5 ASTM A276, Type 316 - Standard Specification for Stainless Steel Bars and Shapes.

1.3.6 ASTM A283 - Carbon Steel Plates, Shapes, and Bars.

1.3.7 ASTM A325 - High Strength Bolts for Structural Steel Joints.

1.3.8 ASTM A385 – Standard Specification for Providing High-Quality Zinc Coatings (Hot Dip)

1.3.9 ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

1.3.10 ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

1.3.11 ASTM A992 – Steel for Structural Shapes (W and WT Shapes) for Use in Building Framing.

1.3.12 AWS A2.0 - Standard Welding Symbols.

1.3.13 AWS D1.1 - Structural Welding Code.

1.3.14 AISI - Standard for Stainless Steel.

1.3.15 SSPC - Steel Structures Painting Council.

1.3.16 ANSI A14.3: Safety requirements for fixed ladders.

1.3.17 ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

1.3.18 ASTM B211 – Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire

1.3.19 ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

1.4 Submittals

1.4.1 Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1.4.2 Submit Product Data.

1.4.3 Shop drawings shall be approved prior to fabrication.

1.4.4 Indicate all revisions on resubmissions.

1.5 Qualifications

1.5.1 Welders' Certificates

Submit under provisions of Division 1, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.6 Field Measurements

1.6.1 Verify that field measurements are as indicated on shop drawings and in accordance with manufacturers' recommendations.

1.7 Design

1.7.1 Where size and spacing of expansion anchors, inserts, and anchor bolts are not shown or specified, provide such items of sufficient size, length, load carrying capacity and spacing to carry the design load times a safety factor of four.

1.7.2 Provide anchorage in accordance with Section 5E "Bolts, Anchor Bolts, Expansion Anchors and Concrete Inserts".

1.8 Basis of Payment

1.8.1 The work shall be paid as part of the Contract lump sum price for PUMP STATION GENERAL WORK, which shall be payment in full for the work, described herein.

2. PRODUCTS:

2.1 Materials

2.1.1 Steel Sections (for S, C, M, L Shapes, Bars and Plates): ASTM A36.

2.1.2 Steel Tubing: ASTM A500, Grade B.

2.1.3 Plates: ASTM A283.

2.1.4 Pipe: ASTM A53, Grade B, Schedule 40.

2.1.5 Stainless Steel Sheet and Plate: ASTM A276, Type 316.

2.1.6 Extruded Shapes and Tubes: ASTM B221.

2.1.7 Aluminum Plate and Sheet: ASTM B209.

2.1.8 Aluminum Bars, Rods and Wire: ASTM B211.

2.1.9 Bolts, Nuts, and Washers: ASTM A325 galvanized to ASTM A153 for galvanized components.

2.1.10 Stainless Steel Fasteners and Fittings: ASTM A276, Type 316.

2.1.11 Structural Steel (W and WT Shapes): ASTM A992.

2.1.12 Welding Materials: AWS D1.1; type required for materials being welded.

2.1.13 Welding Electrodes: AWS D1.1; type required for materials being welded.

2.1.14 Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.

2.2 Fabrication

2.2.1 Fit and shop assemble in largest practical sections, for delivery to site.

2.2.2 Fabricate items with joints tightly fitted and secured.

2.2.3 Continuously seal joined members by continuous welds.

2.2.4 Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

2.2.5 Exposed Mechanical Fastenings: Flush countersunk screws or bolts, unobtrusively located, consistent with design of component, except where specifically noted otherwise.

2.2.6 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 Finishes

2.3.1 Prepare structural component surfaces in accordance with SSPC-SP6 - Commercial Blast Cleaning.

2.3.2 Shop prime structural steel members except members to be galvanized. Do not prime surfaces that will be field welded, contact surface for friction bolts, top surfaces of crane rails, top surface of bottom flange of monorails, welded studs, deformed bar anchors and steel encased in concrete.

2.3.3 Zinc used for hot-dip galvanizing coating shall conform to the Standard Specifications for Slab Zinc (Spelter) ASTM Designation B6 and shall be at least equal to the grade designated as "Prime Western". Thickness of coatings shall conform to ASTM Specifications A123, A153, and A385, as applicable for items coated.

2.3.4 Quality of galvanizing shall be rigidly controlled and it shall be understood that any defects as mentioned below shall be just grounds for rejection.

2.3.5 Galvanized steel shall have no bare spots unless small and suitable for patching, pimples showing excessive contamination, flux, ash inclusions, or blisters.

2.3.6 Where cutting existing galvanized metal Work or attaching to existing galvanized metal Work, such as by welding, the connection or bore edges shall be cold galvanized.

2.3.7 Structural and miscellaneous metal Work shall be galvanized when located on the exterior and on the interior where so indicated and/or specified.

2.3.8 Prime paint items in accordance with finish coat requirements.

2.3.9 Repair all damage to field-primed surfaces.

3. EXECUTION:

3.1 Examination

3.1.1 Verify that field conditions are acceptable and are ready to receive Work.

3.1.2 Preparation

(a) Clean and strip primed steel items to bare metal where site welding is required.

(b) Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate Sections.

3.2 Installation

3.2.1 Install items plumb and level, accurately fitted, free from distortion or defects.

3.2.2 Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

3.2.3 Field weld components indicated on the Drawing.

3.2.4 Perform field welding in accordance with AWS D1.1.

3.2.5 Obtain Engineer approval prior to site cutting or making adjustments not scheduled.

3.2.6 Perform cutting, drilling, and fitting required for installation of metal fabrications. Set the work accurately. Provide temporary bracing and anchors in formwork for items to be built into masonry or concrete. Field weld joints not shop welded because of size limitations. Grind welds smooth and touch-up shop paint coat. Do not weld, cut or abrade surfaces that have been galvanized.

3.2.7 Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2.8 Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

3.2.9 Protect aluminum in contact with dissimilar material with asphalt paint to provide 2 mil dry thickness. Paint miscellaneous metal work, which is to be in contact with, but not fully embedded in concrete or masonry with a heavy coat of asphalt paint. Coating shall not extend onto surfaces that will be exposed.

3.2.10 Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

3.2.11 Touch up damaged galvanizing with cold galvanizing compound as produced by Rust-Oleum Corp. or ZRC Chemical Company, Quincy, Mass. (Aerosol acceptable).

3.3 Erection Tolerances

3.3.1 Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

3.3.2 Maximum Offset From True Alignment: 1/4 inch.

3.4 Access Hatches

3.4.1 Fabricate access hatches for the locations shown, with type, dimensions, details and anchorages as shown and specified.

3.4.2 Where specified, provide manufacturer's standard units, modified, if necessary, to comply with the requirements.

3.4.3 If standard units are not available for the sizes and types required, custom fabricate units to match manufacturer's similar units or as detailed on the Drawings.

3.4.4 Unless noted otherwise, flush floor hatch covers shall be aluminum plate (or steel where specifically specified) 3/8" diamond checkered plate.

3.4.5 A stainless steel snap lock with fixed turn handle shall be mounted on the underside of the cover. Covers in walkways shall have a lift handle that is designed to be flush with the walking surface when not in use. Hardware shall be 316 or 304 stainless steel including springs, lifting mechanism supports, hinges, hinge pins, snap lock and lock strike, and all fasteners.

3.4.6 One-piece removable hatch covers shall be completely removable from frame. These covers shall be completely removable and have no hinges, snap locks, hold open arms or springs.

3.4.7 All parts, except as specified or noted on the Drawings, shall be mill finish aluminum. Steel shall be hot-dip galvanized after fabrication. All fasteners shall be of stainless steel.

3.4.8 Hatch shall be coordinated before fabrication with equipment and pump manufacturer's approved shop drawings to assure adequate clearances for equipment handling.

3.4.9 Acceptable Manufacturers

3.4.9.1 U. S. Foundry and Manufacturing Co.

3.4.9.2 Halliday Products, Inc.

3.4.9.3 The Bilco Company

3.4.9.4 Substitutions under provisions of Division 1

3.5 Schedule

3.5.1 The Schedule is a list of principal items only. Refer to drawing details for items not specifically scheduled.

3.5.2 Chains shall be 1/4" open link security chain hot galvanized wrought iron with snap hook and eye bolt on one end and as shown on the Drawings.

3.5.3 Ledge and Shelf Angles, Channels and Plates, Not Attached to Structural Framing, for support of masonry: hot-dip galvanized.

3.5.4 Lintels: Hot-Dip galvanized, as detailed.

3.5.5 Miscellaneous brackets, supports and frames: hot-dip galvanized.

3.5.6 Fabricate miscellaneous units to the sizes, shapes and profiles shown or, if not shown, of the required dimensions to receive adjacent grating, plates, or other Work to be retained by the framing.

3.5.7 Except as otherwise shown, fabricate from structural shapes, plates and bars of all welded construction using mitered corners, welded brackets and splice plates and a minimum number of joints for field connection.

3.5.8 Cut, drill and tap units to receive hardware and similar items to be anchored to the Work.

3.5.9 Aluminum access hatches and frames: mill finish. Coat surfaces to be cast in concrete or grout with bituminous paint.

END OF THIS SECTION

DIVISION 5 - METALS

SECTION 5C - HANDRAILS AND RAILINGS

1. GENERAL:

1.1 Section Includes

1.1.1 Steel handrails, balusters, and fittings.

1.1.2 Handrails and railings shall conform to applicable Section 1006 of the Standard Specifications for Road and Bridge Construction, adopted January 1, 2007, a publication of the Illinois Department of Transportation. Refer to Division 1 for additional requirements.

1.2 Products Furnished but not Installed Under this Section

1.2.1 Section 3A - Cast-In-Place Concrete.

1.2.2 Section 4A - Unit Masonry System.

1.3 Related Section

1.3.1 Section 9A - Painting.

1.4 References

1.4.1 ASTM A53 Grade B - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.

1.4.2 ASTM A123 - Zinc-Coating (Hot-Dip) on Iron and Steel Products.

1.4.3 ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

1.4.4 ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

1.4.5 ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

1.4.6 SSPC - Steel Structures Painting Council.

1.5 Standard Railing and Handrail Design Requirements:

1.5.1 Railing assembly, wall rails, and attachments shall resist a force of 890 N (200 pounds) in any direction at any point without damage or permanent set.

1.5.2 Railings and handrails shall satisfy all requirements of Occupational Safety and Health Administration, US Department of Labor Chapter XVII, Title 29 Part 1910.

1.6 Submittals

1.6.1 Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

1.7 Field Measurements

1.7.1 Verify that field measurements are as indicated on shop drawings.

1.8 Basis of Payment

1.8.1 The work shall be paid as part of the Contract lump sum price for
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which shall be payment in full for the work described herein.

2. PRODUCTS:

2.1 Standard Steel Railing System

2.1.1 Rails and Posts: 1-1/2 inch nominal diameter schedule 40 steel pipe 1.9 inch OD and 0.145 inch minimum nominal wall thickness); welded joints. Center to center post spacing shall be 4 foot maximum. Pipe shall be carbon steel type ASTM A53 Grade B, ASTM A501, or ASTM A500 Grade B.

2.1.2 Standard Railing: A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches nominal, from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.

2.1.3 Stair Railing: A stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 38 inches nor less than 36 inches from the upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

2.1.4 Standard Toeboard: A standard toeboard shall be 4 inches nominal in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and with not more than 1/4 inch clearance above floor level.

2.1.5 Handrail: A handrail shall consist of a lengthwise member mounted directly on a wall or partition by means of brackets attached to the lower side of the handrail so as to offer no obstruction to a smooth surface along the top and both sides of the handrail. The handrail shall be rounded or other section that will furnish an adequate handhold for anyone grasping it to avoid falling. The ends of the handrail should be turned in to the supporting wall or otherwise arranged so as not to constitute a projection hazard. The height of handrails shall be not more than 38 inches nor less than 34 inches from the upper surface of handrail to surface of tread in line with face of riser or to surface of ramp.

2.1.6 Fittings: Elbows, T-shapes, wall brackets, escutcheons; machined steel.

2.1.7 Mounting: Brackets and flanges, with steel inserts for casting in concrete and embedding into masonry, or flanges and through bolts for securing to grating system.

2.1.8 Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

2.1.9 Splice Connectors: Steel concealed spigots.

2.1.10 Galvanizing: 0.6 Kg/m^2 (2.0 oz/sq. ft.) zinc coating, minimum, in accordance with ASTM A123 for products and ASTM A153 for hardware. All handrail and railing components shall be hot-dip galvanized after fabrication.

2.2 Fabrication

2.2.1 Fit and shop assemble components in largest practical sizes, for delivery to site.

2.2.3 Fabricate components with joints tightly fitted and secured.

2.2.4 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

2.2.5 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.2.6 Continuously seal joined pieces by continuous welds.

2.2.7 Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

2.2.8 Accurately form components to each other and to building structure.

3. EXECUTION:

3.1 Examination

3.1.1 Verify that field conditions are acceptable and are ready to receive work.

3.2 Preparation

3.2.1 Supply items required to be cast into concrete and embedded in masonry with setting templates, to appropriate Sections.

3.3 Installation

3.3.1 Install components plumb and level, accurately fitted, free from distortion or defects.

3.3.2 Provide anchors, plates and angles required for connecting railings to structure. Anchor railing to structure.

3.3.3 Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.3.4 All handrails and railings shall be provided with a clearance of not less than 3 inches between the handrail or railing and any other object.

3.4 Erection Tolerances

3.4.1 Maximum Offset From True Alignment: 1/8 inch.

END OF THIS SECTION

DIVISION 5 - METALS

SECTION 5D - GRATING AND FLOOR PLATES

1. GENERAL:

1.1 Section Includes

1.1.1 Metal gratings

1.1.2 Floor Plates

1.1.3 Formed openings

1.1.4 Furnish grating frames for installation.

1.2 Related Sections

1.2.1 Section 3A - Cast-in-place Concrete

1.2.2 Section 5B - Metal Fabrications

1.2.3 Section 5C - Handrails and Railings

1.3 References

1.3.1 ASTM A36 - Structural Steel

1.3.2 ANSI/ASTM A123 - Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip

1.3.3 ASTM A153 - Zinc Coating (Hot-Dipped Galvanized) on Iron and Steel Hardware.

1.3.4 ANSI/NAAMM A202.1 - Metal Bar Grating Manual

1.3.5 ASTM A653 - General Requirements for Steel Sheet, Zinc- coated (Galvanized) by the Hot-Dip Process

1.3.6 ASTM A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

1.3.7 ASTM A588 - High Strength Low Alloy Structural Steel

1.3.9 ASTM B-221 - Aluminum & Aluminum Alloy Extruded Bars, Rods, Wire Shapes and Tubes

1.4 Quality Assurance

1.4.1 Design grates and plates under direct supervision of professional engineer experienced in design of building structures, registered in the project's State.

1.4.2 Grating and floor plates shall conform to applicable Section 1006, METALS, of the Standard Specifications.

1.5 Submittals

1.5.1 Indicate details of grates, plates, supports, span and deflection table, openings, and perimeter construction details and tolerances.

1.5.2 Submit samples.

1.5.3 Submit manufacturer's installation instructions.

1.6 Basis of Payment

1.6.1 Payment for the work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. PRODUCTS:

2.1 Acceptable Manufacturers

2.1.1 Bar Grating

(a) Reliance.
(b) Blaw-Knox.
(c) IKG Borden.

2.1.2 Substitutions: Under provisions of Division 1.

2.2 Materials

2.2.1 Sheet Steel: ASTM A36; carbon steel with diamond pattern.

2.2.2 Formed Steel: ASTM A36 of shapes indicated.

2.2.3 Provide protection for contact of dissimilar metals.

2.3 Fasteners

2.3.1 Fasteners: Stainless steel.

2.3.2 Type: Recessed welded plate for bar type gratings.

2.4 Fabrication

2.4.1 Fabricate grates and plates of sizes indicated. Unless otherwise required, grating panels shall be removable and sized to weigh less than 90.7 Kg (200 pounds).

2.4.2 Provide steel angle support framing for openings. Fabricate frames to Section 5B and as Specified herein.

2.4.3 Bar Gratings

(a) Bearing Bar: 2x 3/8 inch minimum, spaced 1-3/8 inches on center or as indicated on Drawings or otherwise Specified.

(b) Cross Bar: 3/4 x 1/4 inches spaced 4" on center or as indicated on Drawings.

(c) Anchorages: Welded recessed plate, stainless steel bolts.

(d) Banding: Perimeter of all gratings and cutouts shall be banded with bar same size as bearing bar.

2.5 Finishes

2.5.1 Galvanizing: Hot dipped after fabrication to ASTM A123, A153, A653 and A1011.

2.5.2 Non-slip Surfacing: Aluminum oxide where indicated.

2.5.3 Aluminum: Where indicated on plans, provide aluminum grating to ASTM B-221 alloy 6063.

3. EXECUTION:

3.1 Inspection

3.1.1 Verify that opening sizes and dimensional variations are acceptable to suit grating and plating tolerances.

3.1.2 Verify that supports and anchors are correctly positioned.

3.2 Installation

3.2.1 Install grates and floor plates in accordance with manufacturer's instructions.

3.2.2 Mechanically cut galvanized finished surfaces. Do not use flame cutting tools. Cold galvanize all cut edges.

3.2.3 Secure grating with mechanical fasteners to prevent movement. Grating sections shall be removable unless otherwise required.

3.3 Tolerances

3.3.1 Conform to ANSI/NAAMM A202.1.

3.3.2 Maximum Space Between Abutting Sections: 1/4 inch.

3.3.3 Maximum Variation From Top Surface Plane of Abutting Sections: 1/16 inch.

END OF THIS SECTION

DIVISION 5 - METALS

SECTION 5E - BOLTS, ANCHOR BOLTS, EXPANSION ANCHORS, AND CONCRETE INSERTS

1. GENERAL:

1.1 Section Includes

1.1.1 Furnishing and installing all bolts, anchors and inserts, anchor bolts, expansion anchors and concrete inserts for:

(a) Piping.

(b) Hangers and brackets.

(c) Equipment.

(d) Grating and floor plate.

(e) Electrical, plumbing and HVAC work.

(f) Concrete patching.

(g) Pump base.

(h) Miscellaneous fasteners.

(i) Unless otherwise indicated, Bolts, Anchor Bolts, Expansion Anchors and Concrete Inserts material and work shall be in conformance with the requirements of Section 505 of the Standard Specifications for Road and Bridge Construction, adopted January 1, 2007, a publication of the Illinois Department of Transportation. Refer to Division 1 for additional requirements.

1.2 Related Sections

1.2.1 Section 4A - Unit Masonry

1.2.2 Section 5A - Structural Steel.

1.2.3 Section 5B - Metal Fabrications.

1.2.4 Section 5C - Handrails and Railings.

1.2.5 Section 15C - Piping and Appurtenances

1.3 References

1.3.1 Reference Standards: Comply with the applicable provisions and recommendations of the following, except as otherwise shown and specified.

1.3.2 ACI 349 - Appendix B - Code Requirements for Nuclear Safety Related Concrete Structures.

1.3.3 AISC - American Institute of Steel Construction, Structural Steel Detailing.

1.3.4 ANSI B1.1 - Screw Threads, Coarse Thread Series.

1.3.5 ANSI B18.2 - Square and Hex Bolts and Nuts.

1.3.6 ASTM A36 - Standard Specification for Carbon Structural Steel.

1.3.7 ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

1.3.8 ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.

1.3.9 ASTM A194 - Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service.

1.3.10 ASTM A242 - Standard Specification for High-Strength Low-Alloy Structural Steel

1.3.11 ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

1.3.12 ASTM A325 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

1.3.13 ASTM A354 - Standard Specification for High-Strength Low-Alloy Structural Steel.

1.3.14 ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.

1.3.15 ASTM A588 - Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi [345 MPa] Minimum Yield Point to 4-in. Thick.

1.3.16 ASTM B98 - Standard Specification for Copper-Silicon Alloy Rod, Bar, and Shapes.

1.3.17 AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

1.4 Submittals

1.4.1 Samples: Submit for approval the following:

(a) Representative samples of bolts, anchors and inserts as may be requested by the Engineer. Review will be for type and finish only. Compliance with all other requirements is exclusive responsibility of Contractor.

1.4.2 Shop Drawings: Submit for approval the following:

(a) Setting drawings and templates for location and installation of anchorage devices.

(b) Copies of manufacturer's specifications, load tables, dimension diagrams and installation instructions for the devices.

1.4.3 Contractor shall submit calculations stamped by a professional engineer.

1.5 Quality Assurance: Bolts, anchor bolts, expansion anchors and concrete inserts shall conform to applicable Section 1006, METALS, of the Standard Specifications.

1.6 Basis of Payment

1.6.1 Payment for the work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. PRODUCTS:

2.1 Design Criteria

2.1.1 All bolts, studs and nuts shall have American National form right-hand machine cut threads which shall be in conformity with the current ANSI B1.1, "Screw Threads", Coarse Thread Series, Class 2 Fit, unless otherwise specified.

2.1.2 Bolt heads and nuts shall be semi-finished and shall be in conformity with ANSI B18.2, "Wrench-head Bolts and Nuts and Wrench Openings", Heavy Series, unless otherwise specified. Nut dimensions shall conform to ANSI Standard B18.2.2 for heavy hex nuts.

2.1.3 Allowable tensile design stress for threaded fasteners shall not be greater than 0.33 times minimum tensile strength of threaded fastener on tensile stress area.

2.1.4 Concrete Fasteners: When the size, length and load carrying capacity of concrete fasteners is not Specified or shown on the Drawings, provide the size, length and capacity required to satisfy all of the following. Concrete fasteners include anchor bolts, expansion anchors, or concrete inserts:

(a) Working load shall be a minimum of the design load times a safety factor of four, and shall be based on a concrete compressive strength not exceeding 27.6 MPa (4000 psi).

(b) Shall satisfy all requirements and recommendations of ACI 349, Appendix B.

(c) Shall satisfy all minimum recommendations and requirements of Manufacturer.

(d) Allowances for vibration are not included in the safety factor specified above.

2.1.5 Determine design loads as follows

(a) For equipment anchors, use the design load recommended by the manufacturer and approved by the Engineer.

(b) For pipe hangers and supports, use one half the total weight of pipe, fittings, valves, accessories and water contained in pipe, between the hanger or support in question and adjacent hangers and supports on both sides. Load shall be increased where required to allow for thrust and temperature induced forces.

2.1.6 Anchors and inserts shall be located and sized so as not to impair the integrity of the supporting structure.

2.2 Materials

2.2.1 Bolts and Anchor Bolts (Excluding Pipe Joints):

(a) Galvanized Steel Bolts and Nuts

1) Steel anchor bolts, studs, nuts and washers for interior installation shall be in conformity with the current ASTM Designation: A307 "Carbon Steel Bolts and Studs, 413.6 MPa (60,000 PSI) Tensile Strength", Grade B, A36 or approved equal. All steel bolts, studs, nuts and washers shall be hot-dip galvanized in conformance with Class C of ASTM A153. Nuts shall conform to requirements of ASTM A563, heavy hex style.

(b) Stainless Steel Bolts and Nuts

1) In buried, outdoor, high humidity or submerged locations, provide stainless steel bolts, nuts and washers. Stainless steel bolts and nuts shall be in conformity with the current ASTM A193, Grade B8 (AISI 304) (517 MPa (75 KSI) Min. Tensile Strength), Class 1 and ASTM A194, Grade 8 (AISI 304), AISI 316 or approved equal.

2) For high strength applications, stainless steel bolts and nuts shall be in conformity with the current ASTM A193, Grade B8 (AISI 304) (Tensile Strength 689/862 MPa (100/125 KSI), Class 2 and ASTM A194, Grade 8 Strained Hardened (AISI 304) or approved equal.

(c) Bronze Bolts and Nuts

1) Where shown on Drawings or specified under other Sections, bronze anchor bolts, flange bolts, studs, and nuts shall be in conformity with the current ASTM Designation B98, "Copper-Silicon Alloy Rods, Bars, and Shapes." made of Alloy B12, Hard. Bolts, studs, and nuts machined from bar stock shall be made of Alloy A7, Hard.

(d) Other types, if shown on drawings or specified under other Sections.

2.3 Pipe Joints for Ductile Iron Pipe

2.3.1 Galvanized Bolts and Nuts (For EXPOSED Piping Installations)

(a) Steel anchor bolts, flange bolts, studs and nuts shall be in conformity with the current ASTM A307 "Carbon Steel Bolts and Studs, 413.6 MPa (60,000 PSI) Tensile Strength", Grade B or approved equal.

(b) All steel bolts, studs and nuts, shall be hot-dip galvanized in accordance with ASTM A153.

(c) At joint harnesses and restrained harnesses connected to flange, the tie bolts and studs, flange bolts and nuts shall conform to ASTM A354 Grade BC or ASTM A193 Grade B7 (792.8/862 MPa (115/125 KSI) Min. Tensile Strength for 4" diameter and under). Lug and ring shall be ASTM A36 steel.

(d) All steel bolts, studs and nuts, shall be hot-dip galvanized in accordance with ASTM A153.

2.3.2 Stainless Steel Bolts and Nuts (Where Specified)

(a) Stainless steel flange bolts and nuts shall be in conformity with the current ASTM A193, Grade B8 (AISI 304) (517 MPa (75 KSI) Min. Tensile Strength), Class 1 & ASTM A194, Grade 8 (AISI 304) or approved equal.

(b) Stainless steel bolts and nuts for harness flanges and connecting restrained harnesses to flange shall be in conformity with the current ASTM A193, Grade B8 (AISI 304) (Tensile Strength 689/862 MPa (100/125 KSI), Class 2 and ASTM A194, Grade 8 Strained Hardened (AISI 304) or approved equal.

2.3.3 Expansion Anchors

(a) Expansion Anchors shall be single cone wedge type or multiple cone wedge type. Where self drilling anchors are shown on drawings, self drilling expansion anchor with plug expansion insert shall be used.

(b) Expansion anchors for dry locations shall be zinc plated with chromate coating unless otherwise noted.

(c) Expansion anchors in buried, exterior, submerged, high humidity or below grade locations shall be stainless steel, as specified above in paragraph 2.2.1(b)1).

(d) Product and Manufacturer: Provide anchors by one of the following:

1) Liebig International, Inc.
2) Hilti, Incorporated.
3) Illinois Tool Works Ramset/Red Head.
4) Substitutions: Under provisions of Division 1.

e) Provide stud type (male thread) or flush type (female thread), as required. Anchors shall be sized as required for the concrete strength specified.

2.3.4 Undercut Expansion Anchors

(a) Undercut anchors shall be heavy-duty mechanical anchor which expands into a tapered undercut to develop a high load capacity.

(b) Anchor shall be hot dip galvanized carbon steel with a minimum ultimate tensile strength of 1035 MPa (150 ksi).

(c) Anchor shall be HUC Undercut Anchor as manufactured by HILTI, or Liebig Ultraplus as manufactured by Liebig International.

2.3.5 Other types: If shown on the drawings or specified under other Sections.

2.3.6 Standard holes, 1/16" larger than bolt, shall be drilled for bearing type connections in the connected steel part except where otherwise recommended by anchor manufacturer and reviewed by Engineer.

2.3.7 Expansion anchors shall be Underwriters Laboratories or Factory Mutual approved.

3. EXECUTION:

3.1 Inspection

3.1.1 Examine conditions under which bolts, anchors, or inserts are to be installed, and notify Engineer in writing of unsatisfactory conditions existing.

3.1.2 Do not proceed with the Work until unsatisfactory conditions or deficiencies have been corrected in a manner acceptable to Engineer.

3.2 Installation of Expansion Anchors and Undercut Anchors

3.2.1 Drilling equipment used and installation of expansion anchors shall be in accordance with manufacturer's instructions.

3.2.2 Torque anchor as specified by manufacturer recommendation. Do not cut reinforcing bars.

3.2.3 Provide embedded items for placement in concrete formwork and assure that embedded items are protected from damage and are not filled in with concrete.

3.2.4 Expansion anchors may be used for hanging or supporting pipe 2 inches diameter and smaller.

3.2.5 Expansion anchors shall not be used for larger pipe or supporting vibrating equipment unless otherwise shown or approved by the Engineer.

3.2.6 Unless otherwise shown, anchor design shall be in accordance with ACI 349, Appendix B and approved by Engineer, and in no case shall be less than:

(a) Embedment depth in concrete: 7 diameters.

(b) Anchor spacing on centers: 10 diameters.

(c) Distance to edge of concrete: 1.5 embedment.

(d) Distance to edge of concrete where anchor is loaded in direction of edge: 2.5 embedment.

3.2.7 Undercut Anchors shall be installed in accordance with manufacturer's instructions.

3.3 Cleaning

3.3.1 After embedding concrete is placed, remove protection and clean bolts and inserts.

END OF THIS SECTION

DIVISION 6 - WOOD, PLASTICS, AND COMPOSITES

SECTION 6A - ROUGH CARPENTRY

1. GENERAL:

1.1 Section Includes

1.1.1 Wood nailer at parapet

1.1.2 Blocking and cant strip at roof system

1.1.3 Temporary protection

1.2 Related Sections

1.2.1 Section 4A - Unit Masonry System.

1.2.2 Section 7A - Board Insulation.

1.2.3 Section 7B - Modified Bitumen Roofing.

1.3 References

1.3.1 ASTM A525 Standard Specification for Steel Sheet, Zinc Coated (Galvanized) by the Hot-dip Process.

1.3.2 ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3.3 Federal Specifications (FS):

1. FF-B-575C - Bolts, Hexagon and Square.
2. FF-N-105B - Nails, Brads, Staples, and Spikes.
3. FF-N-836D - Nut, Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding, and Single Ball Seat.
4. FF-S-111D - Screw, Wood.

1.4 Quality Assurance

1.4.1 Grading Rules:

1. Lumber Grading Rules and wood species shall conform with Voluntary Product Standard PS20. Grading rules of the following associations shall also apply to materials produced under their supervision.

   a. Northeastern Lumber Manufacturers Association, Inc. (NELMA)
   b. Southern Pine Inspection Bureau (SPIB)
   c. West Coast Lumber Inspection Bureau (WCLIB)
   d. Western Wood Products Association ((WWPA)
   e. Redwood Inspection Service (RIS)

1.4.2 Grade Marks: Identify all lumber by official grade mark.

1.4.3 Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded, where applicable and condition of seasoning at time of manufacture.

a. S-Dry: Maximum 19 percent moisture content
b. MC-5 or KD: Maximum 15 percent moisture content
c. Density

1.5 Submittals

1.5.1 Submit under provisions of Division 1

1.5.2 Rough Carpentry: Submit certification that lumber and connection material conforms to specified minimum grade.

1.6 Delivery, Storage, and Handling

1.6.1 Deliver, store, protect and handle products to site under provisions of Division 1 and in accordance with the manufacturer's instructions.

1.7 Basis of Payment

1.7.1 Payment for work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. MATERIALS

2.1 Blocking, nailing, cant strips, etc. shall be construction grade douglas fir, hem-fir, or No. 1 common southern pine.

2.2 Fasteners for wood nailers for roofing, shall be not less than 3/16-inch diameter zinc coated steel or equivalent zinc-coated wire anchors, spaced 24 inches on center.

2.3 Chromated copper arsenate shall conform to Fed. Spec. TT-W-550F, Type I or Type II.

2.4 Blocking, nailers and other items, whether or not covered by other materials, shall be pressure treated with water-borne chromate copper arsenate. Concentration for water-borne chromate copper arsenate shall not be less than 0.23 lbs. per cu. ft. The pressure treatment for preservatives shall conform to Fed. Spec. TT-W-571i.

2.5 Wood members in connection with roofing and flashing shall be pressure treated with water-borne chromate copper arsenate as specified above and in accordance with applicable APWA Specifications.

2.6 Lumber for temporary protection shall be southern yellow pine and an exterior type, Grade C, plugged fir plywood.

2.7 Anchors, connectors, and fastenings, not indicated or specified otherwise, shall be of the type, size, and spacing necessary to suit the conditions encountered and as recommended by the National Lumber Manufacturer's Association. Sizes, types, and spacing of nails, screws, or bolts for installation of manufactured building materials, shall be as recommended by the product manufacturer unless indicated or specified otherwise; bolts, nuts, washers, and all other rough hardware embedded in, or in contact with, exterior walls of masonry shall be zinc-coated, except as specified otherwise. Rough hardware shall be formed and punched before coating.

3. EXECUTION:

3.1 Members shall be closely fitted, accurately set to required lines and levels, and rigidly secured in place. Provide blocking where indicated and as necessary to secure the work.

3.2 All field-cut edges and surfaces of treated lumber shall be liberally coated with a concentrated solution of preservative.

3.3 Delivery and Storage

3.3.1 Protect lumber against dampness before and after delivery. Store under cover in a well ventilated area and where not exposed to extreme changes in temperature or humidity until used.

END OF THIS SECTION

DIVISION 6 - WOOD, PLASTICS, AND COMPOSITES

SECTION 6B - GLASS-FIBER-REINFORCED PLASTIC FABRICATIONS

1. GENERAL:

1.1 Section Includes

1.1.1 FRP grating.

1.1.2 FRP guardrails and handrails.

1.1.3 FRP ladders and ladder cages.

1.1.4 FRP structural shapes.

1.2 References

1.2.1 Section 5B – Metal Fabrications.

1.3 Submittals

1.3.1 Product Data: Manufacturer's published literature including structural design data, structural properties data, load/deflection tables, corrosion resistance tables, certificates of compliance, test reports as applicable, concrete anchor systems and their allowable load tables.

1.3.2 Shop Drawings:

(a) FRP products and accessories clearly showing material sizes, types, styles, part or catalog numbers, complete details for fabrication and erection of components including, but not limited to, location, lengths, type and sizes of fasteners, clip angles, member sizes, and connection details.

(b) Shop drawings for members or systems not sized or designed in Contract Documents shall be sealed by licensed professional engineer.

1.3.3 Samples: If requested, submit sample pieces of each item specified herein for acceptance by Owner as to quality and color. Sample pieces shall be manufactured by method to be used in Work.

1.4 Basis of Payment

1.4.1 Payment for work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

1.5 Quality Assurance

1.5.1 Manufacturer's qualifications:

(a) Products shall be furnished only by manufacturers having minimum of 5 years experience in design and manufacture of similar products and systems.

(b) If requested, record of at least 5 previous, separate, similar successful installations in last 5 years shall be provided.

(c) Manufacturer shall be certified to ISO 9001-2000 standard.

1.6 Delivery, Storage, and Handling

1.6.1 Delivery:

(a) Manufactured materials shall be delivered in original, unbroken pallets, packages, containers, or bundles bearing label of manufacturer.

(b) Adhesives, resins and their catalysts and hardeners shall be crated or boxed separately and noted as such to facilitate their movement to a dry indoor storage facility.

1.6.2 Storage:

(a) Materials shall be carefully handled to prevent abrasion, cracking, chipping, twisting, other deformations, and other types of damage.

(b) Store adhesives, resins and their catalysts in dry indoor storage facilities between 70°F and 85°F (21°C to 29°C) until required.

1.7 Project Conditions

1.7.1 Resins: All FRP products shall use isophthalic polyester resins.

1.7.2 FRP products manufactured with phenolic resins shall receive secondarily applied UV-coating system.

1.8 Warranty

1.8.1 Provide manufacturer's 3-year limited warranty on FRP products against defects in materials and workmanship.

2 PRODUCTS

2.1 Design Requirements

2.1.1 FRP items shall be composed of glass-fiber reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet design requirements and dimensions specified.

2.1.2 Glass-fiber reinforcement shall be continuous roving in sufficient quantities as needed by application and physical properties required.

2.1.3 Resin shall have chemical formulations as necessary to provide corrosion resistance, strength, and other physical properties as required.

2.1.4 Finished surfaces of FRP items and fabrications shall be smooth, resin-rich, free of voids and without dry spots, cracks, crazes or unreinforced areas. Glass fibers shall be well covered with resin to protect against exposure due to wear or weathering.

2.1.5 FRP components shall be protected from UV attack with integral UV inhibitors in resin, synthetic surfacing veil to help produce resin-rich surfaces, and/or appropriate UV-resistant coating for outdoor exposures.

2.1.6 Shop-fabricated cuts shall be coated with resin to provide maximum corrosion resistance. Coat field-fabricated cuts similarly in accordance with manufacturer's instructions.

2.1.7 FRP products shall have tested flame spread rating of 25 or less in accordance with ASTM E84 Tunnel Test. FRP products shall also meet self-extinguishing requirements of ASTM D635.

2.1.8 FRP products shall be electrically and thermally nonconductive.

2.1.9 Mechanical clips and fasteners shall be manufactured of Type 316 stainless steel.

2.1.10 Color: Yellow.

2.2 Pultruded FRP Grating

2.2.1 Glass-fiber reinforcement shall be combination of continuous rovings and continuous strand mats in sufficient quantities as needed by application and physical properties required.

2.2.2 Secondary bonding and grit adhesion: Epoxy, unless otherwise specified.

2.2.3 Components shall be high-strength and high-stiffness pultruded elements having continuous roving and continuous strand mat fiberglass reinforcements.

2.2.4 Bearing bars shall be interlocked with cross rod system, adhesive bonded, to provide mechanical and chemical lock.

2.2.5 Cross rods shall be below walking surface of grating. Gratings with cross rods that are flush with walking surface are excluded.

2.2.6 Nonslip surface: Quartz grit, adhesively bonded and baked to top surface of finished grating product.

2.2.7 Depth: 1” deep load bars.

2.2.8 Load/deflection:

(a) Design for uniform live load of 100 psf or concentrated load of 300 lb.

(b) Deflection shall not exceed 0.375” or L/D = 120, whichever is less under uniform live load of 65 psf or a concentrated load of 300 lbs.

2.2.9 Layout:

(a) Provide openings and holes where shown on Drawings.

(b) Grating openings which fit around protrusions (pipes, cables, machinery, etc.) shall be discontinuous at approximately centerline of opening so each section of grating is readily removable.

2.2.10 Hardware: Type 316 stainless steel hold-down clips spaced at maximum of 4’ (1200 mm) apart with minimum of 4 per piece of grating, or as recommended by manufacturer.

2.2.11 Manufacturer: Structural Fiberglass Inc., Fibergrate Composite Structures, Inc., ”Safe-T-Span,” Strongwell “Duradek,” or equal.

2.3 FRP Ladders And Ladder Cages

2.3.1 Design and fabricate in strict accordance with OSHA 1910.27. Ladder shall be capable of supporting concentrated vertical load of 1,200 lb applied at mid-span of rung. Provide supporting test data for rung capacity.

2.3.2 Ladder side rails, rungs, ladder mounting brackets and cage straps: FRP structural shapes manufactured by pultrusion process. Cage hoops and brackets shall be produced by open-molded hand lay-up method.

2.3.3 Fiberglass reinforcement: Combination of continuous roving, continuous strand mat, bi-directional roving mat and surfacing veil in sufficient quantities as needed by application and physical properties required.

2.3.4 Ladder side rail: 1-3/4" (44 mm) minimum square tube.

2.3.5 Rungs:

(a) 1" (25 mm) minimum diameter with continuously fluted or nonskid grit surface.

(b) Rungs shall penetrate wall of tube side rails and shall be connected to rails with both epoxy and rivets to provide both chemical and mechanical lock.

2.3.6 Ladder wall and floor mount: Fabricate from pultruded angles, 3/8" (9.5 mm) minimum thickness.

2.3.7 Ladder cage:

(a) Top and bottom hoops: 3" (75 mm) wide by 1/4" (6.3 mm) thick minimum.

(b) Intermediate hoops: 2" (50 mm) wide by 1/4" (6.3 mm) thick minimum.

(c) Vertical bars: 1-1/2" (38 mm) minimum.

(d) Cage hoops and cage brackets shall be manufactured by open-mold hand lay-up process.

2.3.8 Provide Type 316 stainless steel bolts for attaching ladder cage vertical bars to hoops, ladder hoops to brackets, ladder cage brackets to ladder, and wall brackets to ladder.

2.3.9 Fabrication:

(a) Ladders shall be fully shop assembled.

(b) Ladder cages shall be test assembled and drilled to ensure proper fit in field.

(c) Ladder cage brackets shall remain attached to ladder for shipping, but ladder cage components may be disassembled, packaged, and shipped separately to ensure lowest freight costs and to prevent damage in transit.

(d) Cage components shall be bundled with each respective ladder.

2.3.10 Manufacturer: Structural Fiberglass Inc., Fibergrate Composite Structures Inc. “Dynarail,” Strongwell “Safrail,” or equal.

2.4 FRP Guardrail And Handrail

2.4.1 FRP guardrail and handrail systems shall comply with IBC 2006 and OSHA 1910-23 for industrial occupancies.

2.4.2 Posts and rails:

(a) FRP structural shapes manufactured by pultrusion process.

(b) Structural shapes shall be composed of fiberglass reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet design requirements and dimensions specified.

2.4.3 Fiberglass reinforcement: Combination of continuous roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by application and physical properties required.

2.4.4 Top and bottom rails: 1.75" (44.4 mm) minimum square tube.

2.4.5 Posts:

(a) 2" (50 mm) minimum square tube.

(b) Spacing: Not to exceed 6'-0" (1.83 m).

2.4.6 Kickplate: 1/2" deep x 4" wide (12 mm x 100 mm) with minimum of 2 reinforcing ribs.

2.4.7 Completed guardrail and handrail installation shall meet following load requirements with minimum factor of safety of 2.0:

(a) Concentrated load: 200 lb (91 kg) applied in any direction at top rail.

(b) Uniform load: 50 lb/lf (74.4 kg/m) of top rail in any direction.

(c) Loads are assumed not to act concurrently.

2.4.8 Rails, posts, and kick plates: Integrally pigmented yellow.

2.4.9 Fasteners: Type 316 stainless steel.

2.4.10 No sharp, protruding edges shall remain after assembly of guardrail and handrail.

2.4.11 Attach post bases to supports as shown on Drawings or as recommended by manufacturer.

2.4.12 When required, splice rails using internal square or round connector secured in place using epoxy adhesive or stainless steel rivets.

2.4.13 Manufacturer: Structural Fiberglass Inc., Fibergrate Composite Structures Inc. “Dynarail,” Strongwell “Safrail,” or equal.

2.5 Pultruded FRP Structural Shapes

2.5.1 FRP structural members and connections not sized and detailed on Drawings shall be designed by licensed professional engineer retained by Contractor. Design shall be in accordance with general arrangements shown on Drawings and with design criteria specified.

2.5.2 Design of FRP framing members and connections shall be in accordance with IBC 2006 and OSHA Subpart D.

2.5.3 Design framing members and connections for FRP stairs, platforms, and walkways for 100 psf live load, unless noted otherwise.

2.5.4 Maximum deflection for framing members shall not exceed L/D = 180 under 65 psf live load.

2.5.5 Manufacture structural shapes by pultrusion process. Structural shapes shall be composed of glass-fiber reinforcement and resin in qualities, quantities, properties, arrangements and dimensions as necessary to meet design requirements and dimensions as specified.

2.5.6 Glass-fiber reinforcement shall be combination of continuous roving, continuous strand mat, and surfacing veil in sufficient quantities as needed by application and physical properties required.

2.5.7 Hardware: Use Type 316 stainless steel bolts for field connections.

2.5.8 Pultruded structural shapes shall have minimum longitudinal mechanical properties as listed below:

Property	ASTM Method	Value	Units
Tensile Strength	D638	30,000 (206)	psi (MPa)
Tensile Modulus	D638	2.5×10^6 (17.2)	psi (GPa)
Flexural Strength	D790	30,000 (206)	psi (MPa)
Flexural Modulus	D-790	1.6×10^6 (11.0)	psi (GPa)
Flexural Modulus (Full Section)	N/A	2.6×10^6 (17.9.3)	psi (GPa)
Short Beam Shear (Transverse)	D2344	4,500 (31)	psi (MPa)
Shear Modulus (Transverse)	N/A	4.25×10^5 (2.9)	psi (GPa)
Coefficient of Thermal Expansion	D696	4.4×10^{-6} (8.0×10^{-6})	in/in/°F (cm/cm/°C)
Flame Spread	E84	25 or less	N/A

2.5.9 Manufacturer: Structural Fiberglass Inc., Fibergrate Composite Structures Inc. “Dynaform,” Strongwell “Extren,” or equal.

3 EXECUTION

3.1 Installation

3.1.1 Follow manufacturer's instructions when cutting or drilling fiberglass products or using resin products; provide adequate ventilation.

3.1.2 Field cut and drill fiberglass reinforced plastic products with carbide or diamond tipped bits and blades.

3.1.3 Seal cut or drilled surfaces in accordance with manufacturer's instructions.

3.1.4 Install gratings in accordance with manufacturer's assembly drawings. Fasten grating panels securely in place with hold-down fasteners as specified herein

3.1.5 Install stair treads in accordance with manufacturer's assembly drawings. Fasten stair treads to supports as specified herein

3.1.6 Assemble and install ladder in strict accordance with manufacturer's assembly drawing and installation brochures.

3.1.7 Assemble and install guardrails and handrails in strict accordance with manufacturer's assembly drawing and installation brochure.

3.1.8 Assemble and install FRP structural shapes in strict accordance with manufacturer's assembly drawing and installation brochures.

END OF THIS SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 7A - BOARD INSULATION

1. GENERAL:

1.1 Section Includes

1.1.1 Board insulation for roof system.

1.2 Related Section

1.2.1 Section 4A - Unit Masonry System.

1.2.2 Section 6A - Rough Carpentry

1.2.3 Section 7B - Modified Bitumen Roofing

1.3 References

1.3.1 ASTM C240 - Testing Cellular Glass Insulating Block.

1.3.2 ASTM C272 - Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.

1.3.3 ASTM C552 - Cellular Glass Block and Pipe Thermal Insulation.

1.4 System Description

1.4.1 Materials of this Section shall provide a continuous thermal barrier at building enclosure elements.

1.5 Submittals

1.5.1 Submit under provisions of Division 1.

1.5.2 Shop Drawings: Indicate setting plan for insulation.

1.5.3 Product Data: Provide data on product characteristics, performance criteria, and limitations.

1.5.4 Manufacturer's Installation Instructions: Indicate special environmental conditions required for installation and installation techniques.

1.5.5 Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 Delivery, Storage, and Protection

1.6.1 Deliver, store, protect and handle products to site under provisions of Division 1 and in accordance with the manufacturer's instructions.

1.7 Environmental Requirements

1.7.1 Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.8 Basis of Payment

1.8.1 Payment for the work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. PRODUCTS:

2.1 Manufacturers - Insulation Materials

2.1.1 Pittsburgh Corning Products: Flat Foamglas Insulation; Tapered Foamglas Insulation, 1/8-inch/ft. taper

2.1.2 Substitutions: Under provisions of Division 1.

2.2 Insulation Materials

2.2.1 Cellular Glass Insulation: ASTM C552 Type IV, cellular glass board; with the following characteristics:

(a) Board Density: 128 Kg/m^3 (8.0 lb./cu ft).

(b) Thermal Resistance: R-value of 3.0 per inch.

(c) Compressive Strength: Min. 0.69 MPa (100 psi).

(d) Water Absorption: In accordance with ASTM C240, 0.2 percent by volume maximum.

(e) Board Edges: Square.

(f) Board Thickness: As required to achieve an R value of 19.0.

2.3 Adhesive Materials

2.3.1 Adhesive: Type recommended by insulation manufacturer for application.

2.4 Accessories

2.4.1 Nails or Staples: Steel wire; galvanized; type and size to suit application.

2.4.2 Protective Boards: Wood fiberboard, 1/4 inch thick.

2.4.3 Underlayment: Foamglas Insulation

2.4.4 Fasteners: See manufacturer recommendations for anchorage of insulation to metal deck

3. EXECUTION:

3.1 Examination

3.1.1 Verify substrate and adjacent materials and insulation boards are dry and ready to receive insulation and adhesive.

3.1.2 Verify substrate surface is flat, free of honeycomb, fins, irregularities and materials that may impede adhesive bond.

3.1.3 Verify insulation boards are unbroken, free of damage.

3.2 Installation - Roof Insulation

3.2.1 Lay underlayment and bottom layer of insulation on top of, and anchored to, metal deck in accordance with insulation manufacturer's instructions.

3.2.2 Place insulation in accordance with insulation manufacturer's instructions.

3.2.3 Adhere insulation with a full mopping of hot asphalt applied between all layers and in accordance with Section 7B - Modified Bitumen Roofing.

3.2.4 Lay insulation in parallel courses with all joints staggered between courses and each course firmly adhered to the deck.

3.2.5 Where more than one layer of insulation is required, stagger joints where possible in relation with the layer beneath and firmly adhere each layer to the previous layer.

3.2.6 Lay insulation boards to moderate contact without forcing joints. Cut insulation to fit neatly to perimeter blocking and protrusions through roof.

3.2.7 Miter cut all valleys.

3.2.8 Install the specified membrane in accordance with the membrane manufacturer's instructions and Section 7B - Modified Bitumen Roofing.

3.3 Protection of Finished Work

3.3.1 Protect finished work under provisions of Division 1.

3.3.2 Do not permit work to be damaged prior to covering insulation.

3.4 Schedule

3.4.1 Roof Insulation: Type IV cellular glass.

END OF THIS SECTION

DIVISION 7 - THERMAL MOISTURE PROTECTION

SECTION 7B - MODIFIED BITUMEN ROOFING - CONVENTIONAL APPLICATION

1. GENERAL:

1.1 Section Includes

1.1.1 Modified bitumen membrane roofing, and base flashings.

1.2 Related Sections

1.2.1 Section 6A - Rough Carpentry

1.2.2 Section 7A - Board Insulation.

1.2.3 Section 7C - Sheet Metal Flashing and Trim.

1.3 References

1.3.1 ASTM D41 - Asphalt Primer Used in Roofing, Damproofing, and Waterproofing.

1.3.2 ASTM D312 - Asphalt Used in Roofing.

1.3.3 ASTM D2178 - Asphalt Felt Used in Roofing and Waterproofing.

1.3.4 ASTM D4601 - Asphalt Coated Glass Fiber Base Sheet Used in Roofing.

1.3.5 NRCA (National Roofing Contractors Association) - Roofing and Waterproofing Manual.

1.3.6 ULI - Fire Hazard Classifications.

1.4 System Description

1.4.1 Modified Bitumen Conventional Roofing System: Torch applied modified bitumen membrane system with granular surface finish.

1.5 Submittals

1.5.1 Submittals: Procedures for submittals as specified in Division 1.

1.5.2 Product Data: Provide membrane and bitumen materials, base flashing materials, and insulation.

1.5.3 Manufacturer's Installation Instructions: Indicate special precautions required for seaming the membrane.

1.5.4 Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5.5 Manufacturer's Field Reports: Submit under provisions of Division 1.

1.5.6 Reports: Indicate procedures followed, ambient temperatures, and wind velocity during application.

1.6 Quality Assurance

1.6.1 Perform Work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

1.7 Qualifications

1.7.1 Manufacturer: Company specializing in manufacturing the products specified in this section with ten years documented experience.

1.7.2 Applicator: Company specializing in performing the work of this section with ten years documented experience and approved by system manufacturer.

1.8 Regulatory Requirements

1.8.1 Conform to applicable code for roof assembly fire hazard requirements.

1.8.2 ULI: Class A Fire Hazard Classification.

1.9 Pre-Installation Conference

1.9.1 Convene two weeks prior to commencing work of this Section.

1.9.2 Attendees should include Architect/Engineer, Owner, Contractor, Roofing Sub-Contractor, and Roofing Materials Supplier.

1.9.3 Review installation procedures and coordination required with related work.

1.10 Delivery, Storage, and Handling

1.10.1 Deliver, store, protect and handle products to site under provisions of Section 01600.

1.10.2 Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.

1.10.3 Store products in weather protected environment, clear of ground and moisture.

1.10.4 Stand roll materials on end.

1.11 Environmental Requirements

1.11.1 Do not apply roofing membrane during inclement weather.

1.11.2 Do not apply roofing membrane to damp or frozen deck surface.

1.11.3 Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.12 Coordination

1.12.1 Coordinate work under provisions of Section 01039.

1.12.2 Coordinate the work with installing associated flashings as the work of this section proceeds.

1.13 Warranty

1.13.1 Provide 20 year warranty under provisions of Division 1.

1.13.2 Warranty: Cover damage to building resulting from failure to prevent penetration of water.

1.14 Basis of Payment

1.14.1 Payment for the work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. PRODUCTS:

2.1 Manufacturers - Membrane Materials

2.1.1 GAF Building Materials Corporation: Ruberoid MB Plus Granular Surface Membrane Torch Applied; Specification I-3-1-TGPFR.

2.1.2 Substitutions: Under provisions of Division 1.

2.2 Membrane Materials

2.2.1 Membrane: Ruberoid MB Plus FR, Granular Surfaced Torch Applied; white color.

2.3 Sheet Materials

2.3.1 Glass Fiber Base Sheet: ASTM D4601, Type II; GAFGLAS #75 Base Sheet.

2.4 Bituminous Materials

2.4.1 Asphalt Bitumen: ASTM D312, Type III.

2.5 Base Flashings

2.5.1 Base Flashing: Modified bitumen type to suit membrane sheeting.

2.6 Accessories

2.6.1 Sealant: As recommended by membrane manufacturer.

2.6.2 Fasteners and Anchors: Stainless steel expansion shield and lag bolt type for anchorage of sheathing to solid masonry.

3. EXECUTION:

3.1 Examination

3.1.1 Verify that surfaces and site conditions are ready to receive work.

3.1.2 Verify deck is supported and secured.

3.1.3 Verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains.

3.1.4 Verify deck surfaces are dry and free of snow or ice.

3.1.5 Beginning of installation means acceptance of the surface of the substrate.

3.2 Membrane Application

3.2.1 Install base sheet, membrane, and flashings in accordance with membrane manufacturer's instructions.

3.2.2 Equiviscous Temperature of Bitumen at Point of Application: Within 25 degrees F of bitumen rating labeled on bitumen container.

3.2.3 Torch apply membrane; seal seams and ends permanently waterproof.

3.2.4 Apply membrane smooth, free from air pockets, wrinkles, or tears.

3.2.5 Extend membrane up cant strips minimum of 4 inches onto vertical surfaces.

3.2.6 Install waterproof cut-off to membrane at end of day's operation. Remove cut-off before resuming roofing.

3.2.7 Mop and seal membrane around roof penetrations.

3.3 Flashings and Accessories

3.3.1 Apply membrane base flashings to seal membrane to vertical elements.

3.3.2 Coordinate installation of roof drains and related flashings.

3.3.3 Seal flashings and flanges of items penetrating membrane.

3.4 Field Quality Control

3.4.1 Field inspection will be performed under provisions of Division 1.

3.4.2 Correct identified defects or irregularities.

3.4.3 Request site attendance of roofing and insulation materials manufacturers during installation of the Work.

3.5 Cleaning

3.5.1 Remove bituminous markings from finished surfaces.

3.5.2 In areas where finished surfaces are soiled by work of this Section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

3.5.3 Repair or replace defaced or disfigured finishes caused by work of this Section.

3.6 Protection

3.6.1 Protect building surfaces against damage from roofing work.

3.6.2 Where traffic must continue over finished roof membrane, protect surfaces.

END OF THIS SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 7C - SHEET METAL FLASHING AND TRIM

1. GENERAL:

1.1 Section Includes

1.1.1 Sill, lintel, base, through wall and cap flashings.

1.1.2 Fascias and soffits.

1.2 Products Furnished but not Installed Under this Section

1.2.1 Section 3A - Cast-in-Place Concrete.

1.3 Related Sections

1.3.1 Section 4A - Unit Masonry System.

1.3.2 Section 7D - Joint Sealers.

1.3.3 Section 15A - General Mechanical Provisions.

1.4 References

1.4.1 ASTM A525 - Sheet Steel, Zinc Coated, (Galvanized) by the Hot-Dip Process.

1.4.2 ASTM B209 - Aluminum and Alloy Sheet and Plate

1.4.3 ASTM B32 - Solder Metal.

1.4.4 ASTM B370 - Copper Sheet and Strip for Building Construction.

1.4.5 CDA (Copper Development Association) - Contemporary Copper, A Handbook of Sheet Copper Fundamentals, Design, Details and Specifications.

1.4.6 CDA - Copper Roofing - A Practical Handbook.

1.4.7 FS O-F-506 - Flux, Soldering, Paste and Liquid.

1.4.8 FS QQ-S-571 - Solder, Tin Alloy.

1.4.9 NAAMM - Metal Finishes Handbook.

1.4.10 NRCA (National Roofing Contractors Association) - Roofing Manual.

1.4.11 SMACNA - Architectural Sheet Metal Manual.

1.5 Submittals

1.5.1 Submit under provisions of Division 1.

1.5.2 Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.5.3 Samples: Submit two samples 12" long of each type of metal flashing illustrating typical material, and finish.

1.6 Qualifications

1.6.1 Fabricator and Installer: Company specializing in sheet metal flashing work with 5 years minimum experience.

1.7 Delivery, Storage and Handling

1.7.1 Deliver, store, protect, and handle products to site under provisions of Division 1.

1.7.2 Stack preformed material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

1.7.3 Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.8 Basis of Payment

1.8.1 Payment for the work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. PRODUCTS:

2.1 Manufacturers

2.1.1 Copper Flashing: Through wall, base, lintel, sill and cap; Keystone Flashing Co.

2.1.2 Aluminum Coping: Architectural Products Co., AP Standard Coping Type.

2.1.3 Substitutions: Under provisions of Division 1.

2.2 Sheet Materials

2.2.1 Copper: ASTM B370, cold rolled; soft temper; 4.8 Kg/m^2 (16 oz./sq. ft.) natural finish.

2.2.2 Aluminum Sheet: ASTM B209, smooth 5005-H34 alloy; min. .063 inch thick; anodized with finish to match existing.

2.3 Accessories

2.3.1 Fastener: Same material and finish as flashing metal with soft neoprene washers at exposed fasteners.

2.3.2 Underlayment: 6 mil polyethylene.

2.3.3 Slip Sheet: Rosin sized building paper.

2.3.4 Sealant: Type specified in Section 7D.

2.3.5 Reglets: Recessed friction type copper and surface mounted copper, manufactured by Keystone Flashing Co.

2.3.6 Solder: ASTM B32; 50/50 type.

2.3.7 Flux: FS O-F-506.

2.4 Fabrication

2.4.1 Form sections true to shape, accurate in size, square, and free from distortion or defects. Through wall, base, lintel and sill flashings shall be interlocking, self-draining type with 3-way bonding, formed by dovetailed flat corrugations 3" o.c. transversing sheet material. Two piece cap flashing shall be interlocking, self-draining type with continuous locking slot, self-aligning tongue and sealant flange.

2.4.2 Fabricate cleats, hold-down clips, and starter strips of same material as sheet, minimum 2 inches wide, interlockable with sheet.

2.4.3 Form pieces in longest practical lengths.

2.4.4 Hem exposed edges on underside 1/2 inch; miter and seam corners.

2.4.5 Form material with flat lock seam.

2.4.6 Pretin edges of copper sheet.

2.4.7 Solder and seal metal joints. After soldering, remove flux. Wipe and wash solder joints clean.

2.4.8 Fabricate corners from one piece with minimum 16 inch long legs; solder for rigidity, seal with sealant.

2.4.9 Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed 45^{o} to form drip.

2.4.10 Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.

3. EXECUTION:

3.1 Examination

3.1.1 Verify roof openings, pipes, or vents through roof are solidly set and nailing strips located.

3.1.2 Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 Preparation

3.2.1 Install starter and edge strips, and cleats before starting installation.

3.2.2 Field measure site conditions prior to fabricating work.

3.3 Installation

3.3.1 Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Engineer.

3.3.2 Lap, Cleat and seal all joints.

3.3.3 Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

3.3.4 Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

3.3.5 Seal metal joints watertight.

3.4 Field Quality Control

3.4.1 Field inspection will be performed under provisions of Division 1.

3.4.2 Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF THIS SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 7D - JOINT SEALERS

1. GENERAL:

1.1 Section Includes

1.1.1 Preparing sealant substrate surfaces.

1.1.2 Sealant and backing.

1.2 Related Sections

1.2.1 Section 3A - Cast-In-Place Concrete.

1.2.2 Section 4A - Unit Masonry System.

1.2.3 Section 7C - Sheet Metal Flashing and Trim: Sealants used in conjunction with metal flashings.

1.2.4 Section 8A - Aluminum Doors and Frames.

1.2.5 Section 10A - Specialties.

1.3 References

1.3.1 ASTM C920 - Elastomeric Joint Sealants.

1.3.2 ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.

1.3.3 FS TT-S-00227 - Sealing Compound: Elastomeric Type, Multi-Component.

1.3.4 FS TT-S-001543 - Sealing Compound, Silicone Rubber Base.

1.3.5 SWRI (Sealing, Waterproofing, and Restoration Institute) - Sealant and Caulking Guide Specification.

1.4 Submittals

1.4.1 Submit under provisions of Division 1.

1.4.2 Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

1.4.3 Samples: Submit two samples
4 x 1/2 inches in size illustrating color for selection.

1.4.4 Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.4.5 Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 Quality Assurance

1.5.1 Perform work in accordance with SWRI requirements for materials and installation.

1.6 Qualifications

1.6.1 Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 10 years documented experience.

1.6.2 Applicator: Company specializing in performing the work of this section with minimum 5 years documented experience.

1.7 Environmental Requirements

1.7.1 Do not install solvent curing sealants in enclosed building spaces without providing adequate ventilation.

1.7.2 Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.8 Coordination

1.8.1 Coordinate work under provisions of Division 1.

1.8.2 Coordinate the work with all sections referencing this section.

1.9 Basis of Payment

1.9.1 Payment for the work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. PRODUCTS:

2.1 Sealants

2.1.1 Silicone Sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT, M, A, O; single component, moisture curing, low modulus type; color as selected; Spectrem 1 manufactured by Tremco.

2.2 Accessories

2.2.1 Primer: Non-staining type, recommended by sealant manufacturer to suit application.

2.2.2 Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

2.2.3 Joint Backing: ASTM D1056; round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.

2.2.4 Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

2.2.5 Bituminous and Fiber Joint Filler: ASTM D1751 or FS HH-F-341.

3. Execution:

3.1 Examination

3.1.1 Verify that substrate surfaces and joint openings are ready to receive work and field measurements are as shown on Drawings and recommended by the manufacturer.

3.1.2 Verify that joint backing and release tapes are compatible with sealant.

3.2 Preparation

3.2.1 Remove loose materials and foreign matter which might impair adhesion of sealant.

3.2.2 Clean and prime joints in accordance with manufacturer's instructions.

3.2.3 Perform preparation in accordance with ASTM C804 for solvent release sealants.

3.2.4 Protect elements surrounding the work of this section from damage or disfiguration.

3.3 Installation

3.3.1 Install sealant in accordance with manufacturer's instructions.

3.3.2 Measure joint dimensions and size materials to achieve required width/depth ratios.

3.3.3 Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.

3.3.4 Install bond breaker where joint backing is not used.

3.3.5 Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

3.3.6 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.3.7 Tool joints concave.

3.4 Cleaning and Repairing

3.4.1 Clean work under provisions of Division 1.

3.4.2 Clean adjacent soiled surfaces.

3.4.3 Repair or replace defaced or disfigured finishes caused by work of this Section.

3.5 Protection of Finished Work

3.5.1 Protect finished installation under provisions of Division 1.

3.5.2 Protect sealants until cured.

END OF THIS SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 7E - METAL WINDOW PANELS

1. GENERAL

1.1. Section includes

1.1.1. The Panels required are as manufactured by Mapes Industries, Lincoln, NE. Panels consist of metal skins laminated to stabilizer substrates with an insulating core material. Panels are designed to be glazed into a window system or curtain wall system.

1.2. Quality Assurance

1.2.1. Panel manufacture shall have a minimum of 25 years experience.

1.2.2. Field measurements shall be taken prior to compilation of manufacturing and cutting.

1.2.3. Maximum deviation from vertical and horizontal alignment of installed panels is 1/8" in 20' non-commutative.

1.3. References

1.3.1. American Society of Testing Materials (ASTM)

A. E330-84: Structural Performance of exterior Windows, Curtain Walls and Doors under the influence of wind loads.

B. D1781-76: Climbing Drum Peel Test for Adhesives.

C. D3363-74: Method for Film Hardness by Pencil Test.

D. D2794-90: Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

E. D3359-90: Method for Measuring Adhesion by the tape test.

1.4. Substitutions:

1.4.1. The materials and products specified in this section establish a minimum standard of required function, design, appearance quality and warranty to be met by any proposed substitution.

1.4.2. No Substitutions will be considered unless a written request for approval has been submitted by the bidder and received by the architect 10 days prior to the bid date.

1.5. Submittals

1.5.1. Submittals shall be in conformance with Section 1.

1.5.2. Samples:

A. Panel makeup - 2 samples - 10" x 10".

B. Two samples of each color and finish texture - 3" x 5".

1.5.3. Submission Drawings: Indicate thickness, dimension and components of parts. Detail glazing methods, framing and tolerances to accommodate thermal movement.

1.5.4. Affidavit certifying materials meet all requirements as specified.

1.5.5. 2 copies of manufactures standard literature for specified material.

1.6. Delivery, Storage and Handling

1.6.1. Protect finish and edge in accordance with panel manufacturer's recommendations.

1.6.2. Store materials in accordance with panel manufacturer's recommendations.

1.7. Basis of Payment

1.7.1. Payment for the work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. PRODUCTS

2.1. Panels - Laminated

2.1.1. Laminated metal faced panels as manufactured by Mapes Industries, Inc.

2.1.2. Acceptable alternatives: Panels having similar composite construction and finish providing manufacturer has a minimum of 25 years panel laminating experience and comparable published warranties.

2.2. Finish

2.2.1 Exterior: Porcelain on Steel (Smooth)

2.2.2 Interior: Porcelain on Steel (Smooth)

2.2.3 Color as specified from manufacturer's standard to be submitted to IDOT for approval prior to procurement.

2.3. Panel Fabrication:

2.3.1. Substrates:

A. Exterior High density polyethylene (HDPE)

B. Interior High-Density polyethylene (HDPE)

2.3.2. Cores: A:2-lb density polystyrene

2.3.3. Tolerances – 8% of panels dimension length and width – (+/-) 1/16" thickness

2.3.4. Panel Thickness – 2"

2.3.5. R-Value – 9.23375

2.4. Accessories

2.4.1. Recommended for use as an infill panel component in window and curtain wall systems. Related material to complete installation as recommended by the manufacturer.

2.4.2. Seals against moisture intrusion as recommended by manufacturer. Polyurethane and silicone based sealant with a 20 year life are recommended.

3. EXECUTION

3.1. Installation

3.1.1. Panel surfaces shall be free from defects prior to installation

3.2. Execution

3.2.1. Erect Panels plumb, level and true.

3.2.2. Glaze panels securely and in accordance with approved shop drawings and manufactures instructions to allow for necessary thermal movement and structural support.

3.2.3. Do not install panels that are observed to be defective including warped, bowed, dented, scratched and delaminating components.

3.2.4. Weatherseal all joints as required using method and materials as previously specified.

3.2.5. Separate dissimilar metals using gasketed fasteners and blocking to eliminate the possibility of electrolytic reaction.

3.3. Adjusting and Cleaning

3.3.1. Remove masking film as soon as possible after installation. Masking intentionally left in place after panel installation will be the responsibility of the contractor.

3.3.2. Weep holes and drainage channels must be unobstructed and free from dirt and sealant.

END OF SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 8A - DELETED

SECTION 8B - DOOR HARDWARE

1. GENERAL:

1.1 Section Includes

1.1.1 Hardware for aluminum doors.

1.1.2 Thresholds.

1.1.3 Weather-stripping.

1.2 Products Furnished but not Installed Under This Section

1.2.1 Section 8A - Aluminum Doors and Frames.

1.3 Related Sections

1.3.1 Section 4A - Unit Masonry System.

1.3.2 Section 8A - Aluminum Doors and Frames.

1.4 References

1.4.1 ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

1.4.2 BHMA - Builders' Hardware Manufacturers Association.

1.4.3 DHI - Door and Hardware Institute.

1.4.4 NAAMM - National Association of Architectural Metal Manufacturers.

1.4.5 NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.

1.5 Submittals

1.5.1 Submit under provisions of Division 1.

1.5.2 Shop Drawings: Indicate locations and mounting heights of each type of hardware.

1.5.3 Submit manufacturer's parts list, templates.

1.5.4 Product Data: Provide data on specified hardware.

1.5.5 Samples: Submit 1 sample of hinge, lockset, closers, thresholds and weather-stripping illustrating style, color, and finish.

1.5.6 Samples: May be incorporated into the work or returned to supplier.

1.5.7 Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.6 Project Record Documents

1.6.1 Submit under provisions of Division 1.

1.6.2 Record actual locations of installed cylinders and their master key code.

1.7 Operation and Maintenance Data

1.7.1 Submit under provisions of Division 1.

1.7.2 Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1.8 Quality Assurance

1.8.1 Perform work in accordance with the following requirements:

(a) ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

(b) NFPA 101, Safety to Life from Fire in Buildings and Structures.

1.9 Quality Assurance

1.9.1 Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 5 years documented experience.

1.9.2 Hardware Supplier: Company specializing in supplying commercial door hardware with 5 years documented experience.

1.9.3 Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.10 Regulatory Requirements

1.10.1 Conform to applicable code for requirements applicable to fire rated doors and frames.

1.11 Delivery, Storage, and Handling

1.11.1 Deliver, store, protect, and handle products to site under provisions of Division 1.

1.11.2 Package hardware items individually; label and identify package with door opening code to match hardware schedule.

1.11.3 Deliver keys to Owner by security shipment direct from hardware supplier.

1.11.4 Protect hardware from theft by cataloging and storing in secure area.

1.12 Coordination

1.12.1 Coordinate work with other directly affected Sections involving manufacturer or fabrication of internal reinforcement for door hardware.

1.13 Warranty

1.13.1 Provide five year warranty under provisions of Division 1.

1.13.2 Warranty: Include coverage of door closers.

1.14 Maintenance Materials

1.14.1 Provide maintenance materials under provisions of Division 1.

1.14.2 Provide special wrenches and tools applicable to each different or special hardware component.

1.14.3 Provide maintenance tools and accessories supplied by hardware component manufacturer.

1.15 Basis of Payment

1.15.1 Payment for the work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. PRODUCTS:

2.1 Manufacturers

2.1.1 Hinges: Hager, Stanley, and H Soss.

2.1.2 Mortise Locksets: Corbin Russwin, Schlage, and Sargent.

2.1.3 Lock Guards: Ives and Trimco.

2.1.4 Closers: Corbin Russwin, LCN, and Norton.

2.1.5 Flush Bolts: Ives and Trimco

2.1.6 Weather-stripping: National Guard Products, Zero.

2.1.7 Thresholds: National Guard Products.

2.1.8 Door Stops: Ives and Trimco

2.1.9 Substitutions: Under provisions of Division 1.

2.2 Finishes

2.2.1 Finishes: Identified in schedule at end of section.

3. EXECUTION:

3.1 Examination

3.1.1 Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.

3.2 Installation

3.2.1 Install hardware in accordance with manufacturer's instructions and requirements of NAAMM.

3.2.2 Use templates provided by hardware item manufacturer.

3.2.3 Conform to ANSI A117.1 for positioning requirements for the handicapped.

3.3 Field Quality Control

3.3.1 Field inspection will be performed under provisions of Division 1.

3.3.2 Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.3.3 Provide two copies of certification to Engineer.

3.4 Protection of Finished Work

3.4.1 Protect finished work under provisions of Division 1.

3.4.2 Do not permit adjacent work to damage hardware or finish.

3.5 Schedule

3.5.1 Hinges: Wrought bronze, heavy weight, five knuckle, four ball bearing with non-rising pin, button tip and ring, non-removable pin on exterior doors, US10B finish, Hager Model BB1199.

(a) Door size to 8'-0" x 4'-0":
2 pr. 4.5" x 4.5".

(b) Door size over 8'-0" x 4'-0":
2-1/2 pr. 6" x 6".

3.5.2 Mortise Locksets: Wrought bronze, visible parts US10B finish, non-ferrous internal parts, with minimum 3/4" throw on latchbolt and 1" throw on deadbolt. Latch bolt grip either side. Deadbolt by thumbturn lever inside, throwing deadbolt locks outside lever, no outside key – use blank escutcheon plate, inside grip simultaneously retracts latch bolt and deadbolt and unlocks outside lever. Similar function to Schlage #L9456.

3.5.3 IDOT standard outside deadbolt: Heavy duty, high security padlock locking bolt with a 3/4" throw adjustable from 3/4" to 2-3/8" shall be provided mounted on the exterior of the door. Heavy duty padlock for the doors will be provided by IDOT.

3.5.4 Flush Bolts: Extension Type, Top and bottom of inactive leaf, BHMA Grade 1, mortiсed into door edge. Ives Model No. 457½.

3.5.5 Closers: Heavy duty parallel arms with adjustable closing speed, with hold-open for outswinging exterior doors. Corbin Russwin Series DC2000, Model No. DC2210 A2 M72 690.

3.5.6 Thresholds: Aluminum dark bronze, with chemically treated stainless steel screws, set in full bed of sealant. National Guard Products, Model No. 896NDKB with bumper gasket.

3.5.7 Weather-stripping: Head and jamb gasketing, aluminum with anodized bronze finish and neoprene insert. National Guard Products, Model 700NDkB.

3.5.8 Lock Guards: Prime painted cold rolled steel, thru-bolted with concealed fasteners. Ives No. LG1.

3.5.9 Door Stop: Polished Aluminum with non-marring rubber tips. Ives Model No. 447, all doors. Ives Model No. 449 stop/holder on Doors 02 and 04 only

END OF THIS SECTION

DIVISION 8 - DOORS AND WINDOWS

SECTION 8C - STEEL DOORS AND FRAMES

1. GENERAL:

1.1 Section Includes

1.1.1 Insulated Hollow Metal Doors and Frames.

1.2 Submittals

1.2.1 Product Data: For each product indicated. Indicate door designation, type, level and model, material description label compliance, fire-resistive ratings, and finishes

1.2.2 Door Schedule. Use same reference designations indicated on Drawings.

1.3 Quality Assurance

1.3.1 Steel Door and Frame Standard: Comply with ANSI A250.8, unless more stringent requirements are indicated.

1.4 Basis of Payment

1.4.1 Payment for the work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. PRODUCTS:

2.1 Manufacturers

2.1.1 Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

(a) Amweld Building Products, Inc.

(b) Ceco Door Products

(c) Curries Company

(d) Republic Builders Products

(e) Steelcraft; a division of Ingersoll-Rand

(f) Or architect approved others

2.2 Materials

2.2.1 Hot-Rolled Steel Sheets: ASTM A 1011A 10118M Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

2.2.2 Cold-Rolled Steel Sheets: ASTM A 1008/A 1008M Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability C

2.2.3 Metallic Coated Steel Sheets: ASTM A 653/A 653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

2.2.4 Electrolytic Zinc-Coated Steel Sheets: ASTM A 591/A 591M Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Weight [Mass] Applications.

2.3 Doors

2.3.1 Exterior Doors: Complying with ANSI A250.8 for level and model and ANSI A250.4 for physical endurance level indicated.

(a) Level 4 and Physical Performance Level A, Model 1 (Full Flush)

2.4 Frames

2.4.1 General: ANSI A250.8; conceal fastenings, unless otherwise indicated.

2.4.2 Frame Steel Sheet Thickness to be 0.067- inch- for exterior openings.

2.4.3 Door Silencers: Three silencers on single-door frames and two silencers on double-door frames.

2.4.4 Plaster Guards: 0.016 inch thick, steel sheet plaster guards or mortar boxes to close off interior of openings at all cutouts.

2.4.5 Supports and Anchors: Not less than 0.042 inch thick zinc coated steel sheet.

(a) Masonry Wall Anchors: 0.177 inch diameter, steel wire complying with ASTM A 510 (ASTM A510M) may be used in place of steel sheet.

2.4.6 Inserts, Bolts and Fasteners: Manufacturer's standard units. Zinc-coat items that are to be built into exterior walls according to ASTM A 153/A 153M, class C or D as applicable.

2.5 Fabrication

2.5.1 General: Fabricate steel door and frame units to comply with ANSI A250.8 free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant.

2.5.2 Exterior Doors: Fabricate doors, panels and frames from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053 inch thick, metallic-coated steel channels with channel webs placed even with top and bottom edges.

2.5.3 Core Construction: One of the following manufacturer's standard core materials that produce a door complying with SDI Standards.

(a) Resin-impregnated kraft/paper honeycomb.

2.5.4 Clearances for Non-Fire-Rated Doors: Not more than 1/8 inch at jambs and heads, except not more than ¼ inch between pairs of doors. Not more than ¾ inch at bottom.

2.5.5 Door-Edge Profile: Beveled edge.

2.5.6 Tolerances: Comply with SDI 117.

2.5.7 Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by the hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 series specifications for door and frame preparation for hardware.

2.5.8 Frame Construction: Fabricate frames with mitered or coped and continuously welded corners and seamless face joints. Provide temporary spreader bars.

2.5.9 Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at the Project site.

2.5.10 Locate hardware as indicated or, if not indicated, in accordance with ANSI A250.8.

2.6 Finishes

2.6.1 Prime Finish: Manufacturer's standard, factory applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

3. EXECUTION:

3.1 Installation

3.1.1 Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned and braced securely until permanent anchors are set. After the wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged..

(a) Wall anchors: Provide at least three anchors per jamb. For openings 90 inches or more in height, install an additional anchor at hinge and strike jambs.
(b) Fire-Rated Frames: Install according to NFPA 80.

3.1.2 Door Installation: Comply with ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A 115.1G.

3.1.3 After installation, remove protective wrappings from doors and frames and touch up prime coat with compatible air-drying primer.

END OF THIS SECTION

DIVISION 9 - PAINTING

SECTION 9A - PAINTING

1. GENERAL:

1.1 Description

1.1.1 This item of work includes the furnishing, preparation and application of painting and related items to complete the work indicated on drawings and described in these specifications.

1.1.2 All work under this Section shall be subject to the applicable provisions of Section 100 of the Standard Specifications. Refer to Division 1 for additional requirements.

1.1.3 Terms used in this Section shall be as defined in ANSI/ASTM DIG.

1.2 Reference Standards

1.2.1 The work shall be in conformance with the applicable standards/regulations of:

(a) Steel Structures Painting Council (SSPC)

(b) National Fire Protection Association (NFPA)

(c) American National Standards Institute (ANSI)

(d) Occupational Safety and Health Act (OSHA)

(e) SSPC SP10 "Near White Metal Blast Cleaning", Steel Structures Painting Council.

(f) Military Specification MIL-L-81352A

1.2.2 The term "finishes" as used herein means all painting and coating systems materials, including primers, emulsions, enamels, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

1.2.3 Consult the specifications for work and materials of other trades to determine the provisions regarding their finishing. Surfaces left unfinished by the requirements of other specifications shall be painted or finished as part of this work.

Work requiring finish and not specified shall be finished same as specified for similar work. Finishing specified hereinafter shall be in addition to shop and prime coats specified in other sections.

1.2.4 The work under this section shall be done by a firm with not less than 5 years of experience in commercial painting and finishing. Documentation of this experience shall be included together with the product data submitted for approval.

1.3 Quality Assurance

1.3.1 Painting shall conform to applicable Section 1008, PAINT MATERIALS and MIXED PAINTS, of the Standard Specifications.

1.3.2 The paints to be used in the work shall be products of Tnemec Co., Inc., or approved equal. The types of paint products to be used in the work shall be identified by the manufacturer's name and number.

1.3.3 The products of manufacturers other than those herein named, which are approved equal to the products specified, may be substituted, except that, all paints applied to a surface shall be products of one manufacturer. Data showing equivalent performance of each paint product to be submitted for review at least 30 calendar days before the painting is to begin, and no painting shall proceed until the substituted products have been accepted.

1.3.4 All paints and painting materials shall be delivered to the work in the original and unopened containers plainly marked with the name, brand, shelf life, and analysis of the product, and the name of the manufacturer.

1.4 Delivery and Storage of Materials

1.4.1 Deliver materials in original containers with seals unbroken and labels intact. Do not deliver or store on the site materials other than those approved for use. Empty containers shall have labels canceled.

1.4.2 Store materials outside the building. Keep storage place neat and clean and correct all damage thereto or to its surroundings.

1.4.3 Materials shall not be mixed or applied in any room having finished floor installed without providing adequate protection. Only materials used during the course of one day may be kept within the building. Remove oily rags and waste from building every night and take every precaution to avoid danger of fire.

1.5 Submittals

1.5.1 Submit product data under provisions of Section 1A.

1.6 Shop Drawings:Submit the following for approval:

1.6.1 Copies of manufacturer's technical information, including paint label analysis and application instructions, certification of coating, primer and finish coat for the material and service for each coating system proposed for use.

1.6.2 Copies of Contractor's proposed surface preparation and work area protection procedures in each area of the work.

1.6.3 List each material and cross-reference to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.

1.6.4 Copies of manufacturer's complete color charts for each coating system.

1.7 Basis of Payment

1.7.1 The work shall be paid as part of the Contract lump sum price for PUMP STATION GENERAL WORK
which shall be payment in full for the work described herein.

2. PRODUCTS:

2.1 Colors

2.1.1 Unless otherwise indicated, colors will be selected by the Engineer during the submitted review process.

2.1.2 Complete color charts shall be submitted of proposed paint manufacturers to the Engineer for final paint color selections.

2.1.3 Unless otherwise indicated, all surfaces without a final finish color shall be painted. In general, colors will be differentiated as follows:

(a) Grade Ceiling

(b) Grade walls

(c) Floors

(d) Interior metal trim

(e) Exterior metal trim

(f) Exterior piping and appurtenances

(g) Pump and recirculation piping

(h) Hoist Beam

Notes:

1. Wall and floor at wet well shall not be painted

2. Walls/ceiling below elevation +4.648m (+15'-3") shall not be painted
3. All piping, conduit or miscellaneous items flush to the wall or ceiling to be painted shall be painted the same color as the respective wall or ceiling.

2.2 Color Coding

2.2.1 Piping and electrical conduit shall be color coded with colors as selected by the Engineer. Electrical conduits shall be painted the color of the wall/ceiling against which it is run. Conduits are not required to be painted if they are not running against a wall or ceiling.

2.3 Non-Slip Floor Coating

2.3.1 Concrete floors above the wet pit shall have an abrasive coating of Series 287 Enviro-Tread as manufactured by Tremec Co., Inc., or equal. Bare concrete shall be spot primed at a dry film thickness of 2.0-3.0 mils. The first coat shall have a dry film thickness of 2.0-3.0 mils which includes silica sand to provide a non-skid surface. The second coat shall have a dry film thickness of 2.0-3.0 mils. The epoxy coating shall be applied in accordance with the manufacturer's recommendations.

3. EXECUTION:

3.1 Preparation

3.1.1 Inspect surfaces with regard to their suitability to receive a finish after preparatory work. The application of finish shall be an indication of the Contractor's acceptance of the surface.

3.1.2 Clean surfaces to be painted of loose dirt and dust before painting is started. Adjacent surfaces shall also be clean before starting painting. Do preparatory work necessary to produce a surface suitable to receive the specified finish.

3.1.3 Wash uncoated metal surfaces with mineral spirits to remove dirt and grease before applying paint materials. Blast profile shall not exceed 30% of total dry film thickness of coating. Preparation shall conform to primer manufacturer's requirements. Prime surfaces as soon as practical after preparation. Do not leave prepared, uncoated surfaces overnight. Touch up shop coats damaged by welding or abrasion.

3.1.4 Prior to painting, all surfaces shall be prepared and cleaned as specified and required. Surfaces shall be dry before any paint is applied.

Special surface preparation work shall be as directed by the manufacturer of the paint specified to be applied to the surface. Paint shall not be applied before the prepared surfaces are approved.

3.1.5 Prior to painting steel, all welds, beads, blisters or protuberances, other than identification markings, shall be ground smooth. Pits and dents shall be filled, and other imperfections shall be removed. All rust, mill scale, oil, grease and dirt shall be removed by sandblasting in the shop in accordance with Steel Structures Painting Council Specification No. SP-10, Near White (SSPC-SP-10). Cleaned metal shall be primed the same day immediately after sandblasting to prevent rusting.

3.1.6 Prior to painting other metals, all welds, beads, blisters or protuberances, other than identification markings, shall be ground smooth and other imperfections shall be removed. All nonferrous metals, galvanized steel and stainless steel whether shop primed or field primed, shall be solvent-cleaned in accordance with SSPC-SP-1 prior to the application of the primer. Nonferrous metal shall be treated with one coat of Koppers No. 40 Metal Passivator or equal before prime coat is applied.

3.1.7 Pipe covering and duct covering shall have all adhering debris removed and indentations or unsightly spots smoothed out to an even surface and shall be brushed clean.

3.1.8 Concrete surfaces and concrete masonry shall be brushed and washed. All loose dirt, free lime, form oil, curing compounds and other foreign matter shall be removed by approved methods. Concrete surfaces requiring repair shall be patched and surfaces to receive paint shall be spackled and repaired. Concrete surfaces to be painted shall be acid-etched as recommended by the manufacturer of the coating to be applied to produce a slightly granular surface required for adherence of the paint to the concrete unless otherwise indicated. Concrete and concrete masonry shall be thoroughly dry prior to painting.

3.2 Protection of Non-Finish Items

3.2.1 Furnish and lay drop cloths or other means of protection for finished surfaces during the work.

3.2.2 Before painting, remove hardware, accessories, plates, lighting fixtures and similar items or provide ample protection of such items. Upon completion of work in each area, replace above items. Use only skilled mechanics for removing and replacing items.

3.2.3 If finished surfaces are damaged, entirely remove the stains or replace the damaged material, making good any damage to other work in connection therewith, without additional cost to the State.

3.3 Application

3.3.1 The following items shall not be painted, unless otherwise specified: ducts, covering over ducts, registers, grilles, dampers and linkage, name and identification plates and tags, floor gratings, brass valves, stainless steel, wood, cast-iron piping installed underground.

(a) The following items shall be furnished with the manufacturer's standard prime and finish coats applied in the shop: pumps, motors, air compressors, wall fans, control and SCADA panels, panelboards, transformers, unit heaters, aluminum fascia, motor control centers, hoisting equipment.

(b) The following items shall be shop primed and field painted: structural steel and wrought metals, pipelines, hangers and supports, valves, valve operators and stands, guard housings, steel lintels, hollow metal doors and frames.

(c) All items not shop primed or shop finished shall be field primed and finished where exposed to view. The work shall generally include, but not be limited to, the following: interior concrete block, interior concrete walls, columns, beams and ceilings, covering over insulation on piping, electrical conduit, small piping and copper tubing, exterior PVC piping.

3.3.2 The work shall include all touch-up and remedial painting as required until the completion and acceptance of the final work.

3.3.3 Spray painting shall not be allowed.

3.4 Installation

3.4.1 Furnish equipment for the proper execution of the work. Erect and place same in such a way as not to interfere with work of other trades. Upon completion, dismantle and remove same from the job site.

3.4.2 Employ skilled mechanics to ensure good workmanship. Thoroughly mix materials immediately before application of paint. Surfaces shall be clean, dust free, dry and adequately illuminated. Each coat shall be thoroughly dry before applying succeeding coat.

3.4.3 Finished work shall be uniform and of approved color, smooth and free from runs, sags, and defective application. Edges of paint adjoining other materials or colors shall be sharp and clean, without overlapping. Before applying succeeding coats, primers and undercoats shall be completely integral and performing the function for which they are specified. Prepare and touch up scratches, abrasions, or other disfigurement and remove any foreign matter between successive coats.

3.4.4 Blast cleaned metal surfaces shall be coated immediately after cleaning, before any rusting or other deterioration or contamination of the surface occurs. Blast cleaned surfaces shall be coated not later than eight hours after cleaning under ideal conditions or sooner if conditions are not ideal.

3.4.5 Avoid degradation and contamination of blasted surfaces and avoid intercoat contamination. Clean contaminated surfaces before applying next coat. Ensure method of cleaning contaminated surface follows manufacturer's recommendations.

3.4.6 Primers and undercoats of paint and enamel shall be tinted or shaded different colors than the finish coats. Each coat of material shall be inspected and approved by the Engineer before application of the succeeding coat. Otherwise, no credit for the coat applied will be given and the work in question shall be recoated. Inform the Engineer when each coat is ready for inspection and approval.

3.4.7 Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance.

3.4.8 Painting shall not be done when the temperature is below 10 degrees C (50 degrees F) and when satisfactory results cannot be obtained due to high humidity or excessive temperatures. Paints or other finishes shall not be applied to wet or damp surfaces.

3.4.9 All painting shall be done in accordance with the paint manufacturer's recommendations.

3.4.10 All wall surfaces that will be concealed by equipment shall be painted before equipment installation.

3.5 Cleaning

3.5.1 Upon completion of painting work, clean paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.5.2 Rubbish, debris, empty paint cans and discarded materials shall be placed in metal containers and removed from the site.

3.6 Schedule

3.6.1 Material Painting Schedule

Class of Work	Primer Shop Coat	Field Coats 1st	2nd	3rd
Nonferrous Metal and Galvanized Steel:				
Interior		A	A	A
Exterior		A	A	C
Steel and Iron:				
Interior	B	B*	A	A
Exterior	B	B*	A	C
Submerged or Constantly Wetted	B	B*	D	D
Asphaltic Coated Steel		E*	A	A
Concealed in Masonry	B	B*		
Exposed to Potable Water	B	B*	B	F
Wrapped in Insulation	B	B*		
Exterior, Exposed to Process Wetting and Drying	B	B*	D	D
Concrete Masonry:				
Interior		G	D	D
Concrete		D	D	
Pipe and Duct Insulation:				
Exposed		A	A	
PVC		A	A	

*Touch-up bare metal with primer.

3.6.2 Paint Schedule

(a) Alphabetical designations in the following list are given solely for the purpose of indicating the type and quality of materials desired. Equivalent material from other approved manufacturers may be substituted.

Symbol	Product Name and Number	Volume Solids %	Dry Film Thickness Micrometers	(Mils) Per Coat
A	Tnemec Series 69 Hi-Build Epoxoline II	69	51-76 um	(2.0-3.0 mils)
B	Tnemec Series 140-1225 Chicago Biege Pota-Pox Plus	82	102-152	(4.0-6.0)

C	Tnemec Series 74 Endura-Shield	54	51-76	(2.0-3.0)
D	Tnemec Series 69 Hi-Build Epoxoline II	69	76-127	(3.0-5.0)
E	Tnemec Series 90-97 Tneme-Zinc	63	64-89	(2.5-3.5)
F	Tnemec Series 140-AA83 Pota-Pox Plus	82	102-152	(4.0-6.0)
G	Tnemec Series 69 Hi-Build Epoxoline II	69	178-254	(7.0-10.0)

3.6.3 Notes

(a) Where aluminum surfaces come in contact with incompatible metals, lime, mortar, concrete or other masonry materials, these areas shall be given one field coat of Tnemec Series 69 Hi-Build Epoxoline II.

(b) Stainless steel, where indicated shall be protected by two coats of clear acrylic lacquer conforming to the requirements of Military Specification MIL-L-81352A. Surface preparation shall consist of removing all oil and foreign matter by wiping clean with cloth and lacquer thinner.

(c) Applicable to insulated and uninsulated pipes: Steel pipe not available with a shop coat shall be prime coated in the field immediately after installation.

(d) Piping shall be painted up to and including the flanges attached to mechanical equipment. Electrical conduit shall be painted up to and including the flexible conduit connected to equipment.

END OF THIS SECTION

DIVISION 9 - PAINTING

SECTION 9B - REMOVAL AND DISPOSAL OF LEAD BASED PAINT

1. GENERAL:

1.1 Description

1.1.1 The work specified herein includes furnishing all equipment and material to remove and dispose of all paint, which is all to be assumed to be lead based, from the painted surfaces of the interior of the pump station.

1.2 Design Requirements

1.2.1 Contractor shall be responsible for design of Lead Abatement Program, Health and Safety Plan, implementations and use.

1.3 Submittals

1.3.1 Shop Drawings: Indicate materials and equipment to be used.

1.3.2 Manufacturer's Instructions: Indicate special procedures and conditions requiring special attention.

1.3.3 Submittals Required

(a) Certification of Lead Abatement Contractor and Lead Abatement Supervisor, including list of former clients and telephone numbers.

(b) Blasting materials and additives

(c) Health and Safety Plan, specific to the site.

(d) Final Report by a Certified Hazardous Materials Manager (CHMM)

(e) Name and Qualifications of Environmental Consultant.

1.4 Certifications Required

1.4.1 Work shall be performed by a State Licensed Lead Abatement Contractor. Work shall be supervised by the Contractor's Licensed Abatement Supervisor.

1.4.2 Contractor shall submit written certification prior to work proceeding.

1.5 Scheduling

1.5.1 Schedule Work to not coincide with new construction.

1.5.2 Describe removal procedures and schedule.

1.5.3 Perform noisy work in accordance with city ordinance.

1.6 Project Conditions

1.6.1 Conduct paint removal to minimize interference with adjacent and occupied building areas and plant operation.

1.6.2 Contractor shall obtain required permit from authorities at no additional costs to owner.

1.7 Submittals

1.7.1 Submit drawing showing extent of the area to be covered under this Section.

1.8 Basis of Payment

1.8.1 Payment for the work specified under this Section and as required shall be included in the Contract lump sum price for the Item, PUMP STATION GENERAL WORK.

2. PRODUCTS:

2.1 Manufacturers - Blasting Additive

2.1.1 BLASTOX by the TDJ Group

2.1.2 Substitutions: None

2.2 Blasting additives shall be BLASTOX, which is added to the non-recyclable abrasive blasting material to reduce the leachate potential of the waste product below the Federal Standard for hazardous material.

2.3 Examination

2.3.1 Contractor to verify existing site conditions.

2.4 Preparation

2.4.1 Provide, erect, and maintain temporary structures for protection of the existing facilities.

2.4.2 Provide, erect, and maintain temporary barriers to prevent spread of dust, odors, and noise to permit continued Owner occupancy.

2.4.3 Erect and maintain weatherproof closures for exterior openings.

3. EXECUTION:

3.1 General

3.1.1 Contractor shall perform all work in accordance with 29 CFR 1910, 29 CFR 1920, 29 CFR 1926 and all applicable state and Federal Laws.

3.1.2 Contractor shall cover and protect existing equipment so that no blasting material or moisture shall enter the existing facilities or equipment while removal work is proceeding. Contractor shall filter the exhaust air with an HEPA filter with a minimum of 0.3 Micron filter before discharge to the atmosphere.

Contractor shall monitor continuously and continuously record the discharge air for lead concentrations for the time that Abatement begins until satisfactory final cleaning. Contractor shall submit air monitoring records to Engineer. Air monitoring shall be conducted by a qualified Environmental Consultant with all costs paid by the Contractor.

3.1.3 Contractor shall clean up site on a daily basis so that no debris is tracked off the site by its owners or public personnel.

3.1.4 Contractor shall completely remove existing lead based paint from painted surfaces, structural components and piping. All debris and materials shall be removed from the site. Final clean up shall be based upon a lab analysis of the air sample from the pump station to be less than Federal Standards allow for completed Lead Abatement Program.

3.2 Final Report

3.2.1 Contractor shall submit a Final Report of the Lead Abatement program including:

(a) Names and addresses of licensed personnel performing work including license designation and number.

(b) Air monitoring records of exhaust air conducted by Environmental Consultant.

(c) Manifests of disposal of lead paint material and landfill forms.

(d) The lead leachate potential or TCLP of the lead based paint material that is disposed. Results to be verified by a NAVLAP accredited testing lab. Include accreditation of testing lab.

(e) Final Report to be signed and reviewed by a Certified Hazardous Material Manager. Report is to be complete with notes of any deficiencies and corrective action by Contractor. Report will not be complete until corrective actions are complete.

(f) Record of any correspondence or conversations with any area resident or the general public by the contractor or its personnel.

(g) Field and lab test results of final clean up.

3.2.2 Final Report will not be completed until all corrective actions are completed.

END OF THIS SECTION

DIVISION 10 - SPECIALTIES

SECTION 10A - SPECIALTIES

1. GENERAL:

1.1 Description

1.1.1 This item of work includes the furnishing and installation of bulletin board, fire extinguishers, first aid kit, service desk, nameplate, and related items to complete the work shown and specified.

1.1.2 Refer to Division 1 for additional requirements.

1.2 Related Sections

1.2.1 Section 5E - Bolts, Anchor Bolts, Expansion Anchors, and Concrete Inserts

1.2.2 Section 9A - Painting

1.3 Submittals

1.3.1 Submit shop drawings and product data under provisions of Section 1A.

1.4 Delivery, Storage and Handling

1.4.1 Delivery, storage and handling shall be in accordance with the provisions of Section 1A.

1.5 Guarantee

1.5.1 Provide guarantee under provisions of Section 1A.

1.6 Basis of Payment

1.6.1 Specialties shall be paid for as part of the Contract lump sum price for
PUMP STATION GENERAL WORK
which shall be payment in full for work described herein.

2. PRODUCTS:

2.1 Bulletin Board

2.1.1 Furnish and install one (1) two-panel bulletin board with glass doors as shown. Bulletin board panels shall be 1/4" cork mounted on hardboard. Doors shall have 1/4" glass and shall be continuously hinged with flat key tumbler locks. Overall dimensions shall be approximately 40" high, 60" long, 3" deep.

2.2 Staff Gauges

2.2.1 Two staff gauges, calibrated in feet and tenths of a foot, shall be provided. One shall be mounted in the wet well and one in the discharge chamber to show the water depths in the wet well and discharge chamber. Coordinate the installation with the floats and SCADA bubblers as necessary.

2.2.2 Each gauge shall be porcelain enameled iron rod. The rods shall be professional type, 2-1/2" wide minimum, with large bold markings of a height for the full height of the wet well.

2.2.3 Each staff gauge shall be attached and supported in the well using corrosion-resistant hardware at locations to avoid conflict with level controls, etc.

2.3 Shop Desk

2.3.1 A metal shop desk shall be provided. The desk shall have a 43 inch high work surface and shall be approximately 53 inches high by 34.5 inches wide by 30 inches deep. The unit shall have a rear top shelf riser, a 3.5 inch)high drawer on nylon rollers and a large storage compartment with locking door and an adjustable shelf. The unit shall have 14 ga. corner posts and a minimum 20 ga. top and shall have a gray enamel painted finish.

2.4 First Aid Kit

2.4.1 Furnish and install a first aid kit with brackets for wall mounting as directed. The kit shall be No. 99814C as manufactured by Johnson and Johnson or equal.

2.5 Fire Extinguishers

2.5.1 Furnish and install two fire extinguishers as directed. The extinguishers shall be multipurpose Dry Chemical Type with a U.L. rating of 20A: 120B: C, 9.07 kilograms (20 pound) capacity in enameled steel containers. The extinguishers shall be installed with wall brackets of size required for type and capacity of extinguisher indicated.

3. EXECUTION:

3.1 Installation

3.1.1 Install the specified specialties in accordance with manufacturer's recommendations and instructions to permit intended performance.

3.1.2 The manufacturer or supplier of the specified specialties shall furnish a qualified field engineer for whatever period of time may be necessary to assist and direct the contractor in the proper installation of the equipment furnished, to observe and check initial performance, and whose duty shall include the instruction of the plant operating personnel in the proper operating and maintenance procedures.

3.2 Painting

3.2.1 The specified specialties shall be painted in accordance with applicable AWWA standard specified and with Section 9A of these specifications.

3.3 Testing

3.3.1 The specialties shall be tested in place by the Contractor, and any defects in specialties or connections shall be corrected to the satisfaction of the Engineer.

END OF THIS SECTION

DIVISIONS 11, 12, 13 - NOT REQUIRED

DIVISION 14 - CONVEYING SYSTEMS

SECTION 14A - MONORAIL SYSTEM, HOIST, AND TROLLEY

1. GENERAL:

1.1 Section Includes

1.1.1 Monorail systems.

1.1.2 Hoists and trolleys.

1.1.3 Operating controls.

1.1.4 Accessories.

1.2 Related Sections

1.2.1 Section 5A - Structural Steel.

1.2.2 Section 5E - Bolts, Anchor Bolts, Expansion Anchors, and Concrete Inserts.

1.2.3 Section 9A - Painting.

1.2.4 Division 16 - Electrical.

1.3 References: Equipment shall meet the requirements of the following specifications unless more stringent requirements are otherwise specified:

1.3.1 ANSI B30.2.0 - Safety Standard for Overhead and Gantry Cranes.

1.3.2 ANSI B30.11 - Safety Standard for Underhung Cranes and Monorail Systems.

1.3.3 ANSI B30.16 - Safety Standard for Overhead Hoists.

1.3.4 ANSI B30.17 - Safety Standards for Overhead and Gantry Cranes

1.3.5 ANSI MH27.1 - Specifications for Underhung Cranes and Monorail Systems.

1.3.6 HMI 100 - Standard Specifications for Electric Wire Rope Hoists.

1.3.7 HMI 200 - Standard Specifications for Hand-Operated Chain Hoist.

1.3.8 HMI 400 - Standard Specification for Electric Chain Hoists.

1.3.9 CMAA No.70 - Specifications for Electric Overhead Traveling Cranes.

1.3.10 CMAA No.74 - Specifications for Top Running and Under Running Single Girder Electric Overhead Traveling Cranes

1.3.11 NEC - National Electric Code

1.3.12 NEMA - National Electrical Manufacturers Association.

1.3.13 AWS D1.1 - Code for Welding in Building Construction.

1.4 System Description

1.4.1 Characteristics of motorized trolleys and electric hoists are as follows:

	LOCATION	
	Under Roof EL. +23.33’	
	Motorized Trolley	Electric Hoist
Motor No.	TM-1	HM-1
Use	Low Flow Pump/Trash bin	Low flow Pump/Trash Bin
Rated Capacity	1,000 pounds	1,000 pounds
Rated Speed	30 fpm ±10%	14 fpm
Lift Height	-	54 ft.
Headroom	-	20”
Approach, Maximum, South Side	-	20”
Approach, Maximum, North Side	-	20"

(a) Specific Design Information applicable to ½ Ton Trash Bin Trolley/Hoist (TM-1/HM-1):

Jib Crane for Hoist/Trolley shall be Wallace Model No. HSC0-J1-08, or equal, Wall Bracket Jib Crane. Jib Crane shall be attached by the contractor to the structural member provided, as shown on the drawings. Trolley stops shall be added as indicated on the drawings.

1.4.2 Although only the principal items are described herein, it is understood that all items necessary for safe and efficient operation shall be supplied, so that monorail system shall be complete in all respects and ready for operation.

1.4.3 Minimum and maximum hook heights and approach distances shall be as indicated on Drawings.

1.4.4 All necessary safety devices, stops, brakes, and any additional structural supports necessary to make the system complete and ready for safe operation shall be included.

1.4.5 Hoist equipment and electrification shall meet the explosion proof requirements for Class 1, Division 1, Group D hazardous locations.

1.5 Submittals

1.5.1 Shop Drawings: Indicate as a minimum, Plans, elevations, anchor bolt size and layout, and sectional views fully dimensioned to indicate actual clearance along with other pertinent data.

1.5.2 Panel Layout and Schematic Wiring Diagrams: Provide complete wiring diagrams indicating all electrical devices, numbered terminal strips and wiring and complete description of control system.

1.5.3 Catalog data and information shall be submitted for each unit.

1.6 Quality Assurance

1.6.1 All equipment shall be from one manufacturer or supplier.

1.6.2 All materials shall be new and have first class ingredients and construction.

1.6.3 All monorail system equipment, including trolleys, hoists, switches and electrification devices, shall be installed by a manufacturer approved installer to ensure system completeness, operational integrity and safety.

1.6.4 Hoist manufacturer shall coordinate hoist system requirements with hoist beam supplier and shall verify compatibility and suitability of hoist beams where indicated on Drawings.

1.7 Operation and Maintenance Data

1.7.1 Submit under provisions of Division 1.

1.7.2 Maintenance Data: Include a parts catalog with complete list of equipment replacement parts and local distributors.

1.7.3 Provide two complete sets of replacement parts, including but not limited to, brake linings and contact kits.

1.7.4 Operation Manuals: Include description of system's method of operation and control, including motor control system and special or non-standard features provided.

1.7.5 Maintenance Manuals: Include instructions for lubrication, adjustment and care of equipment, including detailed technical descriptions of operation, adjustment, and settings of electrical circuits and mechanical equipment.

1.7.6 Provide legible schematic wiring diagrams covering electrical equipment as supplied and installed, including changes made in final work, with symbols listed corresponding to identity or markings on equipment.

1.8 Qualifications

1.8.1 Manufacturer: Company specializing in manufacturing the Products specified with minimum ten years documented experience. The suppliers of equipment under this Section shall be members of the Crane Manufacturer's Association of America, Inc.

1.8.2 Installer: Company specializing in performing the work of this section and approved by monorail equipment manufacturer.

1.9 Regulatory Requirements

1.9.1 Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.10 Field Measurements

1.10.1 Verify that field measurements are as indicated on shop drawings.

1.11 Basis of Payment

1.11.1 Monorail system, hoist, and trolley shall be paid for as part of the Contract lump sum price for PUMP STATION MECHANICAL WORK which shall be payment in full for work described herein.

2. PRODUCTS:

2.1 Manufacturers

2.1.1 Abell-Howe Crane.

2.1.2 TC/American.

2.1.3 R&M Materials Handling Inc.

2.1.4 P&H Crane.

2.1.5 Harnischfeger Corp.

2.1.6 ACCO/Louden/Wright.

2.2 General

2.2.1 All equipment shall be of explosion proof design meeting all NEC explosion proof requirements for Class 1, Division 1, Group D hazardous locations.

2.2.2 Service Classifications: All equipment shall be designed for minimum Class C (Moderate Service) as specified in ANSI MH27.1, and operation in normal ambient temperatures (0 degrees to 40 degrees C) and normal atmospheric conditions, free from excessive dust and moisture.

2.2.3 The maximum allowable stresses in materials used for various parts of the equipment are specified herein. However, manufacturer shall be responsible for an adequate design based on factors proven in practice and shall use lower working stresses wherever he deems necessary or desirable.

2.2.4 Adequate factors of safety shall be used throughout the design, especially in the design of parts subject to alternating stresses, vibration, impact, or shock. Under the most severe conditions of static or dynamic loading expected in normal operation, stresses in the materials shall not exceed the values specified below. Maximum shear stresses in ferrous materials shall not exceed 60% of the allowable stresses in tension, except as noted below. The design stresses for components not listed herein shall be selected by manufacturer, but the maximum stresses in tension or compression shall not exceed one-third of the yield strength or one-fifth of the ultimate tensile strength.

2.2.5 Structural building components as shown on the Drawings are separate from this specification. All other supports, connections, clamps, nuts, washers, etc., are part of this specification.

2.2.6 Track end stops shall be of the welded type and shall be capable of withstanding the impact of a fully loaded crane or carrier traveling at 50% of the full load speed.

2.2.7 All working parts shall be arranged for convenient inspection, lubrication, adjustment, repair, or replacement. The equipment shall be assembled, painted, tested, and adjusted in the shop as far as practicable before shipment.

2.3 Power Supply

2.3.1 All electric power supply equipment shall be suitable for 480-volt, 3-phase, 60-hertz electric service. All hoisting equipment shall be provided with suitable junction boxes for connection of field services and complete with a ground pad. Connections shall be located as shown.

2.3.2 Power connections shall be of NEC Type S cable with explosion-proof connections and power reels or festooning systems, UL, Inc. listed for use in explosive locations

2.4 Motorized Trolley

2.4.1 Trolley wheels shall be designed to operate on the bottom flange of the crane girder, wheels shall be bronze with tapered, hardened treads, designed to carry the maximum wheel load under normal conditions without undue wear, with diameter no less than is shown in Table 4.1 of Hoist Manufacturers Institute - Standard Specifications HMI-100-74 for contour wheels with treads no less than 1 inch wide. Wheels shall be machined to match diameters with treads to match the rolling surface of the lower flange of the hoist beam.

2.4.2 Wheel bearings shall be double row precision ball bearings, provided with fittings and seals for pressure lubrication. Bearings shall be selected to provide a minimum B10 life of 5,000 hours.

2.4.3 The electrical controls for the trolley shall be included in the push-button operation for the hoist.

2.4.4 Routine inspection of gear train shall require no disassembly of major components.

2.5 Electric Hoist

2.5.1 Electric hoist controls shall comply with NEC requirements for the application being considered and shall include control fusing and contacts mechanically and electrically interlocked.

2.5.2 Hoist and appurtenances shall be designed to withstand all stresses imposed under safe operating conditions while handling loads within the rated capacity.

2.5.3 Load bearing parts shall be designed such that the static stress, calculated for rated load, shall not exceed 20% of the ultimate strength of the material.

2.5.4 Furnish suitable push-button pendant control. Push-button arrangement to be supplied with strain relief protection

2.5.5 Hooks shall be spark resistant bronze supported by anti-friction thrust bearings and permit 360^{o} rotation. Provide latch to bridge opening of the hook.

2.5.6 Hoists shall be equipped with overload limit device to limit loads to rated capacity.

2.5.7 Provide an upper limit switch that will automatically stop the hoist motion when the block reaches its highest position.

2.5.8 The hoisting rope shall be non-sparking stainless steel cable.

2.5.9 The braking system shall be capable under normal operating conditions with rated load to stop and hold the load when controls are released. Two brakes shall be provided; Mechanical load brake and electrical motor brake.

2.5.10 Controlled lowering shall be limited to 120% of rated lowering speed. In the event of complete power failure, the load shall be stopped and held.

2.5.11 All bearings shall be heavy duty, anti-friction type with a minimum B10 life of 5,000 hours.

2.5.12 All gearing shall be forged heat treated alloy steel machined for smooth quiet operation. All gearing shall meet AGMA quality specifications. No cast gears shall be permitted.

2.5.13 The hoisting drum shall be fabricated of high-grade cast iron or steel to withstand the maximum bending and crushing loads. The drum shall be designed so that not less than two complete wraps of hoisting rope remains in the grooves when the hook is in the lowest position, and there is no overlapping when the hook is in the highest position. Drum grooves shall be turned from solid metal, grooved right- and left-hand for double reeving, and provide grooves not less than one half the nominal wire rope diameter in depth. The drum shall be equipped with shrouded flanges or the equivalent to prevent cable override.

2.6 Electrical Equipment

2.6.1 All electrical equipment and wiring shall comply with the requirements of Division 16 of the Specifications.

2.6.2 Power supply shall be 480V, 3 phase, 60 Hz. All electrical interconnections for the monorail system shall be provided by the manufacturer.

2.6.3 Motor voltage shall be 460V, 3 phase, 60 Hz. Controls, lights and heaters shall be operated on 120V, single phase, 60 Hz, derived from the control power transformer in motor starters. Push-button control voltage shall not exceed 120V.

2.6.4 Motors shall be fully sealed for hazardous locations and protected by thermal overload relays. Motors shall be fully enclosed non-ventilated, 60 minute duty, Class F insulation, 85°C temperature rise over 50°C ambient, 1.15 service factor, NEMA hoist-duty. Motors shall be wound-rotor type except those rated less than 7.5 kW (10 HP) and no more than two speeds may be of either wound-rotor type or squirrel-cage type. Each motor shall be braced and insulated to withstand plugging service and heavy shocks and vibrations transmitted to it by the driven machinery. Motor bearings shall be anti-friction type, grease-lubricated with provision for applying and draining grease and for preventing overgreasing. Motor bearings shall have AFBMA B10 life of not less than 10,000 hours.

2.6.5 DC magnet-actuated disc brake shall be provided for rapid stopping of the motor with minimum or zero hook drift.

2.6.6 Motor starters shall be combination circuit breaker, full voltage, reversing, magnetic, NEMA Size 1 minimum, with thermal overload on each phase, fused control power transformers, NEMA 7 explosion proof enclosure. The starter coil voltage shall not exceed 120V.

2.6.7 All floor-operated functions shall be executed through common pendant push-button station. The push-button station shall be heavy duty, NEMA 7 explosion proof with heavy-duty, multi-conductor cable supported mechanically in a satisfactory manner to protect the electrical conductor against strain. The push-button station shall be constructed to prevent electrical shock and clearly marked for identification of functions.

2.6.8 Hoist-driven rotating cam or traveling nut type limit switches shall be provided for the upper and lower hook positions, and a block-operated back-up overtravel limit switch which directly interrupts power to the hoist motor shall be provided for the extreme upper position. Lever-operated end-of-travel limit switches shall be provided for motorized trolley. All limit switches shall be actuated in one direction only, automatically reset, mounted in NEMA 7 explosion proof enclosures.

2.7 Finishes

2.7.1 All monorail tracks, switches, support steel, rods and clamps shall be painted in accordance with Section 9A of these Specifications. The top surface of the bottom flange of track may not be painted if the manufacturer specifies that painting may impair wheel motion.

Hoists shall be painted with the manufacturer's standard finish.

3. EXECUTION:

3.1 Examination

3.1.1 Verify location and layout of anchor bolts.

3.1.2 Verify that electrical power is available and of correct characteristics.

3.2 Installation

3.2.1 Install system and components in accordance with ANSI B30.11.

3.2.2 The monorail system installer shall provide all labor and perform all work to install and make operable all mechanical and electrical equipment necessary to assure safe and reliable operation.

3.2.3 Structural members shall not be cut, drilled or otherwise altered without permission of the Engineer.

3.2.4 Structural supports as shown on the Drawings are separate from this specification. All other supports, connections, clamps, nuts, washers, etc., are part of this specification.

3.2.5 All tracks, support steel, rods and clamps shall be painted in accordance with Section 9A of these Specifications. The top surface of the bottom flange of track may not be painted if the manufacturer specifies that painting may impair wheel motion. Hoist shall be painted with the manufacturer's standard finish.

3.3 Tests by Regulatory Agencies

3.3.1 Field inspection and testing will be performed under provisions of Division 1.

3.3.2 Perform tests required by ANSI B30.11 and ANSI B30.2.0 in the presence of the Engineer and Owner. Each hoist shall be tested through a complete lift and lowering cycle and through complete trolley travel along beam to determine that the equipment will perform the function of hoisting, braking and traveling quietly and smoothly. The hoisting capacity shall be tested as near actual anticipated loads as possible with available loading facilities such as material or equipment which is readily available within area served. Defects in the equipment indicated by tests shall be promptly corrected.

3.3.3 Schedule tests with two week notice.

3.4 Cleaning

3.4.1 Remove protective coverings from protected surfaces.

3.4.2 Clean surfaces and components ready for inspection.

END OF THIS SECTION

DIVISION 15 - MECHANICAL

SECTION 15A - GENERAL MECHANICAL PROVISIONS

1. GENERAL:

1.1 Section Includes

1.1.1 The scope of work under this Division shall be all mechanical work required for the project work as shown or specified.

1.1.2 The mechanical work shall include the furnishing and installing of various items of mechanical equipment and appurtenances. Unless otherwise specifically indicated, electrical work shown on the electrical drawings shall be provided under Division 16. Any additions or modifications to the work shown on the electrical drawings required for the proper installation or operation of work under this Division shall be provided under this Division, at no additional cost to the Owner, in conformance with the requirements of Division 16. The Contractor shall be responsible for ascertaining the extent of electrical connections required for items furnished under this Division, for ascertaining the extent of electrical work shown on the electrical drawings and for coordinating the electrical work accordingly.

1.1.3 The specifications and drawings are intended to generally define the work required, but they do not include every equipment and installation detail. The work shall include all items and appurtenances required to fully complete the work, whether specifically identified or not, such that the electrical systems are complete and operational.

1.1.4 Furnishing and installing of work under this Division shall comply with Division 1 requirements relating to the furnishing and installing of work.

1.2 Code Compliance

1.2.1 Unless otherwise indicated, in the absence of more stringent requirements in the Specifications or on the Drawings, the work shall be in compliance with the requirements of applicable codes, as a minimum.

1.3 Standards

1.3.1 Wherever the following abbreviations are used in these Specifications, or on the Drawings, they are to be construed the same as the respective expressions represented:

MHSW	P.S. Manual for Highway Storm Water Pumping Station
AASHTO	American Association of State Highways and Transportation Officials
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
AWWA	American Water Works Association
IPCEA	Insulated Power Cable Engineers Association
IES	Illuminating Engineering Society of North America
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
UL	Underwriter's Laboratories
HIS	Hydraulic Institute Standard
FM	Factory Mutual
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association

1.3.2 Wherever a reference is made to a standard or standard specification, the reference shall be to the edition current at the time of bidding, including any revisions or amendments.

1.4 Verification of Contract Drawings

1.4.1 The Contractor shall familiarize himself with the details of the total construction insofar as they may affect the work under this Division, including floor elevations, physical dimensions of structures, materials of construction and the nature of work required under other Divisions. No additional compensation will be granted for failure to consider the total project work.

1.4.2 The contract drawings (Drawings) for electrical work are generally diagrammatic and do not necessarily depict all items to scale. The Drawings indicate the general locations of major elements of the work, however, field conditions or interferences, may require changes in the installation. The Contractor shall coordinate his work to avoid interferences and shall obtain approval prior to making any changes from the installation shown.

1.4.3 Prior to installation, the Engineer may make reasonable minor changes in the locations of the installation without additional cost to the State.

1.4.4 The electrical work shown on the electrical drawings (or on electrical portions of multi-trade drawings) shall be provided under Division 16. Any changes in the electrical installation required for the proper installation or operation of items provided under this Division shall be provided under this Division in full conformance with the requirements of Division 16. In other words, if a change to the electrical work is required to accommodate equipment provided under Division 15, that change shall be the responsibility of Division 15 and it must be in full compliance with the requirements of Division 16.

1.5 Coordination

1.5.1 The Contractor shall coordinate the work under this Division with the work of other trades. This shall include an orderly exchange of information and shall be accomplished such that the total work is not delayed and that interference is avoided.

1.6 Workmanship

1.6.1 The mechanical work shall be performed in a neat and workmanlike manner in accordance with the best practices of the trade.

1.6.2 Unless otherwise indicated, all materials and equipment shall be installed in accordance with the manufacturer's recommendations.

1.7 Protection of Work

1.7.1 All mechanical work, including equipment and appurtenances, shall be protected from damage until final acceptance. Equipment shall be covered to protect against dirt, moisture, paint and the like. The work shall be protected from mechanical injury by appropriate covering or shielding.

1.7.2 Prior to final acceptance, protective measures shall be removed and equipment and items shall be cleaned as required to deliver the installation to the State in clean, undamaged condition.

1.8 Clean-up and Safety

1.8.1 The work site shall be maintained in a clean condition, free of hazards, all in conformance with the requirements of Article 107 of the Standard Specifications. Special care shall be taken to assure that systems are not left in a hazardous condition.

1.9 Materials and Equipment

1.9.1 Quality

(a) All materials, equipment and appurtenances shall be new, shall be suitable for the application and shall be the product of established, reputable manufacturers.

1.9.2 Standards

(a) The construction, sizes, ratings and capacities of items shall be in conformance with the requirements of the codes and with ASTM and ASME standards, as applicable.

1.9.3 UL and/or FM Label

(a) Unless otherwise indicated, materials and equipment shall bear the UL and/or FM label whenever such labeling is available for the type of material or equipment being furnished.

1.9.4 Other Requirements

(a) Refer to Division 1 for other requirements relating to materials and equipment.

1.10 Erecting and Jointing Interior Piping

1.10.1 Description

(a) This section includes furnishing of supports and hangers and installation of all interior piping and supports.

(b) Piping of the materials, coatings and linings shown or specified shall be installed and supported at the locations specified or where shown.

1.10.2 Delivery, Storage and Handling

(a) All products and materials shall be delivered, stored and handled as specified in Division 1.

(b) Extreme care shall be taken in loading and unloading the pipe and fittings. The work shall be done slowly using skids or suitable power equipment keeping the pipe under control at all times.

(c) Under no condition is the pipe to be dropped, bumped, dragged, pushed or moved in any way that will cause damage to the pipe, lining or coating.

(d) When handling the pipe with a crane, a suitable pipe hook or sling shall be used around the pipe. Under no condition is the sling to be allowed to pass through the pipe unless adequate measures are taken to prevent damage to the pipe ends, lining and coating.

(e) Any piping or fittings damaged in the process of delivery, storing, handling, or laying shall be replaced or repaired as approved.

1.10.3 The interior of pipelines shall be cleaned of all dirt and superfluous material of every description in an approved manner.

1.10.4 All bolts shall be primed by dipping with a bituminous coating, except the threads, which are coated immediately prior to installation of the nuts.

1.10.5 All threads shall be coated with a suitable pipe dope, Masters Metallic Compound, graphite and engine oil, or equal, before jointing.

1.10.6 Installed piping shall be free of sags or bends.

1.10.7 Piping shall be installed to allow for expansion and contraction without stressing pipe, joints or connected equipment.

1.10.8 The fire rated integrity shall be maintained where pipes pass through fire rated walls, partitions, ceilings, and floors.

1.10.9 Pipelines shall be fitted and installed in a neat and workmanlike manner in accordance with approved shop drawings.

1.10.10 Flanged joints shall be made with bolts or bolt studs with a nut on each end.

1.10.11 Welding of pipe joints shall conform with the requirements of ANSI B31.1 unless otherwise specified. All off site welding of steel pipe shall conform to the appropriate requirements.

(a) Pipe and fittings with wall thickness of 3/16-inch and larger shall have ends beveled for welding. Parts to be welded shall be securely held in place and in proper alignment during welding.

(b) The abutting pipe ends shall be separated before welding to permit complete fusion to the inside wall of the pipe without overlapping.

(c) Welding shall be continuous around the joint and completed without interruption.

(d) Welds shall be of the single vee butt type, of sound weld metal thoroughly fused into the ends of the pipe and into the bottom of the vee.

(e) Welds shall be free from cold shuts, pinholes, oxide inclusions or other defects.

1.10.12 Anchors and stands shall be furnished and installed when specified, shown, or required for holding the pipelines and equipment in position or alignment.

Where adjustable supporting devices are not required, pipelines 3 inches in diameter and smaller shall be supported on cast-iron, malleable iron, or steel hooks, hook plates, rings or ring plates.

1.10.13 Hangers and Supports

(a) Pipe hangers shall be provided at each change in pipe direction, on both sides of pipe mounted valves and equipment and on both sides of pipe loops and expansion absorbing devices.

(b) Brackets shall be used for the support of piping from vertical surfaces.

(c) Anchors shall be furnished and installed when specified, shown, or required for holding the pipelines and equipment in position or alignment.

(d) Hangers and supports shall be installed to allow controlled movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.

(e) Hangers shall be adjusted to distribute loads equally on the attachment and to achieve any indicated slope of the pipe.

1.10.14 For sleeve type couplings, equally tighten diametrically opposite bolts on the coupling to bring the gaskets up evenly all around the pipe. Final tightening shall be done with torque wrenches set for the torque recommended by the coupling manufacturer.

1.10.15 All piping shall be installed in accordance with the manufacturer's recommendations and approved Shop Drawings and as specified in Division 1.

1.10.16 After installation of the interior piping and supports, control equipment and all appurtenances, the units shall be subjected to a field running test, as specified in Division 1, under actual operating conditions. Where field welding of pipe joints shown, specified, permitted, or required meet the requirements of ASME/ANSI B31.1 -Power Piping, Chapter VI Section 137.4 Hydrostatic Testing. Testing of pipelines shall be in accordance with the requirements of Division 15A Section 12.

1.11 Leakage Tests

1.11.1 Leakage tests shall be performed for any signs of leakage in all pipelines and structures required to be watertight.

1.11.2 Leaks shall be repaired by replacing broken pipe or joint assemblies found to leak at no addition to the Contract Price.

1.12 Testing

1.12.1 All mechanical equipment and systems provided under this Division shall be adjusted and tested. The Contractor shall adjust, repair or replace faulty or improper Division 15 work or equipment discovered during testing.

1.12.2 Tests may be made progressively as portions of the work are complete.

1.12.3 Tests shall be made in the presence of the Engineer.

1.12.4 The Contractor shall maintain a written record of tests and, when complete, it shall be submitted for the record.

1.12.5 The Contractor shall perform all tests necessary to assure proper functioning of materials and equipment. Specific special required tests shall be as described in individual equipment specifications, however, the absence of a specific test requirement does not relieve the Contractor from responsibility to adequately test the equipment and systems for proper operation.

1.12.6 Except where otherwise specifically indicated, testing must be complete prior to final inspection. All instruments, tools, etc., required for the tests shall be provided by the Contractor. Additional testing may be requested by the Engineer during final inspection to spot-check test results or to demonstrate proper functioning of the systems. These tests shall be performed by the Contractor at no additional cost to the State.

1.13 Record Drawings

1.13.1 Alterations and additions to the mechanical installation depicted on the contract drawings made during the execution of the work shall be neatly and plainly marked in red on a set of Record Drawings kept at the contractor's field office for the project. These drawings shall be updated as the work progresses and shall be available for inspection during the course of the work.

1.13.2 Record Drawings shall be prepared and submitted in accordance with Division 1.

1.14 Data to be Filed with the Owner

1.14.1 Certain data, as specified herein, shall be furnished to the Owner when installation and testing are complete, before final acceptance.

1.14.2 The data shall be compiled in 8-1/2 x 11 inch format in high quality heavyweight, hard cover binders with piano style metal hinges or in an alternate approved format. Large drawings and other materials that would be opened or removed for reading shall be provided with heavy clear plastic pouches within the binders. The number of binders shall be as required to hold all required material without overfilling. Various sections, as appropriate shall have suitable dividers. All volumes shall be labeled.

1.14.3 Four sets of the data files shall be provided.

1.14.4 As a minimum, the data files shall include:

(a) A table of contents.

(b) Approved final shop drawings and product data for all equipment and materials incorporated in the work under this Division.

(c) Manufacturer's maintenance manuals for all equipment furnished under this Division for which the manufacturer recommends maintenance.

1.14.5 All data shall be neat and clearly legible. The table of contents and tabulations of set points and other recorded test data shall be typed. Sloppy, illegible, inaccurate, or incomplete data will not be accepted.

1.14.6 See Division 1 for further requirements.

1.15 Final Acceptance Inspection

1.15.1 When the work is complete, tested and fully operational and only after the Record Drawings have been reviewed and accepted, the Contractor shall schedule a Final Acceptance Inspection with the Engineer.

1.15.2 The Final Acceptance Inspection shall be made for the complete work at the facility as a whole and shall be as further described in Section 105 of the Standard Specifications.

1.16 Guarantees

1.16.1 Guarantees shall be provided for equipment, materials and work provided under this Division as specified in Division 1.

1.17 Maintenance

1.17.1 During the course of the construction work and until final acceptance, the Contractor shall be responsible for maintenance and operational integrity of the facility as specified in Division 1.

1.18 Basis of Payment

1.18.1 Work required to comply with this Division shall be paid as specified under each individual Section, which shall be payment in full for the work described.

2. PRODUCTS:

Not Used

3. EXECUTION:

Not Used

END OF THIS SECTION

DIVISION 15 - MECHANICAL

SECTION 15B - BASIC MECHANICAL MATERIALS AND METHODS

1. GENERAL:

1.1 Description

1.1.1 Basic materials and methods specified herein shall be incorporated in the work wherever applicable unless specifically indicated otherwise.

1.1.2 The basic materials and methods specified herein are intended to define a minimum standard of quality and workmanship.

1.2 Concrete

1.2.1 Concrete for equipment bases and other work under this Section shall be provided under this Section in conformance with Division 3.

1.3 Cutting and Patching

1.3.1 All cutting and patching of building materials required for work under this Section shall be provided under this Section.

1.3.2 Cutting and patching shall be provided under this Section in conformance with Division 1.

1.4 Fasteners

1.4.1 Fasteners used to mount pipe supports and other items attached to the structure shall be suitable for the weight supported and shall be compatible with the structure material, i.e. wood screws shall be used for wood, toggle bolts shall be used for hollow masonry, expansion bolts or power-set studs shall be used for solid masonry or concrete and clamps shall be used for structural steel.

1.5 Support and Anchors

1.5.1 This section includes requirements for providing all hanging and supporting devices of construction shown, specified, or required for pipelines, apparatus, HVAC system, plumbing, miscellaneous system, and equipment other than electrical equipment.

1.5.2 Submittals

(a) All submittals, including the following, shall be provided as specified in Division 1.

(b) Shop drawings shall be submitted to show the quantity, type, design and location of all supports, hangers and anchors required.

1.5.3 Supporting devices adequate to maintain the pipelines, apparatus, and equipment in proper position and alignment under all operating and testing conditions with due allowance for expansion and contraction shall be provided.

1.5.4 Supporting devices shall be designed in accordance with the best practice and shall not be unnecessarily heavy. Supporting devices shall accommodate loads imposed during leakage tests for the test pressures specified.

The required strength of supporting devices shall be based on the combined weight of the piping and connected equipment, the weight of the denser of the fluids used in operations or testing and the weight of insulation where applicable. Supports shall be installed with a working safety factor of not less than 5. Installation shall conform to requirements of Division 5 - Metals.

1.5.5 Springs shall be provided where necessary. Hangers and supports shall be of standard design where possible and shall be best suited for the service required. Proper pipe protection saddles shall be included for hangers and supports on pipes that are covered with insulation. Where required, supports shall be screw adjustable after installation unless approved otherwise.

1.5.6 All supporting devices shall be designed to minimize interference with access and movement. Eliminate the potential for injuries due to protruding supporting devices.

1.5.7 Base piping support, hanger rod size, brackets and spacing shall meet the requirements of ANSI/ASME B31.1, MSS SP-58, SP-69, SP-89 and SP-90 except as modified herein.

1.5.8 All products and materials shall be delivered, stored and handled as specified in Division 1.

1.5.9 Structural and miscellaneous steel, metal castings, ductile iron pipe and fittings, steel pipe and fittings, and supports meeting the requirements of Division 5 - Metals shall be used.

1.5.10 Overhead hangers shall be supported using threaded rods properly fastened in place by suitable screws, clamps, inserts, or bolts, or by welding. Hangers shall be subjected to tensile loading only. Where lateral or axial movement may occur, suitable linkage shall be provided to permit sway.

1.5.11 Suspended piping shall be supported by adjustable ring or clevis hangers and threaded rods from heavy-duty concrete inserts or other fastening devices, except as otherwise specified or noted.

1.5.12 Brackets shall be of welded steel and designed for the following load classifications:

Load Classification	Maximum Load per Bracket
Light	340 kg (750 pounds)
Medium	680 kg (1,500 pounds)
Heavy	1,361 kg (3,000 pounds)

When medium or heavy brackets are bolted to vertical surfaces, backplates of adequate size and thickness shall be furnished and installed to distribute the load against the vertical surfaces. When the use of backplates is not practicable, the brackets shall be fastened to the vertical surfaces in such a manner that the safe bearing strength of the vertical surfaces will not be exceeded.

1.5.13 Piping shall be connected, supported and guided to permit and control pipe expansion and contraction and to accommodate building expansion, contraction and settling without damage to the piping or support system.

(a) Anchors shall be furnished and installed when specified, shown, or required for holding the pipelines and equipment in position or alignment. Anchors shall be designed for rigid fastening to the structures, either directly or through brackets.

(b) Anchors shall be cast-iron chair type anchors for piping with steel straps, except where anchors form an integral part of pipefittings or where an anchor of special design is required.

(c) Inserts shall be galvanized concrete inserts. Inserts shall be designed to permit the rods to be adjusted horizontally in one plane and to lock the rod nut or head automatically. Inserts shall be recessed near the upper flange to receive reinforcing rods. Inserts shall be designed so that they may be held in position during concrete placing operations. Inserts shall be designed to carry safely the maximum load that can be imposed by the rod that they engage.

1.5.14 Hanger and supports shall be installed in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1 and Section 15A.

1.5.15 When specified, hangers and supports shall be galvanized as specified in this Division.

1.5.16 Hangers, supports, anchors, and similar devices shall be painted as specified in Division 9.

1.5.17 Field welds, bolted connections, and abraded areas shall be cleaned and painted as specified in Division 9.

1.6 Basis of Payment

1.6.1 The work required to comply with this Division shall be paid as specified under each individual Section, which shall be payment in full for the work described.

2. PRODUCTS:

Not Used

3. EXECUTION:

Not Used

END OF THIS SECTION

DIVISION 15 - MECHANICAL

SECTION 15C - PIPING AND APPURTENANCES

1. GENERAL:

1.1 Section Includes

1.1.1 The work specified herein includes furnishing and installing all piping, fittings, valves, and accessories, except work specified in Division 15G required for a complete and satisfactorily working installation as shown and specified.

1.2 Related Sections

1.2.1 Section 9A - Painting

1.2.2 Section 15A - General Mechanical Provisions

1.2.3 Section 15B - Basic Mechanical Materials and Methods

1.2.4 Section 15D - Pumping Equipment

1.3 Submittals

1.3.1 Submit shop drawings and product data under provisions of Sections 1A and 15A.

1.3.2 Submit detailed drawings and data on pipe fittings, valves, slide gate, actuators and appurtenances and as specified under individual subsection.

1.3.3 Pipe and equipment manufactures' submittals as specified under individual subsection.

1.4 Delivery, Storage and Handling

1.4.1 Delivery, storage and handling shall be as specified under Section 1A.

1.5 Guarantee

1.5.1 Provide guarantee under provisions of Section 1A.

1.6 Basis of Payment

1.6.1 The piping and appurtenances work shall be paid as part of the contract lump sum price for PUMP STATION, MECHANICAL WORK which shall be payment in full for the work described herein.

2. PRODUCTS:

2.1 Water Piping

2.1.1 General

(a) Maximum pipe sections shall be 10'-0" long. All piping shall be generally arranged and aligned as shown and specified. Where special conditions are encountered in the field, the arrangement and alignment of piping shall be as directed by the ENGINEER.

(b) Piping shall be installed as directly as possible between connecting points insofar as the work of other trades permit. Where interference occurs with another trade whose work is more difficult to reroute, the Contractor shall revise the routing as required to avoid subject interferences. Piping shall be carefully installed to provide for proper alignment, slope and expansion.

(c) To allow for expansion and contraction, pipe shall be guided and supported in such manner that pipelines shall not creep, sag or buckle. Anchors and supports shall be provided wherever necessary to prevent any misalignment of piping. Pipe support shall not be limited to support indicated on the drawings.

(d) Small tubing to gauges, controls, or other equipment, installed on any apparatus shall not be coiled nor excessive in length but shall be installed neatly, carefully, bent at all changes in direction, secured in place and properly fastened to equipment at intervals to prevent sagging.

(e) Prior to the start of any piping installation work, the Contractor shall prepare and submit for approval detailed piping installation drawings. These shall be prepared on the basis of actual equipment being furnished and actual dimensions of walls, openings and other significant elements.

(f) Piping and appurtenances shall conform to applicable Section 1006, METALS, of the Standard Specifications.

2.1.2 Pipe and Fittings

(a) Ductile Iron Pipe

1) Ductile iron pipe shall be in accordance with ANSI / AWWA C115 / A21.15.

2) Pipe of 8-inch through 20-inch diameter shall have a pressure rating of no less than 250 psig.

3) All flanges for ductile iron pipe, except blind flanges, shall be of the threaded type meeting the requirements of ANSI / AWWA C115 / A21.15.

4) Pipe shall be installed in maximum lengths of 10 feet.

(b) Ductile Iron Fittings

1) Ductile iron fittings shall have flanged joints as shown or specified.

2) Fittings shall be provided as shown and specified and shall be ductile iron meeting the requirements of ANSI / AWWA C115 / A21.15.

c) Stainless Steel Pipe

1) Stainless steel pipe shall austenitic plate pipe per ASTM A-358 Gr. 304, Class 2.

2) Wall thickness shall be 3/8”, Standard.

3) Joints shall be butt weld. Use TIG with consumable insert.

d) Stainless Steel Fittings

1) Fittings shall be per ASTM A-403 GR. WP304 standard weight ANSI B16.9.

2.1.3 Flanged Connections

(a) Flanged connections shall be made as shown and specified. All flanges shall be drilled in conformance with the 125/150 ANSI Standard template.

(b) Class 150 pound steel flanges shall be smoothed finished (flat faced) for connection to dissimilar metals such as ductile iron.

(c) Flanged joints shall be made with bolts or bolt studs with a nut on each end. Bolts, stud bolts, and nuts shall meet the requirements of ASTM A 307 Grade B and ASME B16.1. Bolts shall have a 1/4-inch projection beyond the nut when joint with gasket is assembled.

(d) Rubber gaskets for flanged joints shall meet the requirements of AWWA C207 as modified and supplemented herein. Gaskets shall be 1/8-inch thick. Gaskets shall be full face.

(e) Insulation (Dielectric): Provide insulated flanged joints as required. Provide flange insulation kits to include flange insulating gasket, flange bolt-insulating sleeves, and flange bolt insulating washers.

2.1.4 Temporary bulkheads shall be provided at the ends of pipeline sections where adjoining pipelines have not been completed and are not ready to connect. Temporary bulkheads shall be removed when they are no longer needed.

2.1.5 Submittals

(a) All submittals, including the following, shall be provided as specified in Division 1 with the following stipulations.

(b) The following shop drawings shall be submitted.

1) Flanged, screwed, welding and mechanical coupling fittings and pipe, couplings, harnessing and special fittings. When special designs or fittings are required, the Work shall be shown in large detail and the special or fitting shall be completely described and dimensioned.

2) Fully Dimensioned layout of pipe, fittings, couplings, sleeves, supports, anchors, harnessing, valves and equipment. Pipe size, type and materials shall be labeled on drawing and a schedule shall be included.

3) Cross sections showing elevation of pipe, fittings, sleeves, couplings, supports, anchors, harnessing, valves and equipment.

4) Catalog data for pipe, couplings, harnessing and fittings.

(c) The following certifications shall be submitted:

1) Certificate of compliance for pipe, fittings, gaskets, couplings, sleeves, cleanouts, harnessing, specials, and coatings in accordance with this Division.

2) Welders' certifications (if applicable).

2.1.6 Quality Assurance

(a) Where applicable, certified welders, having current certificates conforming to the requirements of the ANSI code shall perform all welding on steel pipelines.

2.1.7 Painting and Coating

(a) All pipe and fittings shall be lined and coated in accordance with the piping schedule. All bolts, nuts, couplings and the like shall be coated after the joint has been made.

(b) All ductile-iron pipe and fittings to be cement-mortar lined shall have a cement-mortar lining not less than standard thickness meeting the requirements of AWWA C104, unless shown or specified otherwise.

(c) Cast-iron pipe and fittings shall be shop coated on the outside with one coat of Kop-Coat 3340 Gold Primer, 2.0 mils minimum dry thickness, for use in exposed locations, such as inside buildings, where finish painting or insulating is required.

(d) Pipe for use not exposed to view shall be coated with the standard asphaltic outside coating specified in AWWA C151.

(e) Immediately after facing and drilling, the back of the flanges and boltholes shall be coated with asphaltic coating meeting the requirements of AWWA C151, Section 51-8.1.

(f) The weight and class designation shall be conspicuously painted in white on the outside of each pipe, fitting, and special casting after the shop coat has hardened.

(g) All pipe shall be painted in accordance with Division 9.

(h) Galvanizing: Provide galvanizing in accordance with ASTM A 53 where shown or specified.

(i) Sleeve-type Couplings

1) Couplings shall be shop coated with Dresser Industries Red D or Smith-Blair Standard Blue shop coat.

2) An additional shop coat of Kop-Coat Hi-Guard epoxy or Tnemec Pota-pox shall be provided on the interior of the middle ring.

3) The exterior of sleeve-type couplings shall be finish coated after installation with the same coating specified in Division 9 for the pipeline of which it is a part.

4) Shop coats and finish coats shall be compatible.

2.2 Valves

2.2.1 General

(a) This section includes requirements for furnishing and installing all valves and operators.

(b) Operator-related electrical equipment and appurtenances that are UL, Inc. listed shall be provided.

(c) Valve operators shall be complete, including a suitable enclosure, with all appurtenances necessary for the operator to perform its intended function. Such appurtenances include, but are not limited to, anchor bolts and other mounting hardware, control switches, limit switches, torque switches, electrical supply connections, internal electric wiring and controls, push button controls, terminal blocks, local and remote indicators, operating nuts, and other such items.

(d) The operator type specified in the Valve Schedule shall be provided for each valve.

2.2.2 Quality Assurance

(a) All valves of the same type shall be furnished from the same manufacturer. Parts shall be interchangeable for all valves of the same type and size.

2.2.3 Submittals

(a) The following Shop Drawings shall be submitted:

1) Complete detailed drawings of all valves.

2) Working drawings, including arrangement and erection drawings of the operators and control equipment; schematic control diagrams, electrical connection diagrams, and complete description of the control system; and operating characteristics.

(b) The following quality control submittals shall be submitted:

1) Manufacturer's certified performance and material records.

2) Complete calculations for each size of motor operator indicating the force required to operate the valve, the operator force provided, full load and locked rotor current, and horsepower.

(c) Operation and maintenance manuals shall be submitted for the valve operators.

2.2.4 Construction

(a) Valves and operators shall be fabricated of materials resistant to corrosion for the required service.

(b) Operator housings and pedestal handwheels:

Cast iron	ASTM A 126, Class B ASTM A 48, Class 30 or 35
Ductile iron	ASTM A 395 ASTM A 536, Grade 65-45-12
Cast steel	ASTM A 27

(c) Operator worms, steel ASTM A 29 Grade Designation 8620

(d) Operator gears, steel (spur & helical) ASTM A 441

(e) Worm gears, bronze ASTM B 148, Alloy C95400 or C95500

ASTM B 584, Alloy C86300

(f) Valve Joints

1) All valves shall have flanged ends, unless otherwise specified.

2) Metallic flanged joints shall be faced accurately at right angles to the axis of the casting. Face and drill flanges and shop coat with a rust-preventive compound before shipment.

3) Dimensions and drillings of flanges shall meet the requirements of ANSI B16.1, 862 kPa (125 pounds) as a minimum.

2.3 Knife Gate Valve

2.3.1 Valve shall be flat-faced flange design that is able to permit independent upstream or downstream pipe flange removal without affecting the shut-off or body shell pressure rating of the valve.

(a) Body shell pressure rating shall be 0.14 MPa (20 psig) cwp.

(b) Shut-off pressure rating shall be 0.14 MPa (20 psig) cwp.

2.3.2 The valve body shall be tested at 1.5 times the rated pressure and the valve gate at 1.1 the rated pressure while in the fully shut position with zero leakage permitted past the seat or to the exterior of the valve.

(a) Valve body material shall be cast 316 stainless steel.

(b) Gate shall be type 316 stainless steel.

2.3.3 Resilient seat ring material shall be type 316 stainless steel and seat material shall be natural or synthetic rubber material suitable for the application. The packing shall be a mixture of PTFE fibers and grease compounded to permit ease of handling but with sufficient fluidity to transmit equal sealing pressure across the full length of the packing chamber.

2.3.4 The actuator support structure of the valve shall be fabricated of carbon steel. If external support of the actuator is required to ensure overall valve performance, the valve manufacturer shall include suitable located support brackets with instructions for proper support and alignment. The valve yoke shall be of sufficient strength to withstand five times the maximum operating torque and thrust.

(a) The drive stem shall be of chrome steel.

(b) The stem drive nut shall be of 276 MPa (40,000 psi) cast iron.

(c) Yoke bearings shall be cast bronze.

(d) All mechanical fasteners shall be cadmium plated.

2.3.5 The valve shall be furnished with a replaceable resilient seat that seals around the edge, not the face, of the gate and shall be mechanically retained without the use of adhesives. The seat design shall provide drip-tight shut-off at the fully rated pressure difference in either direction.

2.3.6 The top gate seal shall be fully enclosed and shall be repackable with the valve in service under fully rated pressure and without the removal of packing gland or gland follower. This seal shall be capable of re-sealing by means of injection of packing material into the seal chamber through external ports located at a minimum of four locations to insure even pressure and packing material distribution.

2.3.7 The valve shall have scraper blades on both sides of the gate to wipe the faces of the gate clean of any media prior to contact with the packing.

2.3.8 Both faces of gate shall have a surface finish of 16 microinch to insure ease of operation and seal performance.

2.3.9 The gate shall be guided for the full length of the stroke and supported to withstand full rated shut-off pressure in either direction for the full length of valve stroke. The interior of the valve port shall be contoured to insure self-cleaning of the valve. The resilient seat in the bottom port area of the valve shall be flush with the port area and shall not form a cavity in which debris can collect.

2.3.10 All non-stainless steel metal surfaces shall be painted with a zinc free primer.

2.4 Motor Operated Actuator for Valves and Slide Gates

2.4.1 General: The electric valve actuator shall include a motor, operator unit gearing, limit switch gearing, limit switches, torque switches, stem nut, de-clutch lever, and auxiliary handwheel, reversing motor starter and space heaters, as a self-contained unit. The actuator shall meet AWWA-C-540-93 specifications. A 3-pole disconnect switch shall be built in the motor starter or furnished with the actuator for field mounting. Unless otherwise noted the actuator shall be designed to operate the valve at the rate of 12 inches per minute.

2.4.2 Enclosures: The valve actuator motor and all electrical enclosures shall be explosion proof, Class I, Division 1, Group D for the knife gate; and shall be submersible for the slide gate.

2.4.3 Motor: The motor shall be 460 volts, 3 phase, 60 hertz specifically designed for valve actuator service and shall be of high starting torque, totally enclosed, non-ventilated construction, explosion proof, Class I, Division 1, Group D, where required, Class B insulation, 85^{o}C rise, 40^{o}C ambient. Motor leads shall be brought into the control compartment or limit switch compartment for external connections.

The motor shall be of sufficient size to open or close the valve from any position and under any condition of operation the valve may be subjected to. The motor duty rating shall be sufficient for one complete cycle (open-close-open or reverse) without exceeding its temperature rating and shall not be less than 30 minutes continuous. The motor shall be prelubricated and all bearings shall be of the anti-friction type. The motor speed shall not exceed 188.5 radian per second (1,800 rpm).

2.4.4 Electric Actuator Gearing: The actuator gearing shall be a double reduction unit with the capability of changing the output speed with a relatively fast, simple gear change. The power gearing shall consist of spur or helical gears and worm gearing.

The spur or helical gearing and worm shall be of hardened alloy steel and the worm gear shall be alloy bronze. All gearing shall be accurately cut with hobbing machines. All power gearing shall be grease lubricated. Ball or roller bearings shall be used throughout. All other gears shall be made of bronze or steel.

2.4.5 Position Limit Switch: Position limit switches and associated gearing shall be an integral part of the valve actuator. Limit switch gearing shall be of the intermittent type, made of bronze or stainless steel, grease-lubricated, and enclosed in its own gear case to prevent dirt and foreign matter from entering the gear train. The limit switches shall be geared to the driving mechanism and in step at all times whether in motor or manual operation. The trip points of the switches shall be adjustable over the entire range of the valve travel. They shall not be subject to breakage or slippage due to over-travel. Limit switches shall be of the heavy duty, open contact type with a rotary wiping action.

2.4.6 Torque Switch: Each valve actuator shall be equipped with a double torque switch that is responsive to loads encountered in both the opening and closing direction. Each side of the switch shall have a graduated dial and shall be adjustable. The torque switch shall operate during the complete valve cycle without the use of auxiliary relays, linkages, latches, or other devices. The torque switch shall be designed to shut off the actuator motor in the event that abnormally high torque is realized in either direction of travel. The torque switch is utilized as a protective device in valve applications requiring position seating. For torque seated valves, such as wedge gate and globe valves, the closing torque switch shall shut off the actuator motor when a predetermined torque is reached, corresponding to the required seating torque of the valve.

2.4.7 Manual Operation: A handwheel shall be provided for manual operation with an arrow to indicate "open" rotation. The handwheel shall not rotate during motor operation. A fused motor shall not prevent manual operation. When in manual operating position, the unit will remain in this position until the motor is energized. The actuator will automatically return to electric operation when the motor is energized. The actuator will remain in motor position until handwheel operation is desired. Movement from motor operation to handwheel operation is accomplished by a positive de-clutching lever that disengages the motor and related gearing mechanically but not electrically with no damages to clutch or gear mechanism. It shall not be possible for the unit to be simultaneously in manual and motor operation.

2.4.8 Provide stem protector for rising stem in suitable length and diameter to allow for full extension of the stem. Stem protector shall couple to the top of the actuator by means of a national pipe thread (NPT) and shall be capped and vented.

2.4.9 Hammerblow Device: The valve control shall have a built-in lost motion device that travels sufficiently enough to allow the motor to reach full speed before imparting a hammerblow to start valve in motion in either the closing or opening direction. This lost motion device also must permit motor to attain full speed before load is encountered, and two lugs cast integrally on the drive sleeve should share load equally. Lost motion device is not to be provided for those valves used in inching, throttling, regulating, or modulating service.

2.4.10 Motor Starter: The motor starter shall be 3 phase AC full voltage reversing, rated 600V AC operated at 480V, 60 Hz unless otherwise noted. The starter shall include two 3 pole contactors mechanically and electrically interlocked, fused control transformer with 120V secondary, 120V, 60 Hz coils, 3 phase thermal overload relay, and auxiliary contacts. Heavy duty industrial type control station rated 10 amperes at 480 VAC, with local-off-remote selector switch, open-close-stop pushbuttons and open-closed indicating lights shall be provided on the motor starter, except where the valve actuator is inaccessible from the operating floor the control station shall be remotely mounted from the actuator. Terminal blocks shall be provided for all external wiring connections. Each terminal shall be properly marked.

2.4.11 Space Heater: Space heaters shall be provided in the motor enclosure and starter or limit switch enclosure. The heaters shall be 120V, 60 Hz, with sufficient capacity to prevent condensation in the enclosures.

2.4.12 Power Input: The power input to the actuator shall be 480V, 3 phase, 60 Hertz.

2.5 Duckbill Check Valves

2.5.1 The Contractor shall provide and install seven (7) – 20” duckbill check valves. The check valves will serve as the pump discharge check valves and shall be mounted in the discharge chamber, as shown on the drawings.

2.5.2 Duckbill Check Valves shall be constructed of rubber with a flanged end connection with a stainless steel backup ring. The port area shall contour down to a duckbill, which shall allow passage of flow in one direction while preventing reverse flow. Flange shall conform to ANSI B16.10, class 150 standards. The flexible duckbill sleeve shall be one piece rubber construction with reinforcement.

2.5.3 Valves shall be designed to withstand 15 psi of backpressure without collapsing and without need of a separate vacuum relief device. If necessary, a stainless steel internal support saddle may be used to provide support and prevent collapse.

2.5.4 The manufacturer shall have available flow test data from an accredited hydraulics laboratory to confirm pressure drop data. This data shall include the saddle, if it is used in the design of the valves.

2.5.5 The valves used as the design basis are Series 35 Tideflex check valves as manufactured by Red Valve Co. and represented by Ley & Associates, Inc. Arlington Heights, IL.

2.5.6 The check valves, including saddle support, shall not exceed 6.5 feet of headloss at the rated pump flows.

2.6 Slide Gate

2.6.1 General

(a) This section includes requirements for furnishing and installing the slide gate, operators and all appurtenances necessary for a complete installation

(b) The Contractor shall provide and install a slide gate at the outlet of the discharge chamber to facilitate pump testing. The gate is intended to block the pump discharge water from flowing into the outfall sewer, thus allowing it to build up and/or recirculate to the wet well.

(c) The gate shall block an existing 60” x 72” opening as shown on the drawings. The gate shall be of stainless steel construction and shall be capable of operating while withstanding 20 feet of differential water pressure.

(d) The gate shall have the following features:

1) Flush-bottom seal

2) Non-rising stem

3) Submersible motor operator

4) Position feedback switch for full–open position

(e) The motor operator shall be 460V, 3 phase with intermittent duty. It shall be capable of operation while either being submerged or exposed to the atmosphere without overheating.

(f) The motor operator shall be 460V, 3 phase with intermittent duty. It shall be capable of operation while either being submerged or exposed to the atmosphere without overheating.

(g) Gate operators shall be complete, including a suitable enclosure, with all appurtenances necessary for the operator to perform its intended function as specified under subsection 2.4, Motor Operated Actuator for Valves, Slide Gates and Sluice Gates, of this Section.

(h) Slide gates shall be stainless steel. Quantity of gates, guides, size, location and type shall be as shown or specified. Each gate shall be provided with the type of operator specified in the Slide Gate Schedule.

(i) Slide gates shall be designed to limit deflection under maximum loading to 1/360 of the span. Slide gates shall be designed for the seating or unseating pressures specified, measured to the center of the gate.

(j) Submittals

1) Working drawings shall be submitted, including arrangement and erection drawings of the gates, operators and control equipment; structural design data, if requested; and operating characteristics.

2) The following certifications shall be submitted:

a. Manufacturer's certified performance and material specifications, as specified.

b. If requested, complete calculations shall be submitted for each size of motor operator indicating the force required to operate the gate, the operator force provided, full load and locked rotor current, and watts (horsepower).

3) Operation and maintenance manuals shall be submitted for the slide gate and gate operator.

2.6.2 Stainless Steel Slide Gate

(a) The stainless steel slide gate shall be of ASTM A276, Type 304 stainless steel with a thickness of not less than 1/4 inches, reinforced with Type 304 stainless steel structural shapes, capable of withstanding the water pressure in either direction with the water level at maximum operating level.

(b) The gates and guides shall be fabricated of Type 304 stainless steel. Gates shall be reinforced as required to keep gate deflection within specified limits.

(c) The gate shall be designed for flush bottom closure. Bottom and side seals shall be resilient (50 ± 5 Durometer A) neoprene. The bottom seal shall be installed across the bottom of the gate or frame, mating with the side seals to keep leakage within specified limits. Provide replaceable seals, securely mounted with stainless steel retainer bars bolted to the gate with stainless steel bolts.

(d) Guides shall consist of slotted side pieces with a flush type bottom cross piece. Fabricate pieces of castings or structurals with integral anchoring ribs, shop assembled into a rigid assembly for embedment in concrete. Side slots shall be provided of the width and depth required for support and free operation of the gate without binding.

(e) Bearing surfaces shall be 3/8-inch minimum thickness, installed in a recess or keyed into the guide, designed to hold the polymer bearing surface in position against the gate.

(f) Where guides extend above concrete sidewalls, guides shall be supported by stainless steel structural members or by the gate operator support structure.

2.6.3 Slide Gate Operator

(a) Operators shall be helical gear, non-rising stem. Stems shall be securely fastened to the gate by means of a casting, mounting block or angles secured to the gate. Acme-threaded stem shall have 16 microfinish or better. Gate stem attachment shall be provided with provisions for keying or pinning the stem to the gate attachment.

(b) Stems shall be designed for the maximum operating torque of the operator and the weight and service of the gate. The length over radius of gyration (l/r) ratio of the stem shall be limited to 200, and the stem diameter shall be limited to 1.50 inches. Stems shall be stainless steel meeting the following applicable standards.

1) Stainless Steel ASTM A 276, Type 304 or 304L
ASTM A 582, Type 303

(c) A locking provision shall be provided.

2.7 Pipe Supports and Anchors

2.7.1 Pipe supports and anchors shall be furnished and installed as specified in Division 15B.

2.8 Sleeve-Type Couplings

2.8.1 Couplings shall be provided with rolled steel followers, steel sleeves, rubber compound gasket and high strength bolts and nuts.

2.8.2 Use gaskets that are not affected by the fluid service of the pipeline.

2.8.3 Couplings shall have a minimum pressure rating equal to the test pressure of the pipeline.

2.8.4 Middle rings shall be provided without a pipe stop, and at least 1/4-inch thick and 5" wide for 8" and smaller pipe, 3/8-inch thick and 7" wide for 10" through 30" pipe, with follower rings of the proper thickness.

2.8.5 Unless shown or specified otherwise, harnessing for sleeve-type couplings shall be designed, furnished and installed in accordance with the applicable portions of AWWA Manual M11, Chapter 13 Supplementary Design Data and Details, 13.10 - Joint Harness. Harnessing shall have a design pressure equal to or greater than the test pressure of the pipeline on which it is installed.

2.8.6 All surfaces shall be shop coated with Dresser Red D, Smith-Blair Standard Blue Shop-coat, or equal nontoxic material compatible with the finish coatings specified. The inside coating of the middle ring shall be given an additional shop coat of Kop-Coat Hi-Guard epoxy or Tnemec Pota-pox. Finish coat shall be as specified in Division 9 for the pipeline of which it is a part.

2.9 Stainless Steel Tubing (Trash Rake Hydraulics)

2.9.1 Stainless steel tubing shall meet the requirements of ASTM A269 Type 316. Wall shall be .035", minimum. Tube end shall be 90° flange and fittings shall be O-ring face seal fittings (ORFS) meeting the requirements of SAE J1453.

3. EXECUTION:

3.1 Transportation and Delivery

3.1.1 Every precaution shall be taken to prevent injury to the pipe during transportation and delivery to the site. Extreme care shall be taken in loading and unloading the pipe and fittings. Such Work shall be done slowly with skids or suitable power equipment, and the pipe shall be under perfect control at all times. Under no condition shall the pipe be dropped, bumped, dragged, pushed, or moved in any way that will cause damage to the pipe or coating. When handling the pipe with a crane, a suitable pipe hook or sling around the pipe shall be used. Under no condition shall the sling be allowed to pass through the pipe unless adequate measures are taken to prevent damage to the pipe ends.

3.1.2 If any pipe or special is damaged in the process of transportation, handling or laying, such pipe or pipes shall be replaced or repaired by the Contractor at its own expense.

3.1.3 The Contractor shall furnish and install suitable blocking and stakes to prevent the pipe from rolling. The type of blocking and stakes, and the method of installation, shall be approved by the Engineer.

3.2 Piping Installation General

3.2.1 The dimensions shown on the Drawings for the location of pipelines have been established with the intent that there will be no interferences. The Contractor shall check all dimensions shown on the Contract Drawings prior to the installation of Work and shall notify the Engineer promptly of any interferences or errors discovered. If interferences are found to exist prior to or during construction, changes in the location of pipelines to avoid such interferences shall be made at no extra cost to the Owner and in a manner as reviewed by the Engineer.

3.2.2 Elevations and dimensions locating pipelines are shown on the Drawings to the centerlines of the pipe unless otherwise indicated.

3.2.3 Piping connections and dimensions to equipment are subject to changes as reviewed by the Engineer to suit the types of equipment furnished.

3.2.4 Piping suspended from ceilings shall be installed to provide maximum headroom consistent with good installation.

3.2.5 The layout of the piping and fittings shall be carefully checked to determine that the related equipment can be properly assembled to produce a workable arrangement. Defective or improperly fabricated Work shall be rejected and replaced with Work which, when completely assembled, shall result in an arrangement which shall function as intended and as shown on the Drawings.

3.2.6 All pipelines shall be straight and true in alignment, grade and location indicated, designated or required, and all installation shall be made in a workmanlike manner to the satisfaction of the Engineer. The pipe and fittings shall be adequately braced and blocked or tied, hung or supported for satisfactory installation.

3.2.7 As soon as pipes are in place, all open ends shall be capped until permanent connections are made. All pipelines shall be securely supported when required either by hanging from beams with suitable pipe hangers or supported on walls by suitable wall brackets. Where it is necessary, install hangers or supports after concrete is poured or other masonry Work finished. Anchor bolts with expansion shields shall be used.

3.2.8 Where pipes pass through masonry walls, floors and partitions, the juncture shall be made as shown on Plans. Where no details are shown, the Contractor shall either rough in the piping before the concrete is poured or the masonry completed, or shall provide suitable plugs, sleeves or forms for piping. After the pipes have been installed, the openings shall be filled solid; suitable allowance being made, however, for the expansion and contraction of the piping. The cutting of concrete for pipe shall be avoided wherever possible, and in no case where such cutting is necessary shall reinforcing rods be cut or disturbed, and no such cutting shall be done without the permission of the Engineer. All openings made for pipe Work shall be neatly patched in a workmanlike manner.

3.2.9 Horizontal runs shall be given as steep a pitch with even grade toward the outlet as conditions will permit, and care shall be taken in laying out piping that there is no interference with the proper location of piping for other purposes or other equipment. No change shall be made in the general location shown for piping, or in the method of running and connecting same, except with the written approval of the Engineer. When any change is made, the Contractor shall keep a record of the location of all pipes so changed and a copy of such record shall be given to the Engineer showing the location of all piping.

3.2.10 Install dielectric fitting between dissimilar pipe materials as required.

3.3 Protection of Piping System

3.3.1 Install and maintain pipe and equipment that is clean and free from rust, dirt, scale, etc.

3.3.2 Install temporary airtight covers at all pipe and equipment openings. Special attention shall be given to vacuum and air piping and each pipe section shall be individually inspected prior to placing. No piping shall be placed when wet, nor shall any free moisture be present inside any air piping during installation.

3.4 Pipe Supports and Hangers

3.4.1 Pipe supports and hangers shall be in accordance with Section 15B.

3.5 Welding

3.5.1 All welding of piping and/or special fittings shall be done in conformity with the current ANSI B31.1, "Pressure Piping". A certification of the welder's qualifications, in conformity with the requirements of this code, shall be submitted to the Engineer.

3.5.2 Tee connections in welded piping shall be made with a factory fabricated butt-welding tee or with weld-o-let of butt, socket or threaded type. When weld-o-lets are used, the branch connection shall be one-half the diameter of the main or less.

Scarf welding or direct butt welding of side connections shall not be permitted. Tees fabricated from pipe shall not be permitted.

3.5.3 Long radius welding elbows shall, whenever possible, be used for changing direction of welded pipelines. Mitered joints shall be subject to approval by the Engineer.

3.6 Flanged Joints

3.6.1 All flanged joints shall be made temporarily with gaskets in place using a minimum number of bolts to support the piping. Any misalignment of the assembled piping shall be adjusted or corrected in a manner approved by the Engineer.

3.6.2 Tightening of flange bolts to "pull up" misaligned flanges will not be permitted and shall not be done. The misaligned flanges shall be machined to fit, or approved spacer pieces and gaskets shall be installed if necessary and directed by the Engineer. The temporary assembly of the flanged piping shall demonstrate that there will be no undue stresses in the piping or at the connections to the equipment. The Engineer shall approve the temporary assembly before the joints are tightened. Flanged joints shall then be completed and made watertight and the tension in the flange bolts, when tightened shall not exceed 103.4 MPa (15,000 psi) at the minor diameter of the bolt threads.

3.7 Sleeve Type Couplings

3.7.1 For sleeve type couplings, diametrically opposite bolts shall be equally tightened on the connection so that the gaskets will be brought up evenly all around the pipe. Final tightening shall be done with torque wrenches set for the torque recommended by the coupling manufacturer.

3.8 Piping Markers

3.8.1 Refer to Section 9A - Painting.

3.9 Testing

3.9.1 Where applicable, pipes shall be flushed clean and tested and any leaks shall be made tight.

3.10 Painting

3.10.1 Piping, fittings and appurtenances shall be painted in accordance with Section 9A - Painting.

3.11 Supports for Present Piping

3.11.1 Wherever Contractor is required to expose, suspend or reroute present piping, supports for such piping shall be provided as is required for new piping in accordance with paragraph 3.04 Pipe Supports, this Section.

3.12 Wrecking and Repair

3.12.1 The Contractor shall do its own excavation for piping as required to complete the Work. If excavation is required below present concrete slabs, the backfill materials shall be sand flushed in place or class B concrete fill as required by the Engineer. The concrete used to repair the structure shall be Class concrete. Where reinforcing is cut, dowels shall be used for laps. Junctures between the present portions of slabs remaining and new slabs shall be uniformly saw cut.

3.12.2 All such repair procedures shall be subject to review by the Engineer.

3.13 Installation of Slide Gate

3.13.1 Slide gates shall be installed in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.

3.13.2 Floor stands shall be accurately centered over the gate. Stands shall be solidly bolted to the floor or support structure, with through-bolts wherever possible. Approximately 3/4 inch of nonshrink cement grout shall be placed beneath stands mounted on concrete or similar construction to assure uniform support.

3.13.3 Field Tests

(a) After installation of the gates, control equipment and all appurtenances, the units shall be subjected to a field running test, as specified in Division 1, under actual operating conditions.

(b) Slide gates shall be tested for leakage, strength, and opening and closing against the maximum heads practicable to obtain under operating conditions. Any leaks around the frames or gates shall be stopped. The maximum allowable amount of seepage through any slide gate shall not exceed 0.03 liters per minute per millimeter (0.2 gpm per foot) of seating perimeter.

3.14 Installation of pipe and fittings

3.14.1 All pipe and fittings shall be installed in accordance with the specifications contained herein and in Division 15A and 15B and in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.

3.15 Schedule

3.15.1 Valve Schedule

Facility/ Service	Valve Type	Size inches	Joint Type	Actuator Type	Remarks
Recirculation	Knife Gate Non-Rising Stem	20	F	E	
Pump Discharge	Duckbill Check Valves	12, 20	F	NA	

Note:

(1) Abbreviations used in the schedule are as follows:

Joints
F Flanged

Actuator
E Electric Motor (Nonmodulating)
NA Not Applicable

3.15.2 Slide Gate Schedule

Service	Size WxH (inches)	Seating Hea (feet)	Unseating Head (feet)	Actuator	Remarks
Discharge Channel	(60x72)	10	0	E	Flush-Bottom

Note:

(1) Abbreviation used in the schedule is follows:

Actuator
E Electric Motor (Nonmodulating)

3.15.3 Inside Piping Schedule

Service	Size Inches	Pipe Material(2)	Protective Coatings(4) Int.	Ext.	Joints(3)	Test Pressure (kPa)	(psig)(1)	Remarks
Pump Discharge	20	DI	CL	P	F	690	100	
Recirculation	20	SS	NA	NA	W	690	100	

Note:

(1) Measure the test pressures shown in the schedule at the centerline of the pipeline's low point. Adjust test pressures measured at other locations accordingly.

(2) SS Type 304 Stainless Steel
DI Ductile Iron

(3) F Flanged
H Hub & Spigot
W Welded

(4) P Painted
CL Cement - Mortar Lined

(5) N.A. = Not Applicable

END OF THIS SECTION

DIVISION 15 - MECHANICAL

SECTION 15D - PUMPING EQUIPMENT

1. GENERAL:

1.1 Description

1.1.1 This section includes requirements for furnishing and installing submersible pumping units with all appurtenances necessary for a complete installation.

1.1.2 Pumping units include seven (7) main pumps and one (1) low flow pump as shown on the Drawings and specified. Also included in the scope are one spare main pump and one spare low flow pump.

1.1.3 Main pumps shall be of the vertical, centrifugal, heavy duty, non-clog, draft tube, submersible type, with bottom suction and side discharge at the top of the draft tube, each driven by submersible electric motor mounted as an integral part of the pump. The pumping units shall be designed to pump at the capacities specified. The pumping units shall be designed for continuous and intermittent duty.

1.1.4 The pumps and draft tubes shall be provided with all the appurtenances required for installation including support flanges and lateral braces. The pumps shall also be provided with any and all provisions necessary to remove pumps for maintenance. Each lift system shall be adequately sized for the weight of the pump unit and shall consist of a stainless steel (SS) guide wire, a high-tensile-strength SS carrier cable or chain sling and a SS chain grip or lug for use with a crane or hoist.

The submersible electric cables shall be provided per the requirements of paragraph 2.1.1.f.5, 6, and 9 of this specification and Section 16. The Contractor shall determine the necessary length of the cables to allow for connection to the mating receptacles shown on the drawings.

1.1.5 The spare main pump shall be supplied without draft tube, cable, cable supports, or lifting cables but shall include a spare explosion proof plug, as specified in paragraph 2.1.1.f.5, 6, and 9, below.

1.1.6 Low flow pump shall be of the vertical, centrifugal, heavy duty, non-clog, close-coupled, submersible type, with bottom suction and side discharge, driven by submersible electric motor mounted as an integral part of the pump. The pumping units shall be designed to pump at the capacities specified. The pump shall be provided with guide cable, removal cable, electric cable with plug connectors and base elbow. The pump and appurtenances shall be arranged for installation in the space shown without appreciable revision of the piping. The pumping units shall be designed for continuous or intermittent duty.

1.1.7 The spare low flow pump shall be supplied with, cable, cable supports, or lifting devices and shall include a spare explosion proof plug, as specified in paragraph 2.1.1.f.5, 6, and 9, below.

1.1.8 Unless otherwise indicated, all pumps of a specified type shall be identical, the product of the same manufacturer. Refer to Division 15A.

1.2 Operating Conditions

1.2.1 The main pumps shall be capable of a draw down to a low water elevation of –11.5m (-37.75’) without cavitation occurring. Manufacturer's certification of the proceeding shall be provided as part of the submittal data.

1.2.2 The low flow pumps shall be capable of a draw down to a low water elevation of –13.2m (-43.25') without cavitation occurring. Manufacturer's certification of the proceeding shall be provided as part of the submittal data.

1.2.3 The main and low flow pumps shall operate at the capacities and heads and over the range of operating conditions specified without overloading, cavitation, and vibration. The pumps shall conform with the following requirements:

Items	Requirements	
	Main Pumps	Low Flow Pump
Capacity at rating point (design point)	10,000 gpm	3200 gpm
Developed head at rating point (design point)	53ft	56 ft
Overall efficiency, wire to water, at rating point, minimum, percent	65 min.	61 min.
Diameter of sphere that will pass through pump, minimum	4 inch	2 inch
Pump discharge diameter, minimum	20 inch	10 inch
Pump discharge diameter, minimum	20 inch	10 inch
Pump speed, maximum, rpm	1200	1200
Motor horsepower, minimum	149 kW (200 hp)	55 kW (75 hp)
Motor efficiency at full load, minimum, percent	88	88
Motor power factor at full load, minimum	0.8	0.8
Motor service factor	1.15	1.15
Locked rotor kVa/hp, maximum, NEMA code letter	E	E

1.2.4 Each pump shall have a continuously rising characteristic curve from the rating point to shutoff which passes through the rating point, and which meets or exceeds the specified heads and capacities, all within the Hydraulic Institute tolerances.

1.2.5 Submersible units shall be capable of sustaining full reverse runaway speed without damage.

1.2.6 Motors shall be capable of operating pumps at any point on the curve without overloading and without using the service factor.

1.3 Related Sections

1.3.1 Section 3A - Cast-In-Place Concrete

1.3.2 Section 3B – Grout

1.3.3 Section 5A - Structural Steel

1.3.4 Section 5E - Bolts, Anchor Bolts, Expansion Anchors and Concrete Inserts

1.3.5 Section 9A – Painting

1.3.6 Section 15A - General Mechanical Provisions

1.3.7 Section 15B - Basic Mechanical Materials and Methods

1.3.8 Section 15C - Piping and Appurtenances

1.3.9 Section 16C - Major Electrical Equipment

1.3.10 Section 16D - Supervisory Control and Data Acquisition (SCADA) Equipment

1.4 Submittals

1.4.1 All submittals, including the following, shall be provided as specified in Division 1.

1.4.2 Submit a list of not less than five (5) installations where pumping equipment of the type and approximate size specified herein have been in successful operation for at least five (5) years.

1.4.3 Submit location of the nearest permanent service headquarters of the pump and motor manufacturers.

1.4.4 Submittal data shall include:

(a) Complete manufacturer's specifications and descriptive bulletins for all equipment including size, capacity, description and make of pumps.

(b) Complete description, illustrations, and wiring diagrams of automatic controls and starting equipment.

(c) Complete motor data, as specified.

(d) Pump performance curves for the specified conditions including head, input kilowatts, and overall efficiency, as a function of capacity from zero to maximum capacity.

(e) Drawings of the equipment, including arrangement and erection drawings of the equipment and equipment operating characteristics in such detail as to give all dimensions necessary to accurately locate through the floors and walls all openings for pipes, anchor bolts and fittings for motors, pumps, motor and pump control center openings, and conduit between the associated equipment. This includes drawings, indents, pockets, and clearances necessary in the floors and walls for proper installation of the equipment specified.

(f) Provide pump support requirements including intermediate supports and maintenance access space.

(g) General arrangement drawing of pumping unit, base elbow and guide rail system. Include equipment weight and anchor methods and materials.

(h) Cross-section drawing of pumping unit.

(i) Parts list with materials of construction identified.

(j) Motor performance characteristics.

(k) Spare parts list.

(l) Painting procedure.

(m) Six certified copies of the Shop Test results.

1.4.5 Submit copies of all manufacturers' guarantees and warranties obtained by the contractor to be transferred to the State of Illinois, Division of Highways, at the time of acceptance of this project by the State of Illinois.

1.4.6 Motor data shall include:

(a) Manufacturer

(b) Nameplate rated kilowatts (horsepower)

(c) Rated voltage

(d) Full load rpm

(e) Full load current

(f) Full load power factor

(g) NEMA design letter

(h) NEC code letter or inrush current

(i) Insulation class

(j) Service factor

(k) Recommended starting restrictions, including allowable starts per hour

(l) Recommended maximum KVAR rating of power factor correction capacitors.

1.5 Quality Assurance

1.5.1 General

(a) Pumping equipment shall be produced by a manufacturer who regularly engages in the design, manufacture, assembly and production of submersible sewage pumping equipment of the size and type as specified for not less than five years.

(b) Motor units and wet well wiring shall be rated for service in hazardous Class I, Division 1, Group D locations.

(c) All materials used in the construction of the equipment herein specified shall be new and of the highest available grade and of properties best suited to the Work required.

(d) One manufacturer shall be responsible for providing pumping equipment, including pump motor and all accessories.

(e) Unless otherwise indicated, all pumps of a specified type under this Section shall be identical, the product of the same manufacturer.

(f) To ensure that all equipment is properly coordinated and will function in accordance with the intent of these Specifications, the Contractor shall obtain all the equipment specified herein from the pump manufacturer in whom shall be vested unit responsibility for the proper function of the complete system, including pumps, motors, electrical, control equipment and accessories as shown and specified. Contractor, however, shall retain overall responsibility for equipment coordination, installation, testing and operation.

1.5.2 Contractor's Responsibility

(a) If the power demand of pumping units proposed to be provided for this Project exceeds the minimum horse power as specified and shown in the Drawings, it is the Contractor's sole responsibility, without additional cost to the Owner, to upgrade all affected electrical facilities such as, but not limited to, wiring, conduits, motor controls, switchgear, transformers and incoming facilities to be able to operate all the pumping units satisfactorily and to meet the Specifications.

1.5.3 Manufacturer's Certifications

(a) Submit manufacturer's certification that he has carefully examined all of the Contract Documents in detail, including the arrangement and conditions of proposed structures affecting the performance of the pumping equipment units, and the detailed requirements of manufacturing and subsequent installation of the pumping equipment units.

(b) Submit manufacturer's certification that there are no omissions, ambiguities or conflicts in the Contract Documents or in the pumping station piping layout that affect the pumping units, as shown on the Drawings which have not already been clarified in writing by the Owner.

(c) Submit manufacturer's certification that they have reviewed the location and discharge piping design, the discharge valve locations and types, the loads imposed on the pumping units from the connections, the pumping unit locations such as the physical separation to each other and adjacent walls, the water to be pumped, and pumping station piping layout, as shown on the Drawings, and that any incidental modifications thereto will not affect the specified pumping unit performance and efficiency to be furnished under this Contract, and they will be solely responsible for furnishing and delivering pumping equipment that will perform and meet the requirements, as specified in the Contract Documents.

(d) Submit manufacturer's certification that they have inspected the storage of the pumping equipment and find no conditions that have adversely affected the equipment.

(e) Submit manufacturer's certification that they have supervised the installation of the pumping equipment and that the pumping equipment has been properly installed.

(f) Submit manufacturer's certification that they have inspected the pumping equipment after 1000 hours of operation and certify the pumping equipment is operating satisfactorily.

1.5.4 Data to be Filed with the Owner

(a) Record Drawings: The Contractor shall keep one record copy of all Specifications, Plans, Addenda, Supplementary Drawings, Working Drawings, Change Orders and Clarifications at the site in good order. Specifications, Plans, Supplementary Drawings and Working Drawings shall be annotated to show all changes made during the construction process. These shall be available to the Owner at all times and shall be delivered to the Owner upon completion of the work.

(b) Four bound copies of operating and maintenance instructions, diagrams, parts, lists, requirements and other information pertinent to the operation of the various systems and equipment shall be furnished to the Owner. Refer to Division 1.

1.5.5 Source Quality Control

(a) Shop tests shall be performed on each pumping unit, including spare pumps, in accordance with the test code of the Hydraulic Institute, except as modified herein. The pumps shall be tested in the position that they will be installed.

(b) Tests shall be conducted at rated speed to determine the curves of head, electric input kilowatts, and overall efficiency, wire to water, as a function of capacity. A minimum of six points shall be taken, including shutoff. One point shall be as near as possible to each specified condition of head and capacity and the remaining points at capacities necessary to provide a uniform distribution of data. Capacity shall be expressed in liters per second (gallons per minute) and head shall be expressed in feet. Raw test data, calculated results and sufficient information for computation and plotting of the curves shall be furnished with the certified shop test curves.

(c) Certified test curves shall be furnished for approval prior to shipment. All tests shall be witnessed by the manufacturer by a Registered Professional Engineer registered in the state in which the shop tests are performed. The witnessing Registered Professional Engineer shall sign and seal each copy of the curve and test data sheets. Six copies of the curves along with the certified drive unit test data, shall be furnished for approval. Shipment of the pumping units shall not be made until the test data and curves are approved.

(d) Curves shall be drawn to such scale that values can be read accurately within 1%. The efficiency curves submitted shall constitute a guarantee within 1% on the scale, for all deliveries between 3/4 rated capacity and 1-1/4 rated capacity.

(e) In addition to the hydraulic test (low flow pump only), the pump manufacturer shall perform the following inspections and tests on each pump before shipment from factory:

1) Impeller, motor rating and electrical connections shall first be checked for compliance with the Specifications.

2) A motor and cable insulation test for moisture content or insulation defects shall be made.

3) Prior to submergence, the pump shall be run dry to establish correct rotation and mechanical integrity.

4) The pump shall be run for 30 minutes submerged, a minimum of 1.83 m (6 ft.) under water.

5) After operational test 1.5.5(e) 4 the insulation test 1.5.4(e) 2, is to be performed again. A written report, stating the foregoing steps have been done, shall be submitted prior to shipment.

6) The low flow pump shall be subjected to a hydrostatic test and certification of the hydrostatic test shall be provided. The hydrostatic pressure shall, in any case, not be less than twice the shut-off pressure of the pump as shown by the characteristic curve.

(f) The Contractor shall provide transportation and reasonable expenses to and from all factory pump testing for two (2) representatives of the State of Illinois to witness such testing. State of Illinois shall designate these individuals. The Contractor shall notify the State of Illinois of a scheduled test date two months prior to said date and shall arrange an exact suitable date not less than two weeks prior to the test.

(g) The pump tests shall be performed in the domestic United States. However, if this can't be done, the contractor shall hire an approved witness and pay all necessary expenses if the tests cannot be performed in the domestic United States.

1.6 Guarantee

1.6.1 Refer to Division 1.

1.7 Delivery, Storage and Handling

1.7.1 Products and materials shall be delivered, stored and handled as specified in Division 1.

1.8 Spare Parts

1.8.1 The following spare parts shall be provided. Two sets shall be provided for the main pump and one set for the low flow pump for each pump:

(a) One set of mechanical seals - upper and lower

(b) One set of cable entry grommets

(c) One set of Motor Bearings

(d) One set of Wear Rings

1.8.2 A complete set of special wrenches, spanners, eyebolts and other special tools shall be furnished sufficient to completely dismantle and reassemble each kind and size of pumping unit. Tools shall be forged steel, case hardened, full finished, and furnished with a metal tool case with a handle and provision for padlocking.

1.8.3 The spare parts and equipment shall not be delivered to the site until the project is ready for final inspection. The spare parts shall be securely packed for extended storage and provided with a complete list of parts. Each part shall be clearly identified and coordinated with the list.

1.9 Basis of Payment

1.9.1 The pumping equipment shall be paid as part of the contract lump sum price for PUMP STATION, MECHANICAL WORK which shall be payment in full for the work described herein unless otherwise noted.

2. PRODUCTS:

2.1 Pump Specifics

2.1.1 Specifics Applicable to Main and Low Flow Pumps

(a) Cooling System

1) The cooling system shall provide for continuous pump operation in liquid temperature up to 40^0C (104^0 F).

(b) Casing

1) Pump casing shall be ASTM A48 cast iron, with smooth surfaces devoid of blowholes or other casting irregularities. All exposed nuts or bolts shall be type 304 stainless steel.

2) Wear Rings shall be nitrile rubber coated stainless steel renewable wear rings.

(c) Impellers

1) Pump impellers shall be cast iron ASTM A48 and shall be statically and dynamically balanced, non-clogging, designed with minimum clearances so as to preclude solids and stringy material from damaging the mechanical seal, on the back of the impeller.

2) The impeller shall be secured to the shaft with a stainless steel key and lock nut in such a way that it cannot unscrew or become loosened due to rotation in either direction.

3) Each pump shall be equipped with a stainless steel renewable impeller wear ring.

(d) Oil Chamber

1) Each pump shall be equipped with an oil chamber to function as a buffer between the pumped liquid in the casing and the motor. The oil chamber shall be arranged to accommodate thermal expansion of the oil and furnished with an oil chamber drain plug that is accessible from outside the pump unit and permits changing oil without dismantling pump components. The oil chamber shall be ASTM A48 cast iron.

(e) Mechanical Seal

1) Pumps shall have double or tandem mechanical seals.

The upper seal unit, between the oil chamber and motor housing, shall have one stationary ceramic or tungsten-carbide ring and one positively driven rotating tungsten carbide or carbide seal ring. The lower seal unit, between the pump casing and oil chamber, shall have one stationary ring and one positively driven rotating ring. The rings shall be tungsten carbide or ceramic. Metal parts shall be stainless steel. The spring element of the lower seal shall be protected from solids contained in the pumped liquid. Do not rely upon the pumped liquid for lubrication.

(f) Motor

1) Submersible pump motors shall be of 460-volt, 3-phase, 60-hertz squirrel cage induction type NEMA Design B suitable for operation in NEC Class I, Division 1, Group C and D hazardous areas as determined and approved by a U.S. nationally recognized testing agency (U.L, FM).

2) Motors shall have suitable output torque and speed characteristic to start and operate the pump over the range of specified conditions. Nameplate horsepower rating shall not be exceeded under maximum load conditions for constant speed pumping units. The motors shall be for continuous load operation, specifically designed for submersible pump usage, and shall be capable of sustaining continuous on-off cycling of fifteen starts per hour minimum without exceeding the 80 degree C temperature rise.

3) The stator windings and stator leads shall have a minimum of NEMA Class F (155 degrees C) moisture resistant insulation. The stator coils shall be dipped and baked in Class F varnish and shall be heat-shrink fitted into the stator housing. Impregnation resin shall be applied to stator assembly in three dip and bake steps.

4) Motors shall have ASTM A48 cast iron stator housing. For motors that employ cooling water jackets, the water jacket passages shall preclude clogging by solids contained in the pumped liquid.

5) The motor cables shall be multi-conductor flexible cables designed specifically for use with submersible pumps and shall be of stranded, tinned copper conductors with 600V ethylene-propylene insulation, cabled with non-hygroscopic vulcanized rubber fillers and binder tape, covered with water & oil resistant chloroprene rubber jacket, rated 90^{o} C in 40^{o} C ambient.

Separate cables shall be provided for power and control. For application in Class I, Division 1 locations multiple power cables shall be used to limit conductor current to 213A for main pumps and 80A for low flow pump at motor full load. The power and control cables shall have sufficient length to reach the termination boxes as shown on Plans without splices.

6) Motor cable entries shall have a mechanical locking ring or compression type cord grip to protect the cable jacket from being pulled out of the motor. Do not use epoxy for this purpose. Cable entries shall have watertight seals. Cable entry leads shall be isolated from the internal motor leads to prevent entry of water into the motor chamber by leakage or wicking. One cable for power and one cable for controls shall be provided. Cables shall be suitable for submersible pump application and shall conform to NEC specifications for cable sizing.

7) The motor shall be designed for operating under completely submerged or unsubmerged conditions without damage while pumping under load.

8) The combined service factor (combined effect of voltage, frequency and specific gravity) shall not be less than 1.15.

9) The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 19.5 m (65 feet).

10) The rated motor horsepower shall not be less than the brake horse power of the pump throughout the entire pump performance curve from shut-off through run-out.

11) Control plugs and receptacles for submersible pump and sensors shall be grounded multi-pin, crimp socket, water proof type for pumps with intrinsically sage circuits, and explosion proof type, UL listed as suitable for Class I, Division I, Group D installation for pumps with non-intrinsically safe circuits. Each receptacle shall be mounted on a cast iron junction box with angle. The plugs and receptacles shall be UL listed, adapter and threaded cap. A matching plug shall be provided for each pump. UL listing number of the plugs and receptacles shall be included in the shop drawing submittal. These type of plugs and receptacles are available from Vantage Technology of Englewood, Colorado.

(g) Shaft

1) Shafts shall be one piece, fully machined pump and motor shafts. Maximum shaft deflection under maximum pumping load to shall be .002 inches at the lower mechanical seal face.

2) Shafts shall be carbon steel or stainless steel material and adequately designed to meet the maximum torque required at any start-up condition or operating point in the system. Carbon steel shafts shall be protected from exposure to the pumped liquid by a stainless steel sleeve, carbon steel sleeve or chrome plating.

(h) Bearings

1) The pump shaft shall rotate on permanently lubricated bearings. One assembly shall carry only radial loads and be free to float axially within the frame. The other assembly shall carry both radial and axial loads and be restrained from axial movement.

2) Bearings shall be of sufficient size and properly spaced to transfer all radial and axial loads to the pump housing and minimize deflection

3) Bearings shall conform with ANSI B3.15 and B3.16, Load Ratings and Fatigue Life for Ball and Roller Bearings, and the minimum L_{10} bearing life shall be 100,000 hours at the maximum pumping load that occurs under the specified operating conditions.

(i) Protection Monitoring System

1) Each pumping unit shall be equipped with a monitoring system to protect critical machine functions during operation.

2) Three thermoswitches, one per phase, shall be provided in the motor windings to protect against overheating by initiating an alarm on high temperature.

3) A moisture sensor shall be provided to protect against damage from water contamination. The sensor shall be arranged to initiate the alarm upon sensing moisture in the oil chamber or prior to water reaching the motor windings.

4) For motors 60 HP and larger, a bearing temperature sensor shall be provided for bearing temperature detection and alarms.

5) A monitoring device or devices designed to be compatible with the sensors and motor controls shall be provided. The monitoring devices shall be located in the motor control center. The monitoring system shall be intrinsically safe.

(j) Cable Holder

1) Each pump shall be fitted with a stainless steel cable of adequate length and strength to permit the raising and lowering of the pump for inspection and removal.

2) Provide all stainless steel cable support grip, cable pull line, snap hook and anchor as required or as shown on the drawing.

2.1.2 Specifics Applicable to Main Pumps

(a) Design

1) No portion of the pump/motor unit for the main pumps shall bear directly on the sump floor or on a sump floor mounted stand.

(b) Cooling System

1) Main pump motors shall be cooled by the pumped water past the motor housing within the discharge column.

2.1.3 Specifics Applicable to the Low Flow Pumps

(a) Design

1) Pumps shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars or cable system extending from the station floor to the discharge connection.

2) Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable.

(b) Cooling System

1) Pump motor shall be equipped with a water jacket encircling the stator housing. The cooling media channels and ports shall be non-clogging by design. Provisions for external cooling and seal flushing shall also be provided.

(c) Casing

1) Pump casing shall e of the centerline discharge type.

(d) Solids Flushing

1) A means of flushing solids into suspension at pump start up using the pumped liquid shall be provided. A means of adjustment shall be provided to set the flushing period. Applicable data and drawings shall be submitted for approval.

(e) Pump Draft Tube and Discharge Nozzle

1) A draft tube with discharge nozzle shall be furnished by the pump supplier. The draft tube shall be permanently installed in the wet well. The design shall be such that the pump units may be installed in the mounting column with adequate clearance to prevent binding when lowered into place on the support at the bottom of the tube. The pumps shall not require any bolts, nuts or rigid fastenings for mounting at the bottom the draft tube. No potion of the draft tube shall bear directly on the floor of the sump. The column shall be supported as shown on the drawings

2) The draft tube and discharge nozzle shall be fabricated of ASTM A36 steel and shall conform to AWWA C200, Standard for Steel Water Pipe 6” and Larger. Wall thickness shall be a minimum of 3/8”. Pipe sections and fittings shall be hydrostatically tested at 100 psig.

3) The draft tube and discharge nozzle shall be coated inside and out per Section 9A and AWWA C203 latest edition.

4) A watertight seal shall e provided for the motor power cable, control and signal cables, in the blind flanges of each draft tube/ Provide heavy duty, stainless steel cable support grips for the power and control cables. After installation of the pumps, all slack shall be removed from the hoisting cables and electric cable. Contractor shall submit shop drawings for Engineer’s approval depicting the watertight seals and cable support system for the pump cables.

5) The contractor shall provide an affidavit stating that the draft tube and discharge nozzle comply with all applicable manufacturing standards referenced herein.

2.2 Operation and Control

2.2.1 Pump controls shall be provided in accordance with Division 16.

2.2.2 Pumps shall function in rising water and in falling water as shown on the drawings.

2.2.3 Float Level Detectors

(a) The float level detecting devices shall be located in the wet well as shown and as specified in Section 16C, Subsection 2.3.5. One float shall be utilized for each control level. The existing floats may be reused, but the Contractor shall set them to control at the elevations shown on the drawings.

2.3 Bolts, Studs and Nuts

2.3.1 All bolts, studs and nuts shall have American National form right-hand machine cut threads which shall be in conformity with the current ANSI B1.1, "Screw Threads", Coarse Thread Series, class 2 Fit, unless otherwise specified.

2.3.2 Bolts heads and nuts shall be semi-finished and shall be in conformity with ANSI B18.2, "Wrench-Head Bolts and Nuts and Wrench Openings", Heavy Series, unless otherwise specified. All nuts shall be hexagonal in shape.

2.3.3 Stainless steel anchor bolts, flange bolts, studs and nuts shall be in conformity with the current ASTM Designation: A193, Grade B8 (AISI 304), Class 1 and ASTM A194, Grade 8 (AISI 304), AISI 316 or approved equal.

3. EXECUTION:

3.1 General

3.1.1 All equipment shall be installed in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Divisions 1 and 15A. The manufacturer shall inspect the pump installation and shall certify that the pumps have been installed properly. Information submitted for approval shall include a letter of intent to provide this certification. All wiring and piping shall be completed and all necessary adjustments to equipment shall be made to provide a complete operational pumping installation.

3.1.2 The manufacturer shall have joint responsibility with the Contractor for the proper installation of the equipment, and jointly with the Contractor shall furnish a written statement to the Owner certifying that the equipment as installed complies with the Plans and Specifications, will perform as specified, and is properly installed.

3.2 Field Quality Control

3.2.1 Representative of the Manufacturer

(a) The services of a qualified representative of the manufacturer shall be provided to instruct on proper installation of the equipment, inspect the completed installation, make any necessary adjustments, participate in the startup of the equipment, participate in the field testing of the equipment, place the equipment in trouble-free operation, and instruct operating personnel in its operation and maintenance.

3.2.2 Installed Testing

(a) After installation of the pumping units, control equipment and all appurtenances, each unit shall be subjected to a field running test under actual operating conditions. Water for these tests shall be the responsibility of the Contractor. Field tests shall be performed in the presence of and as directed by the Engineer. Tests shall demonstrate that under all conditions of operation each unit:

1) Has not been damaged during transportation or installation.

2) Has been properly installed.

3) Has no physical or mechanical defect.

4) Has been properly connected.

5) Is free of overheating of any parts.

6) Is free of overloading of any parts.

(b) The pumps shall be tested to demonstrate that the pumps and control system operate as specified. Any defects in the equipment or failure to meet the requirements of the Specifications shall be promptly corrected.

(c) The following shall be checked on start-up:

1) Current draw and voltage on all legs of each pump shall be observed and recorded to see if there is any imbalance.

2) Megger testing shall be performed and logged on all pumps.

3) Pump controls and terminations shall be checked.

4) At a minimum, each pump, including all spare pumps, shall be run in recirculation a minimum of 30 minutes.

3.3 Painting

3.3.1 All pumping equipment shall be painted as specified in Division 9.

3.4 Schedule

3.4.1 Refer to Drawing M4.

END OF THIS SECTION

DIVISION 15 - MECHANICAL

DIVISION 15E - VENTILATION

1. GENERAL:

1.1 Section Includes:

The work specified herein includes furnishing and installing the ventilating system including fans, louvers, dampers, ductwork, supports, air inlets and outlets and all associated appurtenances and work as indicated and as specified herein.

1.2 Related Sections:

1.2.1 Section 4A - Unit Masonry System

1.2.2 Section 5E - Bolts, Anchor Bolts, Expansion Anchors, and Concrete Inserts

1.2.3 Section 15A - General Mechanical Provisions

1.2.4 Section 15B - Basic Mechanical Materials and Methods

1.2.5 Section 16A - General Electrical Provisions

1.2.6 Section 16B - Basic Electrical Materials and Methods

1.3 References:

All reference standards shall be from the latest edition.

1.3.1 AMCA 99 Standards Handbook.

1.3.2 AMCA 210 Laboratory Methods for Testing Fans for Rating Purposes.

1.3.3 AMCA 300 Test Code for Sound Rating Moving Air Devices.

1.3.4 ASHRAE Handbook 2001 Fundamentals; Chapter 32 – Duct Design.

1.3.5 ASHRAE Handbook 2000 Equipment; Chapter 16 – Duct Construction.

1.3.6 ASTM A 366 Steel, Sheet, Carbon, Cold Rolled, Commercial Quality.

1.3.7 ASTM A 525 General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

1.3.8 ASTM A 527 Steel Sheet, Zinc-Coated (Galvanized) by Hot-dip Process, Lock Forming Quality.

1.3.9 NFPA 90A Installation of Air Conditioning and Ventilating Systems.

1.3.10 SMACNA HVAC Duct Construction Standards - Metal and Flexible.

1.4 System Description:

1.4.1 The ventilation system consists of ductwork, dampers, louvers and supply and exhaust fans for the MCC Control Room, Pump Access Room, and the Lower Level/Trash Rack/Wet Well areas. The MCC Control Room ventilation system will operate when the temperature is above 85°F. The Lower Level/Trash Rack/Wet Well ventilation system will operate when the lower level & wet well lights are turned on, when combustible gas is detected, or when temperature is above 85°F. The Pump Access Room system will operate when temperature is above 85°F or when combustible gas is detected. A “Hand-Off-Auto” switch will be provided for each system to allow manual operation.

1.4.2 All fan and damper motors associated with the Pump Access Room and the Lower Level/Trash Rack/Wet Well area shall be rated for Class 1, Div. 1 Group D hazardous locations. Fans shall be AMCA type B sparkproof. Fan motors and drives shall be located in a ventilated enclosure outside of the airstream or have NEMA 7 explosionproof construction. Damper motors shall be installed outside of the airstream, NEMA 7 explosion proof or rated “intrinsically safe” for Class 1, Div 1 Group D locations.

1.5 Submittals

1.5.1 Submit shop drawings and product data under provisions of Sections 1A and 15A.

1.5.2 Submit detailed drawings and design data.

1.6 Guarantee

1.6.1 Provide guarantee under provisions of Section 1A.

1.7 Delivery, Storage and Handling

1.7.1 Delivery, storage and handling shall be as specified under Section 1A.

1.8 Definitions:

1.8.1 Low Pressure Ductwork (Three pressure classifications):

(a) 125 Pa (1/2 inch WG) positive or negative static pressure and velocities less than 10 m/sec (2,000 fpm)

(b) 250 Pa (1 inch WG) positive or negative static pressure and velocities less than 12.7 m/sec (2,500 fpm)

(c) 500 Pa (2 inch WG) positive or negative static pressure and less than 12.7 m/sec (2,500 fpm).

1.9 Basis of Payment:

1.9.1 The pump station ventilation work shall be paid at the Contract lump sum price for
PUMP STATION, MECHANICAL WORK
which shall be payment in full for the work described herein.

2. PRODUCTS:

2.1 Supply Fans SF-1 and SF-2

2.1.1 General

Supply fan SF-1 shall be a belt-drive wall-mounted propeller fan. Supply fan SF-2 shall be a belt-drive roof-mounted centrifugal fan. Fan airflow, static pressure, and size shall be as noted in the fan schedule in paragraph 3.4.

2.1.2 Ratings

(a) All fans shall conform to AMCA 210 and bear the AMCA Certified Rating Seal.

(b) All fans shall conform to AMCA 301, tested to AMCA 300 and bear the AMCA Certified Sound Rating Seal.

2.1.3 Fabrication

(a) All fans shall conform to AMCA 99.

(b) Statically and dynamically balance fans to eliminate vibration or noise in occupied areas.

(c) Supply fan SF-1 shall be enclosed in a weatherproof wall housing with weatherhood, filters, and weatherproof motor actuator for damper D-1

(d) Supply fan SF-2 shall have a weatherproof drive enclosure with backdraft damper D-5.

2.1.4 Performance

Fans used shall not decrease motor size, increase noise level, or increase tip speed by more than 10 percent, or increase inlet air velocity by more than 20 percent, from specified criteria. Fans shall be capable of accommodating static pressure variations of plus or minus 10 percent. Base performance on sea level conditions.

2.1.5 Impeller

Die cast aluminum alloy, fabricated aluminum or fabricated steel with heavy hubs, statically and dynamically balanced, keyed and locked to shaft by standard square key and set screw, directly connected to motor.

2.1.6 Motor

Self-aligning pre-lubricated ball or sleeve bearings affixed to mounting plate, neoprene vibration isolation between fan assembly and mounting plate.

2.1.7 Frame

Motor drive frame assemblies and fan panels shall be galvanized steel. Drive frame assemblies shall be welded wire or formed channels and fan panels shall have prepunched mounting holes, formed flanges, and a deep formed inlet venturi. Drive frames and panels shall be bolted construction or welded construction.

2.1.8 Wall Housing Assembly

(a) Wall housing shall be constructed of galvanized steel with heavy gauge mounting flanges and prepunched mounting holes. Welded steel wire guards, coated with a thermal setting polyester urethane shall protect the drive side.

(b) The wall housing shall be suitable for outdoor environments and provide the fan, motor and damper complete protection from the elements.

(c) Provide weatherhood for mounting on the exterior intake of the wall housing louvers. The weatherhood shall be constructed of galvanized steel with mounting flanges and prepunched holes.

(d) Provide an insect screen to be attached to the weatherhood. The screen shall mount to the interior side of the weatherhood.

(e) Provide a 1/4" mesh heavy-gauge stainless steel wire screen on the inlet of the weatherhood.

(f) Provide a removable, washable stainless steel filter for supply fan SF-1 mounted inside the wall housing. Access to the filter shall be from the inside of the building.

2.1.9 Roof Mounting Assembly

(a) Housing shall be constructed of galvanized steel with heavy gauge mounting flanges and prepunched mounting holes. Housing shall mount to new roof curb frame.

(b) The roof housing shall be suitable for outdoor environments and provide the fan, motor, and inlet complete protection from the elements.

(c) Provide weatherhood for mounting on the exterior intake of the fan inlet. The weatherhood shall be constructed of galvanized steel with mounting flanges and prepunched holes.

(d) Provide an insect screen to be attached to the weatherhood. The screen shall mount to the interior side of the weatherhood.

(e) Provide a 1/4" mesh heavy-gauge stainless steel wire screen on the inlet of the weatherhood.

2.2.0 Dampers

(a) General

Provide motorized dampers, mounted inside the wall housing. The damper size shall be as noted in the damper schedule in paragraph 3.5.

(b) Fabrication

18 gage galvanized steel frame with 3 ½” depth, roll formed aluminum blades 0.032” - 0.040”, 3/16” diameter plated steel stub axles turning in acetyl bearings, extruded vinyl blade seals and internal 0.064” aluminum tie bar (on-blade).

(c) Damper Motor

Motor shall be 2-position type connected to the damper via adjustable linkage. Power for the motor shall be 120 VAC, single phase. The motor shall be of suitable power to drive the damper to the full open position.

2.2 Exhaust Fans EF-1 and EF-2

2.2.1 General

Exhaust fan EF-1 and EF-2 shall be belt-drive roof-mounted centrifugal fans. Fan airflow, static pressure, and size shall be as noted in the fan schedule in paragraph 3.4.

2.2.2 Ratings

(a) All fans shall conform to AMCA 210 and bear the AMCA Certified Rating Seal.

(b) All fans shall conform to AMCA 301, tested to AMCA 300 and bear the AMCA Certified Sound Rating Seal.

2.2.3 Fabrication

(a) All fans shall conform to AMCA 99.

(b) Statically and dynamically balance fans to eliminate vibration or noise in occupied areas.

(c) Exhaust fan EF-1 shall be enclosed in a weatherproof roof mounted housing with a backdraft damper.

(d) Exhaust fan EF-2 shall be mounted in ductwork with backdraft damper D-6.

2.2.4 Performance

Fans used shall not decrease motor size, increase noise level, or increase tip speed by more than 10 percent, or increase inlet air velocity by more than 20 percent, from specified criteria. Fans shall be capable of accommodating static pressure variations of plus or minus 10 percent. Base performance on sea level conditions.

2.2.5 Impeller

Die cast aluminum alloy, fabricated aluminum or fabricated steel with heavy hubs, statically and dynamically balanced, keyed and locked to shaft by standard square key and set screw, directly connected to motor.

2.2.6 Motor

Self-aligning pre-lubricated ball or sleeve bearings affixed to mounting plate, neoprene vibration isolation between fan assembly and mounting plate. Motor shall operate from 120 VAC, single-phase power.

2.2.7 Frame

Motor drive frame assemblies and fan panels shall be galvanized steel. Drive frame assemblies shall be welded wire or formed channels and fan panels shall have prepunched mounting holes, formed flanges, and a deep formed inlet venturi. Drive frames and panels shall be bolted construction or welded construction.

2.2.8 Motor Side Guard

Provide a motor side guard. The motor side guard shall be constructed of welded steel wire to completely enclose the motor and drive side of the fan. The guards shall be coated with thermal setting polyester urethane.

2.3 Fixed Louver/Motorized Damper Assembly

2.3.1 General

Provide a combination fixed louver/motorized damper, with external bird screen for exhaust damper D-2 and supply damper D-3.

2.3.2 Fabrication

Frame shall be constructed of .080" extruded aluminum with .072" extruded aluminum blades. Fittings shall be plated center steel brackets, brass pivots and a 5/16" diameter plated steel linkage rod. Operating arm shall be 14 gage galvanized steel. Cover channel shall be .063" aluminum. Blade edge seals shall be vinyl gasketing extending the full length of the adjustable blades. Provide standard mill finish.

2.3.3 Bird Screen

Provide an externally mounted bird screen. The screen shall be constructed of .051" x 3/4" diamond pattern expanded aluminum.

2.3.4 Insect Screen

Provide an externally mounted insect screen. The screen shall be constructed of 0123" diameter aluminum, 18" x 14" mesh giving a free area ratio of 60%.

2.3.5 Damper Motor

Power for the motor shall be 120 VAC, single phase. Damper motors that are exposed to hazardous atmospheres shall be intrinsically safe or explosionproof.

2.3.6 Field Finish

Finish exterior of fixed louver to matching color of existing exterior metal in accordance with the Division 9 Painting specifications. Color: Dove Grey.

2.4 Low Pressure Ductwork

2.4.1 General

(a) Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.

(b) Galvanized (hot dipped) Steel Ducts: ASTM A525 or ASTM A527 hot dipped galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz. per sq. ft. (382 g/sq. m) for each side in conformance with ASTM A90. Galvanized ducts shall be installed for all supply and exhaust ducts except for the SF-2 supply duct serving the wet well location. Ductwork shall conform to the 250 Pa (1 inch WG) pressure class per Section 1.8.

(c) Stainless Steel Ducts: ASTM A366. Stainless steel ducts shall be installed for the SF-2 supply duct serving the wet well location. Ductwork shall conform to the 250 Pa (1 inch WG) pressure class per Section 1.8.

(d) Fasteners: rivets, bolts, or sheet metal screws.

(e) Sealant: non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

(f) Hanger Rod: steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.4.2 Fabrication

(a) Fabricate and support in accordance with SMACNA Low and Medium Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated.

(b) Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

No variation of duct configuration or sizes permitted except by written permission.

(c) Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide turning vanes.

(d) Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.

(e) Provide easements where low pressure ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area.

(f) Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of airflow.

(g) Use double nuts and lock washers on threaded rod supports.

3. EXECUTION:

3.1 General

3.1.1 All equipment shall be installed in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1 and Section 15A. The manufacturer shall inspect all fans and louver assemblies and shall certify that the ventilation equipment has been installed properly. Information submitted for approval shall include a letter of intent to provide this certification. All mechanical installation and wiring shall be completed and all necessary adjustments to equipment shall be made to provide a complete operational installation.

3.1.2 The manufacturer shall have joint responsibility with the Contractor for the proper installation of the equipment, and jointly with Contractor shall furnish a written statement to the Owner certifying that the equipment as installed complies with the Plans and Specifications, will perform as specified, and is properly installed.

3.1.3 Install and seal ducts in accordance with "SMACNA HVAC Duct Construction Standards – Metal and Flexible."

3.1.4 Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

3.1.5 Streamline all ductwork to the full extent practical and equip with proper and adequate devices to assure proper balance and distribution of indicated air quantities.

3.1.6 Prior to ductwork fabrication, verify if all ductwork as dimensioned and generally shown will satisfactorily fit allocated spaces. Take precautions to avoid space interference with beams, columns, joists, pipes, lights, conduit, other ducts, equipment, etc. Notify Architect/Engineer if any spatial conflicts exist, and then obtain Architect/Engineer's approval of necessary routing. Make any such necessary revisions that are minor at no additional cost.

3.1.7 Carefully coordinate all duct connections to fans to provide proper connections, elbows and bends that minimize noise and pressure drop.

3.1.8 Provide all curved elbows with radius ratios of not less than 1.5 unless otherwise shown or approved by Architect/Engineer. Provide all mitered elbows with turning vanes.

3.1.9 Carefully suspend all ductwork so that no objectionable conditions result (such as vibration, sagging, etc.)

3.1.10 Coordinate any and all dimensions at interfaces of ductwork and at interfaces of ductwork with equipment so that proper overlaps, interfaces, etc. are maintained.

3.1.11 Changes in direction: Changes in direction shall be basically as indicated on the drawings and the following shall apply:

(a) Supply duct turns of 90 degrees in low pressure duct shall be made with mitered elbows fitted with closely spaced turning vanes designed for maintaining a constant velocity through the elbow.

(b) Return and exhaust duct turns of 90 degrees in low pressure duct shall be made with mitered elbows, as specified herein before, for supply ducts, unless radius elbows are indicated in which case they shall be vaned and constructed with a turning radius 1-1/2 times the width (width considered as the dimension in the plane of the turn) as measured to the duct centerline.

(c) Tees in low-pressure duct shall conform to the design requirements specified herein before for elbows.

3.2 Field Quality Control

3.2.1 Representative of the Manufacturer

The services of a qualified representative of the manufacturer shall be provided to instruct on proper installation of the equipment, inspect the completed installation, make any necessary adjustments, participate in the startup of the equipment, place the equipment in trouble-free operation, and instruct operating personnel in its operation and maintenance.

3.3 Start-Up Services

3.3.1 IDOT shall be notified at least two (2) weeks before start-up services are required.

3.3.2 The equipment manufacturer shall provide the services of a field representative for a total of two (2) trips for a total of not more than two (2) working days for the purpose of instruction and assisting the Contractor and the IDOT's personnel in the start-up and proper operation of the equipment. Manufacturer's representative shall provide written certification that equipment has been installed in accordance with their requirements.

3.3.3 The equipment manufacturer shall furnish operating and maintenance instructions for the equipment.

3.3.4 The manufacturer shall provide written certification that the equipment has been installed in accordance with their requirements.

3.4 Fan Schedule:

	SF-1	**EF-1***	**SF-2***	**EF-2***
Fan Type	Propeller	Centrifugal	SWSI Centrifugal	Centrifugal
Class	1	1	1	1
Size	24	18	17.5" X 27.6"	30
Capacity m^3/min (CFM)	1700	750	8200	8200
SP Pa (" w.g.)	.5	.375	1	.5
Drive	Belt	Belt	Belt	Belt
Voltage	120	120	460	460
Fan RPM	1750	1160	574	612
Motor kW (hp)	1/2	1/4	5	
Accessories	Wall collar, motor side guard, Bird Screen, Damper, Filters	Roof mounted, Bird Screen, Damper	Roof mounted, Galvanized Steel Hood, Bird Screen, Damper	Roof mounted, Bird Screen, Damper

* Indicates non-spark & explosion proof equipment required.

3.5 Damper Schedule:

	D-1	D-2	D-3	D-4	D-5	D-6
Size	24 x 24	24 x 30	18x 18	18x 18	24x 30	30x30
Actuator	Counter Weight	Counter Weight *	Counter Weight	Counter Weight*	Counter Weight	Counter Weight
Voltage	-	-	-	-	-	-
Phase	-	-	-	-	-	-
Configuration	Supply	Exhaust	Supply	Exhaust	Supply	Exhaust
Notes	Damper for SF-1	Damper for SF-1	Damper for EF-1	Damper for EF-1	Damper for SF-2	Damper for EF-2

END OF THIS SECTION

DIVISION 15 - MECHANICAL

SECTION 15F - TRASH RAKE & BAR SCREEN

1. GENERAL:

1.1 Section Includes

1.1.1 There shall be furnished as shown on the plans, one (1) trash rake and bar screen. The bar screen shall be nominally 8'-0" wide x 26'-0" high mounted at a 5º angle from vertical, as shown on the drawings. The equipment will be mounted between two existing vertical concrete walls. Therefore, the equipment shall accommodate the variability of the walls.

1.2 Related Sections

1.2.1 Section 3A - Cast-In-Place Concrete

1.2.2 Section 3B - Grout

1.2.3 Section 5A - Structural Steel

1.2.4 Section 5E - Bolts, Anchor Bolts, Expansion Anchors and

1.2.5 Section 15A - General Mechanical Provisions

1.2.6 Section 15B - Basic Mechanical Materials and Methods
Concrete Inserts

1.2.7 Section 16A - General Electrical Provisions

1.2.8 Section 16B - Basic Electrical Materials and Methods

1.2.9 Section 16D - Supervisory Control and Data Acquisition (SCADA) Equipment

1.3 Guarantee

1.3.1 The equipment manufacturer shall guarantee the equipment against defects in design, material and workmanship for a period of eighteen months after delivery or one year after plant start-up, whichever occurs sooner.

1.4 Submittals

1.4.1 Submit shop drawings and product data under provisions of Sections 1A and 15A.

1.4.2 Submit detailed drawings and design data.

1.5 Basis of Payment

1.5.1 The work required to comply with this Section shall be paid for as part of the contract lump sum price for PUMP STATION MECHANICAL WORK which shall be payment in full for the work described herein.

2. PRODUCTS:

2.1 General Requirements

2.1.1 The contractor shall provide a complete working bar screen and trash rake system including all protection and alarm devices required for operation. The current design is based on Duperon Flex-Rake Full Penetration Model. If a different manufacturer is supplied, a complete operational system shall be provided per the detailed description.

2.2 Bar Screen and Trash Rake Specifics

2.2.1 General Design

(a) The unit shall comprise a complete assembly consisting of a housing and support frame, drive, main chain, sprockets and shafts, bearings, rakes, operating controls and anchorages to provide a complete operating system. It will be mounted and operated on a new bar screen which is 2.44m X 3.96m (7'-10" wide X 13'-0") long mounted at 5 degrees from vertical. The bar screen consists of 2" X ¼" flat bars on 1" centers.

(b) The rake fingers of the unit shall operate on the upstream side of the vertical, screen section with the fingers protruding through the screen bars to remove any obstruction jamming between or wrapping around the bars.

The rake fingers shall discharge the screenings onto a discharge plate in the housing. The unit shall be sized to discharge into wheeled carts located at elevation –20.75 ft. The unit shall prevent elevated screenings from falling back into the screen chamber while being discharged from the rakes onto the discharge plate.

(c) The equipment shall be suitable for operation in NEC Class I, Division 1, Group D hazardous locations. The rake unit shall also be suitable for operation during infrequent flooding events that result in submersion.

2.2.2 Drive

(a) Each drive shall include a shaft mounted or chain driven helical gear reducer. If a chain drive is provided, the reducer shaft and drive sprocket shall be connected to the driven sprocket with the chain The mechanically cleaned bar screen shall be a stainless steel link driven front-cleaning, front-return type mechanically cleaned bar screen.

(b) The motor(s) shall be NEMA Design B, totally enclosed explosion-proof with Class B insulation, include a sealed conduit box, and designed to operate on 3 phase, 60 cycle, 480 volt current.

(c) A torque overload switch sized for drive and mechanism protection shall be provided. The switch will sound an alarm, and stop the drive motor in the case of overload. When tripped, the switch shall otherwise indicate the rakes are "jammed".

(d) A Hydraulic Motor with Hydraulic Power Unit (HPU) shall be used to satisfy the submersion requirement. The Contractor shall install a complete system, including tubing, fittings, valves, supports, hoses, etc. The system shall be capable of maintaining the manufacturer’s required fluid temperature range throughout an ambient temperature range of 40°F to 95°F. The electrical pump motor shall meet the requirements stated in 2.2.2.b, above.

(e) The HPU shall be provided by the trash rake manufacturer in order to ensure single-point responsibility for operating warrantee. The Contractor shall follow all manufacturers recommendations for field installation. Any conflicts between manufacturers' recommendations, and this specification shall be brought to the attention of the Engineer. The HPU shall have the following features:

1. Variable stroke positive displacement pump.

2. Fluid Temperature Control (See 2.2.2.d above).

3. Replaceable Filter with local and remote indication of pluggage.

4. Adjustable pressure switch.

5. Fluid level switch and temperature switch.

6. Hydraulic oil pressure and flow switch.

7. Solenoid with switches controlling trash rake forward and reverse.

8. Relief valve for overpressure protection.

(f) The HPU shall be located on the grade floor (elevation +15.25') in the stairwell, as shown on the drawings. This is an area subject to combustible atmospheres. Consequently, if the hydraulic fluid reservoir requires external venting, it shall be vented to the exterior of the building through the North wall. External vents shall have a mist eliminator.

(g) Hydraulic tubing, valves, hoses, etc., shall be sized appropriately by the manufacturer given the flow rate required for the service, and the overall length of the supply and return. The tubing shall be stainless steel, continuously pitched at ¼" and supported every 5 feet with ZSI hydraulic type supports. Fittings shall meet SAE-J1453 standard, such as Parker Seal-Loc fittings. Hoses shall be Parker 451TC, or approved equivalent. Hose connections shall terminate at an anchored connector or bulkhead connector fixed to a rigid machine member. High-pressure isolating ball valves , for maintenance, shall be provided and installed as close to the hydraulic motor as possible.

2.2.3 Rakes

(a) The rakes for the unit shall be fabricated of UHMW and shall not cause damage to the bar screen finish or structure. The fingers shall fully penetrate the bar screen to bring the trash to the top discharge plate. The unit shall be furnished with enough cleaning rakes so that whenever the mechanism stops there will always be one or more cleaning rakes engaged in the screen bars to keep them properly spaced. Scrapers shall be 21 inches apart. The scrapers move at approximately 28 inches per minute.

2.2.4 Main Chain

(a) Shall be of 304 stainless steel and 302/4 stainless steel pins. It shall either be shipped fully assembled up on the bar screen (if applicable) or shipped in pre-assembled sections. Lifting capacity shall be 1000#.

(b) The link system shall be such that it bends in one direction only, which allows it to become its own lower sprocket and frame. The link system shall also have the ability to flex around a large object such as a drum, tire, log etc. to avoid shutting down the unit.

2.2.5 Sprockets and Shafts

(a) The mechanically cleaned bar screen shall have a head sprocket only, with no sprockets, bearings, or similar drive components under water.

2.2.6 Bearings

(a) Shall be greased ball bearing type, non self-aligning, sealed and lubricated.

2.2.7 Operating Controls

(a) Operating controls for the unit shall consist of the following:

1) Torque controller to monitor shaft power overload.

2) A motor starter shall be furnished with the equipment for installation under Division 16. The starter shall be 3 phase, 600 VAC magnetic, non-fusible disconnecting switch combination type, NEMA size 1 minimum, 480-120 V control transformer with fused primary and secondary 100 VA extra capacity; 120 V control coil, ambient compensated overload relay; H-O-A switch, LED type pilot lights, control relays, and time delay relay; control panel to be mounted in motor control room.

2.2.8 Painting

(a) All steel bar components shall be coated with a urethane moisture-cure two coat paint system in accordance with the paint manufacturers specifications. Products will be MC Zinc and MC Tar, manufactured by Wasser, or equivalent. All steel mechanically cleaned bar screen components shall be coasted with a urethane moisture-cure three coat paint system. Products will be MC Zinc MC Ferrox B, and MC Luster, as manufactured by Wasser, or equivalent. Standard rake color is Safety Blue. Materials shall meet all state and federal VOC and other regulatory requirements.

(b) Field touch-up of scratches mars and bruises to shop applied primer coatings, and all finish painting shall be furnished and applied by the Contractor in accordance with Specification Section 9A.

(c) All items such as motors, reducers and equipment completely shop assembled and ready for installation shall be factory painted with one (1) shop coat of the equipment manufacturer's machinery enamel before shipment. Color shall be manufacturers standard.

2.2.9 Anchorage

(a) All wedge anchors, anchor bolts, nuts and washers shall be of stainless steel and furnished by the equipment manufacturer. They shall be set by the Contractor in accordance with certified dimension prints furnished by the equipment manufacturer.

2.3 Trash Bins

2.3.1 The trash bins shall be fabricated of 12 gauge steel plates. Supply two (2) 36.68" Long x 48" High (including casters) x 44" wide trash bins with transition cap to connect the two containers. The trash bins shall be have a finish per paragraph 2.2.8. The bin specifications are as follows:

(a) 3/16” floor

(b) 12 Gauge sides

(c) Undercarriage - 3" Structural channel 18" on center with full 3" structural channel apron

(d) 12 Gauge formed (4-bend for added strength) side channel. Drain holes under each channel

(e) 1 3/8" Solid bullnost inserted 4" into rails

(f) Fully gusseted floor and dump ends

(g) 1/2" thick lift pin support plates

(h) 3/16-inch side bump plates below lift pins

(i) Fully sealed

(j) Drain plugs.

2.3.2 Provide with two rigid and two swivel casters shall have 6" x 2" phenolic wheels. Casters shall be arranged in a diamond pattern with a 1/2" tilt. All material shall be welded construction. The bins shall have a lifting eye at each corner to allow the bins to be hoisted out of the well for emptying. Each eye shall be rated for 1000 lbs.

3. EXECUTION:

3.1 General

3.1.1 All equipment shall be installed in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1 and Section 15A. The manufacturer shall inspect the equipment installation and shall certify that the bar screen and rake have been installed properly. Information submitted for approval shall include a letter of intent to provide this certification. All mechanical installation and wiring shall be completed and all necessary adjustments to equipment shall be made to provide a complete operational installation.

3.1.2 The manufacturer shall have joint responsibility with the Contractor for the proper installation of the equipment, and jointly with Contractor shall furnish a written statement to the Owner certifying that the equipment as installed complies with the Plans and Specifications, will perform as specified, and is properly installed.

3.2 Field Quality Control

3.2.1 Representative of the Manufacturer

The services of a qualified representative of the manufacturer shall be provided to instruct on proper installation of the equipment, inspect the completed installation, make any necessary adjustments, participate in the startup of the equipment, participate in the field testing of the equipment, place the equipment in trouble-free operation, and instruct operating personnel in its operation and maintenance.

3.3 Start-Up Services

3.3.1 IDOT shall be notified at least two (2) weeks before start-up services are required.

3.3.2 The equipment manufacturer shall provide the services of a field service representative for a total of two (2) trips for a total of not more than two (2) working days for the purpose of instruction and assisting the Contractor and the IDOT's personnel in the start-up and proper operation of the equipment.

3.3.3 Operating and maintenance instructions for the equipment shall be furnished to the Contractor by the equipment manufacturer.

3.3.4 The manufacturer shall provide written certification that the equipment has been installed in accordance with their requirements.

END OF THIS SECTION

DIVISION 15 - MECHANICAL

SECTION 15G - MISCELLANEOUS ITEMS

1. GENERAL:

1.1 Section Description

1.1.1 This Section shall include all work required for the furnishing and complete installation of the Items indicated on the Drawings, as specified herein and as follows:

(a) Cable Supports

(b) Knife Gate Valve

(c) Trash Bin

(d) Gas Detection Monitor System and Monitor / Sensors

(e) Slide Gate

(f) Duckbill Check Valves

(g) Hoists are included in Section 14A.

(h) Refer to Division 1 for additional requirements.

1.2 Related Sections

1.2.1 Section 15A - General Mechanical Provisions

1.2.2 Section 15B - Basic Mechanical Materials and Methods

1.2.3 Section 15C - Piping and Appurtenances

1.2.4 Section 15D - Pumping Equipment

1.2.5 Section 16D - Supervisory Control and Data Acquisition (SCADA) Equipment

1.3 Submittals

1.3.1 Submit shop drawings and product data under provisions of Sections 1A and 15A.

1.4 Delivery, Storage and Handling

1.4.1 Delivery, storage and handling shall be in accordance with the provisions under Section 1A.

1.5 Guarantee

1.5.1 Provide guarantee under provisions of Section 1A.

1.6 Basis of Payment

1.6.1 Payment: The work specified under this Section and as required shall be included for payment in the Contract lump sum price for the item, PUMP STATION, MECHANICAL WORK.

2. PRODUCTS:

2.1 Cable Supports

2.1.1 The cable supports shall be supplied by the pump manufacturer and shall be installed according to their instructions. The cable support shall be complete and shall support all cables required for the main pumps and low-flow pump whether or not shown on the Drawings. Cable grips and hardware shall be stainless steel.

2.2 Knife Gate Valve

2.2.1 The Contractor shall provide one (1) 20” resilient seated knife gate valve for use in the 20” return pipe during pump tests. The valve shall be a Dezurik Model KGL with an electric motor actuator or an approved equivalent.

(a) The valve body shall be pressure Class 150 with raised faces on the flanges for mating with a ANSI B 16.5 flange. The wetted parts of the valve shall be stainless steel.

(b) The motor operator shall be 460V, 3 phase with a position feedback switch for the full closed position.

3 EXECUTION:

3.1 Installation

3.1.1 Install the specified specialties in accordance with manufacturer's recommendations and instructions to permit intended performance.

3.1.2 The manufacturer or supplier of the specified specialties shall furnish a qualified field engineer for whatever period of time may be necessary to assist and direct the Contractor in the proper installation of the equipment furnished, to observe and check initial performance, and whose duty shall include the instruction of the plant operating personnel in the proper operating and maintenance procedures.

3.2 Painting

3.2.1 The specified specialties shall be painted in accordance with Section 9A of these specifications.

3.3 Testing

3.3.1 The specialties shall be tested in place by the Contractor, and any defects in specialties or connections shall be corrected to the satisfaction of the Engineer.

END OF THIS SECTION

DIVISION 16 - ELECTRICAL

SECTION 16A - GENERAL ELECTRICAL PROVISIONS

1. GENERAL:

1.1 Description

1.1.1 The scope of work under this Section shall generally be all electrical work required for the project work as specified or as indicated on the drawings.

1.1.2 The electrical work shall include the furnishing and installing of various items of electrical equipment and, unless otherwise indicated, shall also include the electrical connection of various items such as electric pump motors, fan motors and similar items furnished under other Sections. The Contractor shall be responsible for ascertaining the extent of electrical connections required for items furnished under other Sections and for coordination the electrical work accordingly.

1.1.3 The specifications and drawings are intended to generally define the work required, but they do not include every equipment and installation detail. The work shall include all items and appurtenances required to fully complete the work, whether specifically identified or not, such that the electrical systems are complete and operational.

1.1.4 Refer to Division 1 for other requirements relating to the furnishing and installing of work which shall apply to the work under this Division.

1.2 Code Compliance

Unless otherwise indicated, in the absence of more stringent requirements in the Specifications or on the Drawings, the work shall be in compliance with the requirements of the National Electrical Code.

1.3 Standards

1.3.1 Wherever the following abbreviations are used in these Specifications or on the Drawings, they are to be construed the same as the respective expressions represented:

AASHTO	American Association of State Highways and Transportation Officials
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
FM	Factory Mutual
ICEA	Insulated Power Cable Engineers Association
IES	Illuminating Engineering Society of North America
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Assoc.
NESC	National Electrical Safety Code
UL	Underwriter's Laboratories

1.3.2 Wherever a reference is made to a standard or standard specification, the reference shall be to the edition current at the time of bidding, including any revisions or amendments.

1.4 Verification of Contract Drawings

1.4.1 The Contractor shall familiarize himself with the details of the total construction in so far as they may affect the work under this Division, including floor elevations, physical dimensions of structures, materials of construction and the nature of work required under other Divisions. No additional compensation will be granted for failure to consider the total project work.

1.4.2 The contract drawings (Drawings) for electrical work are generally diagrammatic and do not necessarily depict all items to scale. The Drawings indicate the general locations of major elements of the electrical system, outlets, fixtures, pull boxes and the like, however, field conditions or interferences, may require changes in the installation. The Contractor shall coordinate his work to avoid interferences and shall obtain the approval of the Engineer prior to making any changes from the installation shown.

1.4.3 Prior to installation, the Engineer may make reasonable minor changes in the locations of the installation without additional cost to the State.

1.5 Coordination

1.5.1 The Contractor shall coordinate the work under this Division with the work of other trades. This shall include an orderly exchange of information and shall be accomplished such that the total work is not delayed and that interference is avoided. The Contractor shall coordinate all electrical systems into a complete operational package. The Contractor shall assign one contact person for all such co-ordination work, has an understanding and working knowledge of the electrical control systems on this project. This person shall oversee and assume proper operation of the complete electrical control system including all testing and calibration as outlined herein. The Contractor shall provide the name and phone numbers of this individual at the pre-construction inspection. This cost shall be incidental to Pump Station Electrical.

1.6 Workmanship

1.6.1 The electrical work shall be performed in a neat and workmanlike manner in accordance with the best practices of the trade.

1.6.2 Unless otherwise indicated, all materials and equipment shall be installed in accordance with the manufacturer's recommendations.

1.7 Testing

1.7.1 All electrical equipment and systems provided under this Division should be adjusted and tested. The Contractor shall adjust, repair or replace faulty or improper Division 16 work or equipment discovered during testing.

1.7.2 In addition, all electrical items provided under other Divisions and connected and/or adjusted under this Division shall be tested and if a failure occurs due to the connecting or adjusting methods used, the failure shall be remedied under this Division by repair, replacement, or change, as determined by the Engineer, at no additional cost to the Owner.

1.7.3 Tests may be made progressively as portions of the work are completed.

1.7.4 Tests shall be made in the presence of the Engineer.

1.7.5 A written record of tests shall be maintained by the Contractor and, when completed, it shall be submitted to the Engineer for the record.

1.7.6 The Contractor shall perform all tests necessary to assure proper functioning of materials and equipment. As a minimum, the tests shall include the following:

(a) Before making final connections check the insulation resistance of all cables of 3-phase circuits that operate above 150 volts.

(b) Check wiring for proper phase sequencing including buses, feeder cables and transformers and assure proper connection at motors for proper rotation.

(c) Measure and record the line-to-line and line-to-neutral voltages at the line side of the service entrance, all panel buses or main terminals and at the primary and secondary terminals of all transformers furnished under this Division except for control transformers which are integral to motor starter units. Set the taps on transformers as required or as directed by the Engineer.

(d) Check and record the motor nameplate data for each 3-phase motor. Check the ratings of motor circuit protective devices and assure compatibility of the devices for the connected motors. In particular, assure that the motor starter overload elements are proper for the motor nameplate full load amperes.

(e) Set control relays, protective relays and instruments in accordance with manufacturer's recommendations. Record the set points.

(f) Check all control circuits for proper functioning of all devices and check all switches, contactors, pushbuttons, limit switches, thermostats, circuit breakers and the like for proper operation.

(g) Check all alarm circuits for proper operation and proper set points, as applicable. Record any appropriate set points.

(h) Measure and record the line currents of each phase of each 3-phase motor under load.

(i) Align and adjust lighting fixtures and assure proper operation of all controls, ballasts and lamps.

(j) All equipment must be properly calibrated for proper operation of the system.

1.7.7 Testing must be complete prior to final inspection. All instruments, tools, etc. required for the tests shall be provided by the Contractor. All equipment shall be properly calibrated for proper operation of the complete system. Additional testing may be requested by the Engineer during final inspection to spot-check test results or to demonstrate proper functioning of the systems. The Contractor at no additional cost to the State shall perform these tests.

1.7.8 The Contractor shall simulate the automatic operation of the complete pump station to assure proper operation. After assurance of proper operation, the Contractor shall demonstrate automatic operation including simulation to the Engineer's satisfaction.

1.7.9 Note that failure to test the equipment completely is not an allowance for an extension.

1.8 Data to be filed with the Owner

1.8.1 Submit shop drawings and product data under provisions of Section 1A. Certain data, as specified herein, shall be furnished to the Owner when installation and testing are completed, before final acceptance.

1.8.2 The data shall be compiled in 8-1/2 x 11-inch format in high-quality heavyweight, hard cover binders with piano-style metal hinges or in an alternate format approved by the Engineer. Large drawings and other materials, which would be opened or removed for reading, shall be provided with heavy clear plastic pouches within the binders. The number of binders shall be as required to hold all required material without over-filling. Various sections, as appropriate shall have suitable dividers. All volumes shall be labeled.

1.8.3 Four sets of the data files shall be provided.

1.8.4 As a minimum, the data files shall include:

(a) A table of contents.

(b) Approved final shop drawings and product data for all equipment and materials incorporated in the work under this Division.

(c) Manufacturer's maintenance manuals for all equipment furnished under this Division for which maintenance is recommended by the manufacturer.

(d) A tabulation of cable insulation tests.

(e) A tabulation of motor nameplate data.

(f) A tabulation of required voltage tests.

(g) A tabulation of required motor current tests.

(h) A tabulation of relay and control device set points.

(i) A tabulation of alarm set points.

1.8.5 All data shall be neat and clearly legible. The table of contents and tabulations of set points and other recorded test data shall be typed. Sloppy, illegible, inaccurate, or incomplete data will not be accepted.

1.9 Record Drawings

1.9.1 Alterations and additions to the electrical installation depicted on the contract drawings which are made during the execution of the work shall be neatly and plainly marked in red on a set of Record Drawings kept at the contractor's field office for the project. These drawings shall be updated as the work progresses and shall be available for inspection by the Engineer at all times during the course of the work.

1.9.2 When the work is completed, and before final acceptance, a set of Record Drawings shall be submitted to the Engineer for review and acceptance. The set shall include the marked field set and a set of reproducible drawings. A set of reproducible drawings will be supplied to the Contractor for use in preparing the Record Drawings. The drawings shall each be stamped "RECORD DRAWING", and shall be marked with the contractor's stamp, the date, and the signature of the contractor's supervising engineer or electrician.

1.9.3 The Record Drawings must be submitted and must be acceptable to the Engineer prior to final acceptance. There will be no deviation from this requirement.

1.10 Guarantees

1.10.1 Guarantees shall be provided for equipment, materials and work provided under this Division as specified in Division 1.

1.11 Basis of Payment

1.11.1 The work, except the Electric Service specified under Subsection 3.4 shall be paid for at the Contract lump sum price for PUMP STATION ELECTRICAL WORK, which shall be payment in full for the work described herein unless otherwise noted.

1.11.2 The work for Electric Service specified under Subsection 3.4 shall be paid under the pay item ELECTRIC SERVICE CONNECTION.

2. PRODUCTS:

2.1 Materials and Equipment

2.1.1 Quality

All materials, equipment and appurtenances shall be new, shall be suitable for the application and shall be the product of established, reputable manufacturers.

2.1.2 Standards

The construction, sizes, ratings and capacities of items shall be in conformance with the requirements of the NEC and with NEMA standards, as applicable.

2.1.3 UL Label

Unless otherwise indicated, materials and equipment shall bear the UL label whenever such labeling is available for the type of material or equipment being furnished.

2.1.4 Service Equipment

Equipment that is used as electric service equipment shall bear an UL listing: "SUITABLE FOR USE AS SERVICE EQUIPMENT".

2.1.5 Other Requirements
Refer to Division 1 for other requirements relating to materials and equipment.

3. EXECUTION:

3.1 General

3.1.1 Provide other trades with advance information on locations and sizes of concrete pads, frames, boxes, sleeves and openings needed for the Work. Also provide information and shop drawings necessary to permit trades affected to install their Work properly and without delay.

3.1.2 Prior to submittal of shop drawings, coordinate electrical equipment, particularly motor control equipment and control panels, with all applicable equipment and systems furnished under other Divisions of the Specifications. Special attention shall be called to the requirements of Instrumentation and Controls specified under Division 15. Acknowledge in submittal drawings any designated instrument tag numbers when tag numbers are assigned in drawings or specifications. Acknowledge that coordination of all applicable equipment has been performed.

3.1.3 The electrical system design, including, but not limited to, the type, size and quantity of equipment and components, layout, installation and connections as shown on Plans and/or as indicated in the Specifications, is based on electrical, electro-mechanical and/or electronic equipment supplied by selected manufacturers.

If equipment furnished by the Contractor requires a different electrical system than that specified hereinafter or shown on Plans, the Contractor shall make all necessary modifications to the electrical system design, subject to the Owner's approval, to provide a complete electrical system ready for successful operation. The costs of making the modifications to the electrical system shall be entirely borne by the Contractor without extra cost to the Owner. If equipment furnished by the Contractor necessitates changes to electric, gas and/or telephone utilities' service equipment, or to the Work specified under other Sections of the Specifications, then the cost for making the changes shall also be entirely borne by the Contractor without extra cost to the Owner.

3.1.4 Locate all equipment such that they are readily accessible for operation, maintenance, repair and replacement. Ready accessibility to removable parts of equipment and to wiring shall be provided without moving other equipment, which is to be installed, or which is in place. In general, such equipment is not to be blocked or concealed except where specifically permitted. Do not route conduits across or through access or maintenance space of other equipment. Where equipment is permitted to be concealed, provide approved access door. Where equipment is concealed in fire-resistance rated walls or partitions, provide access doors having same fire-resistance rating as well as partitions in which door is placed.

3.1.5 Where electrical equipment is to be installed in limited space, provide additional drawings (scale - minimum 1/4 in. = 1 ft.) as necessary to show physical and dimensional relationship between electrical equipment and adjacent equipment furnished under other Divisions of the Specifications. Acknowledge locations of adjacent structural or mechanical systems, including ductwork, piping, or equipment accesses. Acknowledge clearances established by all codes and regulations are met or exceeded.

3.1.6 The installation shall be such that its components will function together as workable systems. It shall be completed, with all accessories necessary for its operation, and shall be left with all equipment properly adjusted and in working order. The Work shall be executed in conformity with the best practices and so as to contribute to efficiency of operation, minimum maintenance, accessibility and appearance.

3.1.7 Locations of electrical equipment shown on Plans are approximate and are subject to minor changes as directed by and at no extra cost to the Owner.

3.1.8 Perform equipment tests as per manufacturer's instructions except where otherwise specified.

3.1.9 All wiring for the demolished equipment shall be disconnected and removed from the sources.

3.2 Protection of Work

3.2.1 All electrical work, including equipment, fixtures and appurtenances shall be protected from damage until final acceptance. Fixtures and equipment shall be covered to protect against dirt, moisture, paint and the like. The work shall be protected from mechanical injury by appropriate covering or shielding.

3.2.2 Prior to final acceptance, protective measures shall be removed and equipment and items shall be cleaned as required to deliver the installation to the State in clean, undamaged condition.

3.3 Clean-Up and Safety

3.3.1 The work site shall be maintained in a clean condition, free of hazards, all in conformance with the requirements of Article 107 of the Standard Specifications. Special care shall be taken to assure that electrical systems are not left in an exposed or otherwise hazardous condition. All electrical boxes, cabinets, pole handholes, etc., which contain wiring, either energized or non-energized, shall be closed or shall have their covers in place and shall be locked when possible, during off-work hours.

3.4 Electric Service

3.4.1 Work under this Section shall include all equipment, wiring and appurtenances required for both the complete, operational temporary and permanent electric service.

3.4.2 The Contractor, if any, shall pay excess facilities charges, to the utility. The Contractor will be reimbursed the exact amount of these charges under a separate pay item, ELECTRIC SERVICE CONNECTION. For bidding purposes, this item shall be estimated at $15,000.

3.4.3 The Drawings and Specifications indicate the general nature of work required for upgrading the existing ComEd electric service. The Contractor shall verify the service requirements, shall ascertain the installation requirements and the items of equipment, wiring, appurtenances being furnished by the utility and shall provide all other material and work required for a complete installation.

3.4.4 The existing power metering shall be upgraded. The Contractor shall coordinate the current transformer rating with the electric utility.

3.4.5 All electric service work must conform to the requirements of the electric utility.

3.4.6 The Contractor shall obtain approval of the electric utility for the electric service and metering prior to installation. Copies of approved documents and drawings shall be submitted to the Engineer for the record prior to installation.

3.5 Telephone Service

3.5.1 Work under this Section shall include all equipment, wiring and appurtenances required for complete, operational telephone service and a telephone connection for SCADA system and desk outlet. The telephone service is existing, no change is required. The existing telephone wiring shall be completed to accommodate equipment relocation inside the pumping station.

3.5.2 Charges by the telephone utility, if any, shall be paid to the utility by the Contractor under the pay item, PUMP STATION ELECTRICAL WORK. The installation and coordination of charges by the telephone utility shall be referred to Conney Stresino of IDOT Business Services, telephone number (847) 705-4011.

3.5.3 The Contractor shall verify the service requirements, if needed, for the relocation of existing digital communicator panel into control room, and shall provide all other material and work required for a complete installation.

3.5.4 All telephone service work must conform to the requirements of the telephone utility.

3.5.5 The Contractor shall obtain approval of the telephone utility for the electric service prior to installation. Copies of approved documents and drawings shall be submitted to the Engineer for the record prior to installation.

3.6 Final Acceptance Inspection

3.6.1 When the work is complete, tested and fully operational, and only after the Record Drawings have been reviewed and accepted by the Engineer, the Contractor shall schedule a Final Acceptance Inspection with the Engineer. The Contractor is cautioned to test for the proper operation of all equipment prior to the final acceptance inspection and to make any corrections necessary to establish proper operation. THE FINAL ACCEPTANCE INSPECTION SHALL NOT BE HELD WHILE FINAL CONNECTIONS AND CHECKS ARE BEING MADE.

3.6.2 The Final Acceptance Inspection shall be made for the complete work at the facility as a whole and shall be as further described in Division 1.

3.7 Maintenance

3.7.1 During the course of the construction work and until final acceptance, the Contractor shall be responsible for maintenance and operational integrity of the facility as specified in Division 1.

3.8 Modifications to Existing Facilities:

3.8.1 Modify, remove, or abandon certain parts of the existing electrical installation as shown and as specified herein.

(a) Disconnect wires and conduit from equipment, including motors, which are to be removed.

(b) Remove exposed conduit and wire, outlet boxes, devices, and similar items, which are no longer, required.

(c) Remove wires from concealed conduit no longer required, cut off the conduit flush with the surface, and seal the ends.

(d) Install blank plates on abandoned outlet boxes concealed in the structure.

(e) Break up and remove abandoned underground conduit runs, which interfere with construction. Other underground conduit runs may be abandoned in place. All unused conduits and conduit openings shall be sealed.

3.8.2 Materials and devices used to modify existing equipment, either for temporary or permanent use, shall be compatible with existing equipment and shall be suitable for the installation. Items shall conform to similar items specified herein, where applicable.

3.8.3 Patch holes and repair damage to existing facilities to the satisfaction of the Engineer.

3.8.4 Certain items of equipment such as motor starters and other reasonably salvageable materials will be retained by the State. Use care in removing such equipment and materials, and deliver them to locations within District 1 as designated by the Engineer. Prior to the removal of any equipment, the Engineer shall be contacted to designate items that are to be salvaged.

3.8.5 Concrete, damaged conduit, and other equipment and materials considered useless by the Engineer shall be removed and disposed of off the site. The bid price for the electrical work shall include an allowance for the salvage value of such materials and equipment.

END OF THIS SECTION

DIVISION 16 - ELECTRICAL

SECTION 16B - BASIC ELECTRICAL MATERIALS AND METHODS

1. GENERAL:

1.1 Description

1.1.1 Basic materials and methods specified herein shall be incorporated in the work wherever applicable unless specifically indicated otherwise.

1.1.2 The basic materials and methods specified herein are intended to define a minimum standard of quality and workmanship.

1.1.3 Refer to Division 1 for additional requirements.

1.2 Related Sections

1.2.1 Section 3A - Cast-In-Place Concrete

1.2.2 Section 16A - General Electric Provisions

1.2.3 Section 16C - Major Electric Equipment

1.2.4 Section 16D - Supervisory Control and Data Acquisition (SCADA) Equipment

1.3 References

1.3.1 Codes and Standards referred to in this Section are:

Fed. Spec. W-F-408 -	Fittings for conduit, metal (rigid thick wall and thin wall)
ASTM B-3 -	Specification for soft annealed copper wire
ASTM B-8 -	Specification for concentric lay stranded copper conductors, hard medium, hard or soft
ASTM B-33 -	Specification for tinned or soft or annealed copper wire for electrical purposes
ASTM B-189 -	Specification for lead-coated and lead-alloy-coated soft copper wire for electrical purposes
ASTM D 635 -	Test method for rate of burning and/or extent and time of burning of self-supporting plastics in a horizontal position
Fed. Spec. HH-I-595 -	Insulation tape, electrical, pressure sensitive adhesive, plastic

Fed. Spec.
WC-596 - Electrical power connectors

NEMA WD-1-1965 - General requirements for ac switches

ANSI C82.2 - Fluorescent Lamp Ballasts - Methods of Measurement.

ANSI C82.1 - Ballasts for Fluorescent Lamps.

ANSI C82.4 - Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps.

ANSI C2 - National Electrical Safety Code.

Fed. Spec
W-P-115 - Panel, power distribution

UL 50 - Cabinets and boxes

NEMA KS1 - Enclosed and miscellaneous distribution equipment switches (600-volt maximum)

1.4 Nameplates

1.4.1 All electrical equipment and appurtenant devices shall be equipped with nameplates having designations corresponding to those on the Drawings or as otherwise directed by the Engineer. This identification requirement shall include items such as motor control centers, starters, circuit breakers, automatic transfer switches, safety switches, control stations remote from starters, panelboards and all such similar equipment.

1.4.2 Nameplates shall be a laminated composition material, engraved to produce a two-color nameplate. Embossed tape labels will not be acceptable. Unless otherwise indicated, nameplates shall be black with white letters.

1.4.3 Nameplates shall not be less than 3/32-inch thick and shall have polished surfaces on both sides and a bevel all around on the front edges. Nameplates for panels and similar equipment shall be not less than 1-1/4 by 5 inches with 1/2-inch high inscriptions. Unless otherwise indicated, other nameplates shall be not less than (3/4 by 2 inches with 3/16-inch high inscriptions.

1.4.4 Nameplates shall be attached with brass or stainless steel screws, or, where screws cannot be used, as otherwise specifically approved by the Engineer. Tapes or other pressure adhesives will not be acceptable.

1.4.5 Nameplates shall be attached to their respective equipment or device whenever space is available. Whenever space is not available, they shall be attached nearby at a location approved by the Engineer.

1.4.6 A list of all nameplates shall be submitted to the Engineer for review and approval before installation.

1.5 Wiring Identification

1.5.1 All wiring shall be identified by means of color coding and wire markers as specified herein. Circuit identification shall include all color coding requirements of the NEC, with particular attention directed to Article 210-5.

1.5.2 All wiring shall be tagged with self-sticking wire markers or other markers approved by the Engineer. The tagging shall be applied at each termination and splice. The tagging shall also be applied at other locations, where indicated on the Drawings. Designations shall include the full circuit and wire designation except for terminations at a panel for which the panel portion of the circuit designation may be omitted. Markers shall be permanent, of a size recommended by the manufacturer for the respective wire size and shall be applied as recommended by the manufacturer.

1.5.3 Unless specifically approved by the Engineer, color coding of neutral and ground wires shall be by means of colored insulation, except where bare ground wires are indicated.

1.5.4 Branch circuit wiring smaller than No. 6, from panelboards, for lighting, receptacles and similar loads shall be color coded by means of colored wire insulation. Colors shall be as selected by the Contractor but a sufficient number of colors shall be used such that wiring in common enclosures is clearly differentiated and color combinations of wiring runs are generally not repeated. Care shall be taken in the phasing of combined-neutral circuit runs. Switched legs shall be differentiated from unswitched legs of a circuit.

1.5.5 Control circuit wiring shall be color coded by means of colored wire insulation as follows:

"line": black

neutral: white

ground: green

others: red, or as otherwise indicated on the drawings

1.5.6 Except as otherwise specified herein, wire color coding may be by means of colored insulation or colored tape, applied at each termination, splice and pull box.

1.6 Submittals

1.6.1 Provide shop drawings and product data under provisions of Section 1A.

1.7 Guarantee

1.7.1 Provide guarantee under provisions of Section 1A.

1.8 Basis of Payment

1.8.1 The work shall be paid at the contract lump sum price for

PUMP STATION ELECTRICAL WORK

which shall be payment in full for the work described herein.

2. PRODUCTS:

2.1 Raceways

2.1.1 General

(a) Unless otherwise indicated, all wiring shall be installed in raceways in an integrated system comprised of raceways, couplings, fittings, hubs, supports and the like and boxes and covers as specified elsewhere herein.

(b) Unless otherwise indicated, raceways shall be rigid steel conduit with threaded fittings and terminations as specified herein.

2.1.2 Rigid Steel Conduit

(a) Rigid steel conduit shall be manufactured to conform to Federal Specification WW-C-581, NEC Article 346, ANSI C80.1, and UL labeled.

(b) All surfaces, including factory-made threads shall be protected from corrosion by hot-dip or electro-galvanizing after threading. Factory threads shall be protected by plastic and caps.

2.1.3 Rigid Steel Conduit, Polyvinyl-Chloride Coated (PVC-RGS)

(a) Requirements of article ” Rigid Steel Conduit “ shall apply

(b) Coating: Apply minimum 40-mil, gray polyvinyl chloride (PVC) coating over exterior and apply urethane coating uniform and consistent to interior of conduit. Internal coating shall be nominal 2 mil thickness. Conduit having areas with thin or no coating, not acceptable. Protect conduit threads by urethane coating. PVC coating shall have been investigated by UL as providing primary corrosion protection for rigid metal conduit.

(c) PVC exterior and urethane interior coatings applied to conduit shall afford sufficient flexibility to permit field bending without cracking or flaking at temperatures above 30˚F (-1˚C).

2.1.4, Flexible Metal Conduit

(a) Flexible metal conduit shall be liquid-tight flexible metal conduit as defined by NEC Article 351 and shall be UL listed for wet location use.

(b) Flexible metal conduit shall have nylon-insulated throats.

(c) Sizes through 1-1/4 inch shall have a built-in copper grounding conductor, UL listed as such.

2.1.5 Rigid Nonmetallic Conduit

(a) Rigid nonmetallic conduit shall be manufactured to conform to Federal Specification WC-1094A, NEMA TC-2 and NEC Article 347 and shall be UL listed for exposed encased and underground applications.

(b) The conduit shall be "Schedule 40".

2.1.6 Conduit Fittings

(a) Conduit couplings, elbows and nipples shall conform to the fitting specifications corresponding to their respective conduit specifications.

(b) Locknuts, bushings, reducers, conduit plugs and similar fittings shall be galvanized or cadmium plated and shall conform to Federal Specification W-F-408.

(c) Conduit bodies, such as used for pulling fittings or for avoiding sharp bends shall be hot dip galvanized and shall be complete with covers having self-retaining screws. Unless otherwise indicated, conduit bodies shall be cast iron alloy or malleable iron, with gaskets and matching cast metal or malleable iron covers.

(d) Insulating bushings shall be malleable iron or steel complete with plastic inserts or shall be high impact resistance plastic. They shall be UL listed with a rating not less than 150 degrees C and they shall be equipped with ground lugs where required.

(e) Conduit hubs which are not integral to a box or fitting shall be malleable iron or stainless steel and shall have nylon-insulated throats, neoprene o-rings, and shall be positively grounded and watertight.

2.1.7 Junction and Pull Boxes

(a) General

1) Boxes shall be cast boxes or sheet steel boxes as indicated or specified. Each box shall be complete with a cover of the same type and material as the box except that flush-mounted sheet steel boxes for switches and receptacles shall have Type 302 satin finish stainless steel plates. Boxes shall be hot-dip galvanized. Sizes of boxes shall be not less than shown on the Drawings, and shall otherwise conform to NEC requirements as a minimum except that boxes shall not be less than 4-inches square by 2-inches deep.

(b) Cast Boxes

1) Cast metal boxes shall be gray-iron alloy free from defects such as voids and shrinkage cracks, complete with covers having neoprene gaskets. Cast aluminum boxes shall not be used.

(c) Sheet Steel Boxes

1) Sheet steel boxes 29500 cubic cm (1800 cubic inches) or less shall be code gauge and boxes larger than 29500 cubic cm (1800 cubic inches) shall not be less than 12-gauge for the box and cover.

2) Where permitted below grade elevation or where otherwise indicated on the Contract Drawings, sheet steel boxes shall be fabricated of stainless steel with gasketed stainless steel covers and stainless steel hardware.

3) Sheet steel boxes which are 3-feet by 3-feet by 1-1/2 feet or larger in any dimension shall be reinforced via structural steel support members integral to the box. Covers for boxes of this size or larger shall be equipped with handles for ease or removal and a support lip to hold the weight of the cover during attachment and removal.

4) Sheet steel boxes and covers, where permitted below grade for large pull boxes, shall be hot-dip galvanized after complete fabrication.

2.1.8 Expansion Fittings

(a) Expansion fittings for exposed conduit shall be compatible with the respective conduit run, and, unless otherwise indicated shall permit not less than 4 inches of movement.

Each fitting shall be equipped with an external grounding bonding jumper and appropriate clamps. Fitting assemblies shall be asbestos free.

(b) Expansion fittings for conduit embedded in concrete or other masonry shall be of the expansion/deflection type, shall be watertight and corrosion-resistant and shall permit not less than a 3/4-inch movement in any direction. Each fitting shall be equipped with an internal grounding-bonding strap.

(c) Expansion fittings for other raceways shall be as indicated or where not indicated shall be suitable for the application as approved by the Engineer.

2.1.9 Conduit Wall Seals

(a) Conduit wall seals shall be used for all conduits entering concrete structure walls.

(b) Conduit wall seals used in new concrete walls shall consist of oversize polyvinylchloride (PVC) coated steel sleeves with sealing assemblies at both sides of the wall. The sealing assemblies shall be cast iron alloy or malleable iron with pressure rings and neoprene sealing grommets, membrane clamp and they shall be tightened by means of hex head screws. Each wall seal shall accept multiple conduit sizes. The sealing assemblies' castings shall be hot-dip galvanized. The pressure disc shall be PVC coated stainless steel and the bolts shall be stainless steel.

(c) Existing concrete walls shall be core-drilled for conduits to pass through. Conduit wall seals used in cored holes in existing concrete shall consist of an assembly of an oversize outside pressure disc with membrane clamp, a neoprene sealing ring and an interior pressure disc, with discs tightened by means of not less than three stainless steel socket head cup tighten screws with stainless steel washers. Pressure discs shall be PVC-coated steel.

2.2 Wire and Cable

2.2.1 General

(a) The terms wire and cable as used herein and on the Drawings shall be interchangeable and shall refer to electric wire and cable conductors in conformance with the NEC.

(b) Unless otherwise indicated, all wire and cable shall be insulated conductors as defined by the NEC.

(c) Wire and cable shall be UL listed, new, and delivered to the site in full reels or boxes. The reels or boxes shall have tags or imprint showing the UL listing.

(d) No wire size smaller than No. 12 AWG shall be used unless specifically shown.

(e) Fixture wire, for branch circuit taps to lighting fixtures, shall be in conformance with NEC requirements. Temperature ratings shall be carefully coordinated with the respective lighting fixtures.

(f) Unless otherwise indicated, wire and cable shall be single conductor.

2.2.2 Conductors

(a) Unless otherwise specifically indicated all wire and cable shall have copper conductors conforming to ASTM B-3 or ASTM B-8 with Class B stranding.

(b) Conductors which are No. 8 AWG and larger shall be stranded. Conductors smaller than No. 8 AWG may be solid or stranded.

(c) Conductors sized No. 8 AWG and larger shall be coated in accordance with ASTM B-33 or B-189.

2.2.3 Insulation

(a) Wire and cable insulation shall be suitable for the conditions of the installation and the voltage of the respective system and, unless otherwise specifically specified, all wire and cable for system operating at 480 volts or less shall be insulated for 600 volts AC and shall be rated at not less than 90 degrees C dry and 75 degrees wet.

(b) All 600-volt wire and cable sized No. 8 AWG and larger shall be UL listed as Type USE and RHH and RHW, VW-1, with insulation of heat and moisture ethylene-propylene rubber (EPR) resistant compound.

(c) All 600-volt wire and cable smaller than No. 8 AWG shall be UL listed as Type THW or THWN, with insulation of heat and moisture resistant polyvinylchloride (PVC) thermoplastic and a nylon jacket or Type XHHW with insulation of cross-linked polyethylene compound, except that all such wiring on the project shall be of the same type.

2.2.4 Signal Cables

(a) Signal cable (SC) shall be 2-conductor, 3-conductor or multiple assemblies of pairs or triads as indicated, and shall be UL listed Type TC cable rated not less than 600 volts AC and 90 degrees C.

(b) Conductors shall be soft annealed copper, 18 AWG minimum, with 7-strand Class B stranding in conformance with ASTM B-8.

(c) Pairs (2/C) or triad (3/C) cables shall be an assembly of left hand lay twisted insulated conductors, tinned copper drain wire, an overlapped conductive tape shield and a jacket overall. Conductor insulation and jacket shall be flame-retardant ethylene telraflouroethylene compound. The cable shall meet the requirements of IEEE Standard 383 and shall be rated non-burning under ASTM D635.

(d) Multiple-pair or multiple triad cable shall be an assembly of individual conductor groups consisting of insulated pairs or triads plus a copper drain wire covered with an overlapped conductive tape shield bound together with an overlapped conductive shield, a drain wire and rip cord and a jacket overall. Conductor insulation shall be heat and moisture-resistant thermoplastic not less than 15 mils thick with a minimum 4-mil nylon jacket, having a UL listed temperature rating not less than 90 degrees C. Conductor insulation shall be color coded to differentiate individual conductors as well as conductor groups.

2.2.5 Telephone Cable

(a) Telephone cable shall be standard multi-conductor, single line telephone cable meeting or exceeding the requirements of the local telephone utility.

2.3 Electrical Tape

2.3.1 Electrical tape shall be UL listed all weather vinyl plastic tape which is resistant to abrasion, puncture, flame, oil, acids, alkalis and weathering. It shall conform to Federal Specification HH-I-595. Thickness shall not be less than 8.5 mils and width shall not be less than 3/4-inch.

2.4 Grounding

2.4.1 All electrical systems, equipment and appurtenances shall be properly grounded in strict conformance with the NEC, even though every detail of the requirements is not specified or shown. Good ground continuity throughout the electrical raceway system shall be assured. Where connections are made to painted surfaces, the paint shall be scraped to fully expose metal at the connection point and serrated connectors or washers shall be used.

2.4.2 Unless otherwise indicated, grounding conductors shall be copper and shall be insulated for 600 volts.

2.4.3 Unless otherwise indicated, ground rods shall be copper-clad steel rods not less than 1-inch in diameter and 10 feet long, driven so that tops of the rods are 24 inch below finished grade. Where indicated, ground wells shall be included to permit access to the rod connections.

The copper-clad steel ground rods, 1-inch in diameter, extended to 10 feet into earth, are already installed at Pump Station. No additional changes required. All electrical equipment and appurtenances shall be properly grounded to the existing ground rods in compliance with this Section.

2.4.4 The copper-clad steel ground rods, 1-inch in diameter, extended to 10 feet into earth,
shall be installed for new parking lot fence as shown on the Contract Drawing.

2.4.5 Unless otherwise indicated, all connections to ground rods, structural steel or fencing shall be made with exothermic welds. Where such connections are made to insulated conductors, the connection shall be wrapped with at least 4 layers of electrical tape extended 6-inches onto the conductor insulation.

2.4.6 Where a ground field of "made" electrodes is provided, the exact locations of the rods shall be documented by dimensioned drawings as part of the Record Drawings.

2.4.7 The grounding system shall be fully tested. This testing shall include continuity tests of all equipment grounding and a test of the system ground via measurements using a suitable bridge or by other means approved by the Engineer.

2.5 Receptacles

2.5.1 Duplex convenience receptacles shall be premium specification grade with wide heavy wrap-around support bridge, large deep-slot terminal screws, which permit back or side wiring, heavy-walled area body and ground terminal lug. They shall conform to Federal Specification W-C-596 Style X2 and NEMA Standard WD-1-1965. Unless otherwise indicated they shall be brown, 2-pole, 3-wire, NEMA configuration 5-20R, 20-ampere and 125 volt.

2.5.2 Provide factory sealed explosion-proof convenience receptacles suitable for Class I, Group D, Division 1 installations conforming to UL 1010 and UL 884, with malleable iron single gang box, 3/4-inch hubs and cover, 125 Volt, 20-ampere, 2-pole, 3-wire.

2.5.3 Power receptacles for the submersible pumps shall be factory sealed explosion-proof, dead front type suitable for Class I, Division 1, Group D installation conforming to UL 1010 with malleable iron box, conduit hub and threaded cover, 600 Volts, 3-pole, 4-wire.

Receptacles up to 100 amperes shall have integral circuit breaker. Receptacles over 100 amperes shall have two control poles which shall not be shorten by the control pins before the power pins are connected and shall be disconnected before power pins are disconnected. A matching explosion proof plug with environmental threaded cover and male insert shall be provided for each receptacle. The grommets shall be sized to the power cable diameters.

(a) Low Flow Pump:150 ampere, 3-pole, 4-wire explosionproof receptacle with integral 150 ampere circuit breaker and matching plug.

(b) Main Pump: 400 ampere, 3-pole, 4-wire junction box, with two explosion proof receptacles and two matching plugs. Supplied with environmental threaded cover and female insert for line side power, each of these receptacles shall be pre-wired and factory sealed eliminating the need for an external seal.

c) Spare 200HP Pump: Two appropriate plugs shall be provided.

d) Draw Down Pump: 100 ampere, 3-pole, 4-wire receptacle with integral 100 ampere circuit breaker and matching plug.

2.5.4 Control plugs and receptacles for submersible pump moisture/temperature sensors shall be multi-pin and explosion proof type suitable for Class I, Division 1, Group D installation. The grommets shall be sized to the control cable diameters.

2.5.5 Receptacles installed outdoors or otherwise exposed to the weather shall be installed with weatherproof flap-type covers and shall be of the Ground Fault Circuit Interrupter (GFCI) type, unless otherwise indicated.

2.5.6 Ground fault circuit interrupter (GFI) receptacles: Duplex, 20-ampere, and 125 volts, feed-through type.

2.5.7 Unless otherwise indicated, receptacles shall be installed with their centers 48 inches above the finished floor.

2.5.8 Clock receptacle shall be 3-wire, 15-ampere, 125-volt with hanger and flush stainless steel plate for each clock.

2.5.9 Other receptacles shall be as shown on the Drawings.

2.6 Toggle Switches

2.6.1 Toggle switches shall be premium specification grade with large deep-slot terminal screws, silver cadmium oxide contacts and a rugged molded plastic body. The switches shall conform to Federal Specification W-S-896E, Specification Sheet W-S-896/3.

Unless otherwise indicated, the switches shall be single pole single throw (SPST), 20-ampere, with brown handles, rated for 120-277 volts AC only. Toggle switches in the pump room and stairwell shall be double pole to start supply or exhaust fan in the same time when lights will be turn on in any of this area.

2.6.2 Toggle switches in locations classified as hazardous shall be factory sealed explosion-proof, dead front type suitable for Class I, Division 1, Group D installation.

2.6.3 Switches installed outdoors or otherwise exposed to the weather shall have NEMA 4 covers.

2.6.4 Other switches shall be as shown on the Drawings.

2.6.5 Unless otherwise indicated, toggle switches shall be installed with their centers 48 inches above the finished floor.

2.7 Lighting Fixtures

2.7.1 Lighting fixtures shall be as indicated on the Drawings and they shall be provided complete with lamps and all necessary fixture wire for connection.

2.7.2 Fluorescent Fixtures

(a) Fluorescent fixtures shall have spring-loaded, high quality sockets, which will hold lamps in place securely, even under conditions of vibration.

(b) Lenses, shall be virgin acrylic.

(c) Fixtures shall be complete with the frames, flanges, fittings, etc., required for the indicated installation. The fixtures shall be carefully examined for coordination with architectural and structural work.

(d) Fluorescent ballasts shall be Standard Type ballasts as specified herein. Standard Type ballasts shall be UL listed, high power factor Certified Ballast Manufacturers (CBM) certified Class P ballasts with integral thermal protection.

1) Fluorescent, solid-state, electronic ballast "Solid-State Ballast"

2) Power factor: Not less than 90%.

3) Maintain constant light output of 4' rapid-start fluorescent lamps over operating ranges of 90 volts to 145 volts (120-volt ballasts).

4) Input current third harmonic content: Not to exceed 13%. Total current THD: Less than 20%. Light regulation of ±10 lumen output with ±10% input voltage regulation. Ballast shall have 10% flicker (maximum) using any compatible lamp.

(e) Energy-saving (high efficiency) fluorescent ballasts shall be used. These ballasts shall be of the standard core and coil type (non-electronic) and shall be UL listed, high power factor, Certified Ballast Manufacturers (CBM) Certified Class P Ballasts with integral thermal protection. Ballasts shall be of the manufacturer's series for which the two-lamp F40 size, when tested in accordance with ANSI C82.2, will have listed input watts of not more than 72 watts.

(f) Fluorescent fixtures shall be for operation on a 120 volts supply.

2.7.3 High Intensity Discharge (HID) Fixtures

(a) High intensity discharge fixtures shall have porcelain sockets with lamp retaining mechanisms to resist loosening of the lamps from vibration or thermal effects.

(b) HID ballasts shall be of the high power factor type whenever such type is available. The indication of manufacturer's fixture catalog number for a fixture does not supersede this requirement.

(c) Type: Constant-wattage, high-power-factor type or reactor high power factor type. Capacitors shall not contain polychlorinated biphenyl (PCB) fluids or other fluids recognized as hazardous when discharged into environment.

(d) Ballasts shall be integral with the respective fixture and shall be suitable for starting at -29 degrees C (-20 degrees F).

(e) Sound rating: Not less than B sound rating for interior fixtures.

(f) Fusing: Provide fuse for protection of each ballast, size as recommended by luminaire manufacturer.

2.8 Panelboards

2.8.1 Panelboards shall be in conformance with the NEC shall be UL listed and shall conform to Federal Specification W-P-115b.

2.8.2 Panelboards shall be of dead-front construction, providing access to the wiring compartment without exposing bus.

2.8.3 Boxes (tubs) shall be code gauge galvanized steel with ample wiring space and knockouts all in conformance with UL 50. Fronts shall be code-gauge steel with a hinged door and a cylinder lock. The front shall have a gray finish over a rust inhibitor. The interior of the door shall have a circuit directory in a frame with a clear plastic cover. Boxes and fronts shall be suitable for surface or flush mounting as indicated and where no other indication in made, panels shall be surface mounted.

2.8.4 Unless otherwise indicated, phase bus bars may be copper or aluminum, sized as shown or as required by UL standards, whichever is larger. Neutral shall have a solid bar with a separate connector for each pole of panelboard branch circuit space. Phase bus shall be for bolt-on branch circuit breakers. A ground bar shall be provided for all panels.

2.8.5 Unless otherwise specifically indicated, each panelboard shall be provided with a main breaker sized at the panel bus rating.

2.8.6 Unless otherwise indicated, branch circuits shall be arranged in parallel vertical rows with alternate phasing. Branch circuit protective devices shall be bolted-on circuit breakers unless otherwise indicated and these devices shall be interchangeable and removable without disturbing adjacent devices.

2.8.7 Panelboards operating at 240 volts phase-to-phase or less shall be rated at 240 volts AC with circuit breakers rated at 240 volts AC and, unless otherwise indicated, these circuit breakers shall have UL listed interrupting rating of not less than 22,000 RMS symmetrical amperes at 240 volts.

2.8.8 Circuit breakers shall be molded case type, bolt-on, with trip-free handles and visual trip indicators.

2.8.9 Panelboards shall be grounded per the NEC requirements.

2.9 Safety Switches

2.9.1 Safety switches shall be heavy-duty types, UL listed as suitable for use as service entrance equipment and shall be in conformance with NEMA Standard KS1-1983 for type HD switches and Federal Specification WS-865c for heavy-duty switches. Switches used as service entrance equipment shall have a factory-installed solid neutral and other switches shall have a factory-installed grounding kit unless otherwise indicated.

2.9.2 The switches shall have a quick-make, quick-break mechanism, full cover interlock to prevent opening the cover with the switch in the closed position and a position-indicating operating handle. The operating handle shall be well insulated from the current carrying parts of the switch.

2.9.3 Unless otherwise indicated, switches shall be rated 600 volts, and when used with UL listed Class R fuses, shall have a UL listed short circuit withstand rating of 200,000 RMS symmetrical amperes.

2.9.4 Unless otherwise indicated, safety switches shall be 3-pole.

2.9.5 Unless otherwise indicated, safety switches shall be 30 ampere.

2.9.6 Unless otherwise indicated, safety switches shall be un-fused. Where fused switches are indicated, they shall be provided complete with UL Class K-5 current limiting fuses.

2.9.7 Unless otherwise indicated, safety switches installed below grade or exposed to the weather shall have NEMA 4 stainless steel enclosures. Safety switches installed indoors above grade shall have NEMA 12 enclosures. Safety switches in explosion-proof hazardous locations shall be in enclosures suitable for Class I, Division 1, Group D installation.

2.10 Manual Motor Starter Switches

2.10.1 Manual motor starter switches shall be complete with melting alloy type thermal overload protection that shall be trip-free and resettable. The exact size of the overload element shall be coordinated for the specific respective motor.

2.10.2 The switches shall be rated not less than 1 horsepower at 115 and 230 volts single phase. The switches shall be single pole unless otherwise indicated.

2.10.3 Where indicated, the switches shall be equipped with a pilot light and/or a hand-off-automatic selector switch.

2.10.4 Unless otherwise indicated, the manual motor starter switches shall be equipped with NEMA 4 cast enclosure. Switches that are flush mounted shall be mounted with the flush box and shall have a suitable flush-mount plate. Switches in explosion-proof hazardous locations shall be in enclosures suitable for Class I, Division 1, Group D installation.

2.11 Circuit Breakers

2.11.1 This specification shall apply to all circuit breakers furnished under this Division which are not integral to panelboards or motor control center equipment.

2.11.2 Circuit breakers shall be UL listed, molded case, thermal-magnetic, manually operated circuit breakers of the trip ratings shown or indicated.

2.11.3 Unless otherwise indicated, circuit breakers shall be 3-pole.

2.11.4 Unless otherwise indicated, circuit breakers shall be rated for use on 480 volt circuits.

2.11.5 Multi-pole circuit breakers shall have a common trip and single operating handles. Handles shall be trip free. Circuit breakers in 250 ampere frames and above shall have an adjustable magnetic trip setting.

2.11.6 The circuit breakers shall indicate "ON", "OFF", and "TRIPPED" conditions.

2.11.7 Unless otherwise indicated, circuit breakers shall have a UL listed interrupting rating of not less than 25,000 RMS symmetrical amperes at 480 volts.

2.11.8 Unless otherwise indicated, circuit breakers installed below grade or exposed to the weather shall have NEMA 4 stainless steel enclosures and circuit breakers installed indoors above grade shall have NEMA 12 enclosures. Circuit breakers in hazardous locations shall be in enclosures suitable for Class I, Division 1, Group D installation. All circuit breakers shall have external position-indicating operating lever handles with padlock provisions.

2.11.9 Where indicated or where required for indicated functions, circuit breakers shall be equipped with accessories such as shunt trips, auxiliary switches, and under voltage release.

2.12 Motor Starters

2.12.1 This specification shall apply to all motor starters that are provided under this Division which are not integral to motor control center equipment.

2.12.2 Unless otherwise indicated, motor starters shall be of the combination type with integral motor circuit short circuit protection mounted in a common enclosure with the starter and control components for control of circuit as indicated. Unless otherwise indicated, motor circuit short circuit protection shall be motor circuit protectors. Motor circuit protectors shall be manually operated and shall have a magnetic trip level adjustment. Trip ratings shown on the Drawings are approximate and the trip rating provided shall be as recommended by the device manufacturer for the characteristics of each respective motor. The contractor shall coordinate device selection with motors provided under other Divisions.

2.12.3 Motor starters shall not be smaller than NEMA Size 1.

2.12.4 As a minimum, each starter shall be equipped with two normally open (N.O.) and two normally closed auxiliary contacts in addition to a starter seal-in (holding) contact. Unused contacts shall be spare.

2.12.5 Unless otherwise indicated, control circuits shall operate at 120 volt derived from a control transformer integral to the combination starter. The control transformer shall have a fused secondary and shall be sized adequately for the starter and all connected control devices but in no case shall the transformer be sized less than 50 volt-amperes over the capacity required to operate the starter.

2.12.6 Control Devices shall be as specified elsewhere herein or as indicated on the Drawings.

2.12.7 Unless otherwise indicated, motor starters installed below grade or exposed to the weather shall have NEMA 4 stainless steel enclosures, motor starters installed indoors above grade shall have NEMA 12 enclosures, and motor starters in hazardous locations shall be in enclosures suitable for Class I, Division 1, Group D installation. The units shall be complete with position-indicating operating handles, for the short circuit protective device, with handle padlock provisions.

2.13 Control Devices

2.13.1 Control devices shall be provided as part of motor starters, and also for control stations remote from motor starters and as otherwise indicated.

2.13.2 Unless otherwise specifically indicated, pushbuttons, selector switches, indicating lights and other control devices shall be of the heavy-duty oil tight type.

2.13.3 Contact blocks for pushbuttons and selector switches shall have not less than one double pole double throw (DPDT) contact.

2.13.4 Indicating lights shall have built-in transformers, LED lamps and lenses of the colors indicated. Unless otherwise indicated, indicating lights shall be push-to-test type.

2.13.5 Legend plates shall be provided on all oil tight control devices. Unless otherwise indicated, green indicating lights shall have "RUNNING" legend plates and legend plates for other indicating lights shall be as indicated or as selected by the Engineer.

2.13.6 Unless otherwise indicated, enclosures for control stations (control devices which are remote from motor starters or other equipment) which are located below grade or exposed to the weather shall be NEMA 4 stainless steel, enclosures for control stations located indoors above grade shall be NEMA 12. The enclosures for control stations located in hazardous locations shall be suitable for Class I, Division 1, Group D installation.

2.13.7 Thermostats

(a) Supply air fan in MCC room and exhaust air fan in Pump room shall be controlled by 2-position type electric thermostats. When the thermostat senses a temperature 24 degrees C (85 F) (adjustable) or higher, the thermostat shall energize fan control circuits located in the Ventilation Control Panel. Upon a drop in temperature below 24 degrees C (85 F), the fans shall stop.

(b) Electric thermostats shall have bimetallic sensing elements and concealed adjustable set point. Electric thermostats shall have field adjustable sensitivity and be furnished with thermometers in stainless steel covers. Electric thermostats located in hazardous area shall be suitable for Class I, Division 1, Group D locations. Electric thermostats located in the Electrical Room shall have NEMA 12 enclosures.

2.14 Electric Unit Heaters

2.14.1 General

(a) Electric unit heaters with their corresponding thermostats control and mounting brackets shall be provided and installed at the locations shown on the drawing.

(b) Heaters shall be provided with heavy-duty magnetic control contactor except shown otherwise on the Plans.

(c) Electric unit heaters shall be the type and have the capacity and electric characteristics indicated. If current other than that indicated is required, transforming devices shall be provided with the unit heaters. Fan motors shall be wired internally to the heater power supply.

(d) Units shall be horizontal type as shown and be UL approved and bear the UL label. Units shall meet all requirements of the NEC.

(e) Heaters shall have automatic reset thermal cutout overheat protection control with bulbs or capillary tubes located in the air stream. Overheat protection controls shall interrupt the heater load supply directly or by independent contractors connected to the thermal cutout only. Integral delay type thermostats or relays shall allow the fans to continue to run after the heating elements are off until the heat is dissipated. Where designated or required, delay thermostats shall prevent the fans from starting until the elements have warmed up.

(f) Heating elements shall be non-glow, metal sheath finned tube type. They are shockproof. Heat radiation fins are corrosion resistant copper clad steel, furnace brazed to the tubular heating elements for good heat transfer.

(g) Unit heaters shall be controlled by factory built-in, snap action thermostats. Thermostats shall have internal sensing elements and thermometers on cover and manually adjustable set points and differentials with a set point range of approximately 4 degrees C (40 degrees F) - 27 degrees C (80 degrees F) and a differential of 2 degrees C (3 degrees F).

(h) Horizontal unit heaters shall be provided with factory made brackets for wall mounting as indicated. Brackets shall be complete with necessary fasteners, bolts, lock washers, cutter pins, and supports.

(i) Adjustable louvers shall be provided on the discharge side to direct airflow. Resistance coils shall be located on the discharge side of fans on horizontal units. Fan motors shall be located out of the air stream and separated from it by separator plates.

(j) Fans shall be broad bladed, non-sparking, all aluminum propeller type, with high efficiency and quiet operation, directly connected to motors and dynamically balanced with the motors. Motors shall be continuous heavy duty, totally enclosed, with sleeves, roller or ball bearings, built-in automatic reset, thermal overload protection, and designed for use with unit heaters. Fans and motors shall be resiliently mounted to prevent vibration and be provided with welded wire, or equal, removable fan guards.

(k) Heating elements and entire units shall be enclosed in steel housing, bonderized and furnished with baked on enamel.

(l) Unit heater shall be installed in accordance with the manufacturer's recommendations.

2.14.2 Unit Heaters in Non-Hazardous Locations

(a) Each unit heater shall have integral mounted magnetic contactors, fused control power transformer, thermal cutouts, fan delay relay and factory built-in thermostat. The unit heater shall be pre-wired, except of electrical service. Internal wiring shall extend to terminal blocks clearly marked. Service wire terminals for field connections shall be numbered.

2.14.3 Unit Heaters in Hazardous Locations

(a) Unit Heaters in hazardous area shall meet UL requirements for Class I, Division 1, Group D classification for hazardous locations.

(b) Each Unit heater shall have integral thermal cutouts and fan delay relay. The devices inside unit heater shall be pre-wired, except those require field connections shall be wired to terminal blocks with wire numbers clearly marked for external connections.

(c) Each heater shall be furnished with built-in power disconnect switch and thermostat in explosion proof enclosure for field installation. Each heater shall have pre-wired, self-contained control center in an explosion proof enclosure.

2.15 Fire Alarm System

2.15.1 The existing Fire-Lite MS-4 fire alarm system shall include contact outputs for remote connection to the SCADA system and AEGIS system as shown on drawings.

2.15.2 The system shall be complete with two zones: the pump room, and the MCC room. Notification and initiating devices shall be provided as indicated on the Contract Drawings. The smoke detectors shall be of photoelectric type. The smoke detectors in hazardous area shall meet UL requirements for Class I, Division 1, Group D classification for hazardous locations. All devices install shall match existing manufacturer.

2.15.3 Submittal information shall include all necessary wiring diagrams and installation requirements

2.15.4 Complete installation shall be within guidelines of latest versions of ICBO, BOCA, SBCCI, IBC, IFC, and IMC.

2.15.5 The system shall be the product of a single manufacturer having local available service. The system shall be UL listed and Factory Mutual approved. Fire alarm system shall be manufactured by ISO 9001 certified company and meet requirements of BS EN9001: ANSI/ASQC Q9001. Fire alarm control panel shall meet UL 864 (control units).

2.15.6 Contractor shall have a minimum of 5 years documented fire alarm installations and must be able to provide parts and labor to expand system specified, if so requested for period of 5 years from date of acceptance.

2.15.7 When applicable, interconnect main control panel to existing fire protection and alarm system without disruption to existing operations.

2.15.8 Fire Alarm system shall indicate a fire; provide identifiable visual alarms with remote annunciator back up. Relay outputs for alarms shall be provided for transmitting an alarm to SCADA and AEGIS system.

2.15.9 Complete installation shall conform to latest edition of applicable sections of NFPA 12B, 13, 13A, 15, 16, 17, 17A, 70, 70E, 71, 72, 90A, 101, and state and local building codes and requirements.

2.15.10 All system components and programming thereof shall be provided by contractor. Contractor is responsible to comply with state and local codes for installation of the system. At a minimum, the system shall meet NFPA 72 and the International Fire Code (IFC).

2.15.11 Notification Devices

(a) Photoelectric smoke detectors:

1) Type: 2% light obscuration sensing, twist-lock base, LED source and silicon photodiode target, alarm LED, 360° smoke entry with insect screen, magnetic test switch.

2) Power supply: 24 volts dc, 2 wire from fire alarm control panel.

3) Each detector shall have on-board microprocessor that evaluates its photoelectric light scattering chamber activity and makes intelligent decision based upon light obscuration history as to whether alarm condition is present.

4) Standards: UL 268 listed, FM-approved.

(b) Manual pull stations:

1) Type: Noncoded, double-action, push/pull. Breakglass type not acceptable.

2) Operation: Spring-loaded interference plate (marked “PUSH”) shall be pushed back to access pull lever. Firm downward pull shall activate alarm switch.

3) Mounting: Surface or semi-recessed, 4’-0” above finished floor.

4) Key lock test and reset.

5) Construction: Lexan or cast aluminum, red satin baked enamel, white lettering.

6) Key to match control panel.
7) Standards: UL 38 listed, FM-approved

2.15.12 Initiating Devices

(a) Audio/visual alarm indicating appliance:

1) Common enclosure for fire alarm audible and visual alarm devices. Visual portion of device shall be fully synchronized solid-state Xenon flashtube and shall meet requirements of ADA and UL Standard 1971.

2) 15, 30, 75 and 110 candela models shall be available, with models rated 15/75 on axial.

3) Design to accommodate speaker, horn, bell, or chime.

4) T-tapping of signal device conductors to signal circuit conductors not acceptable.

5) Front panel or bezel may be inverted so Xenon strobe is below audible device.

6) Power supply: 24-volts dc from fire alarm control panel or NAC panel.

7) Standards: UL-listed, FM-approved and meeting ADA requirements.

2.16 AEGIS/Intrusion Alarm System

2.16.1 The existing AEGIS/Intrusion Alarm System shall be relocated from the existing pump station to a new panel in the control room. The equipment inside the existing AEGIS/Intrusion alarm enclosure shall be removed, remounted and rewired in the new AEGIS/Intrusion Alarm Panel. All inputs/outputs shall be provided and existing components shall be replaced as necessary with the approval of the Engineer for a complete and operational system.

2.16.2 An AEGIS/Intrusion Alarm System shall be provided as generally shown on the drawings and specified herein for the purposes of detecting unauthorized entry into the pump station along with communicating various indicated alarms. An Intrusion alarm condition shall be sent to the SCADA panel and the pump station control panel. All required input alarms shall be communicated via telephone output to the designated destination.

2.16.3 The system shall consist of a new NEMA 12 wall mounted panel with lockable hinged door, 120V - 12V transformer, DC power supply with battery and battery charger, digital dialer, a transmit LED, a 6 volt control relay, alarm buzzer, magnetic reed switches at the entry doors, a key operated alarm override switch at the main entry door with LED and other appurtenances in the Intrusion Alarm Panel as indicated or required.

2.16.4 The magnetic reed switches shall consist of two elements, the magnet which mounts to the interior face of the door and the magnetically operated reed switch which mounts to the door frame. The switch contacts shall be closed when the door is open and open when the door is closed.

2.16.5 The override switch (“key switch” in the plans) shall be weatherproof, shall be suitable for recessed mounting in a masonry wall and shall be secured against unauthorized removal. The switch shall have two contacts, one contact for shutting the door switches, and one contact for connection to the SCADA panel.

The switch shall be operated by a special key. The key shall be removable in both positions. The key shall match the Owner's existing keying system. The override switch shall have an LED to indicate open or closed position. The override switch shall have a tamper pushbutton incorporated into the design, which shall be held open by the cover plate and spring closed if the cover plate is removed.

2.16.6 A submittal for the Intrusion Alarm Panel showing the layout of the intrusion alarm system devices and complete point to point wiring diagram shall be provided.

2.16.7 The panel shall operate on 120V, 60 Hz input.

2.17 Time Switches

2.17.1 Time switches, unless otherwise noted, for the control of lighting or other functions shall be equipped with astronomical dials based on the latitude of the site. The switches may be digital solid state or heavy-duty motor driven. Each switch shall have a reserve power feature to provide continuous operation during loss of power, with not less than 16 hour capacity. The reserve power feature shall not require periodic battery replacement. Output contacts shall be double pole single throw normally open (DPST-NO), unless otherwise indicated and shall be rated not less than 40 amperes per pole at 277 volts. Unless otherwise indicated, switches shall be for operation on 120 volts. Provide a flush NEMA 1 enclosure with a gray finish similar to panelboards.

2.18 Electric Motors

2.18.1 This section outlines the requirements for electric motors as specified with equipment furnished under other Divisions.

2.18.2 Provide all submittals, including the following, and as specified in Division 1.

(a) Provide manufacturer's catalog data for each motor.

(b) Provide shop drawings for each motor detailing arrangement, wiring, conduit boxes, and motor application.

(c) Provide certified standard commercial test reports for all motors.

2.18.3 Motor Requirements

(a) Design all polyphase motors for high energy efficiency and high power factor operation.

(b) Provide motor nameplate horsepower as specified for the driven equipment.

(c) Provide motors to operate continuously over the entire load range of the driven equipment without loading motor in excess of nameplate rating and its specified temperature limit.

(d) Provide squirrel cage induction motors for 373 watts (1/2 hp) and larger operating at 460 volts, 3-phase, 60-hertz.

(e) Provide 115-volt, single phase, 60-hertz motors less than 373 watts (1/2 hp).

(f) Design motors to be suitable for continuous operation with a line voltage variation within ±10-percent of rated voltage.

(g) Rate motors for continuous operation in 40 degrees C ambient.

2.18.4 Provide motors with the following mechanical protection.

(a) Dry, clean and well ventilated areas: Provide open drip-proof motors.

(b) Wet, damp or dusty areas: Provide totally enclosed, fan-cooled motors with removable drain plug.

(c) Class 1, Division 1 Area: Provide totally enclosed fan-cooled explosion-proof motor.

(d) Submersible Locations: Provide a completely sealed submersible motor suitable for operation in a hazardous location.

2.18.5 Make conduit box NEMA enclosure ratings compatible with motor enclosures.

2.18.6 Provide NEMA Design B, unless otherwise specified with NEMA Class F moisture resistant insulation and NEMA Class B, 80 degrees C temperature rise at rated nameplate load.

2.18.7 Use antifriction ball or roller type bearings at manufacturer's option, unless otherwise specified.

2.18.8 Use regreaseable bearings with support side thrust loadings, with a AFBMA B-10 bearing life rated at least 100,000 hours, based on a reliability of 90 percent in accordance with ANSI B3.15.

2.18.9 Provide 1.15 service factor unless otherwise specified. Where motors with a 1.0 service factor are furnished, provide motors rated at least 15 percent greater than required brake kilowatts (horsepower).

2.18.10 Provide steady state shaft loading not to exceed 100 percent of full load rating under maximum load, excluding the service factor, unless otherwise specified.

2.18.11 Provide breakdown torque of 200 percent or more of motor full load torque. Provide locked rotor torque of 80 percent or more of motor full load torque.

2.18.12 Provide slide rails and sole plates as required for proper installation.

2.18.13 Provide capacitor or open split phase start, for smaller than 373 watts (1/2 hp) motors unless otherwise specified.

2.18.14 Provide horizontal or vertical squirrel cage induction motors for continuous duty with full voltage starting except as otherwise specified.

2.18.15 Provide motor having efficiency meeting the requirements of NEMA MG1-12.55.

2.18.16 Provide motor winding temperature switches or thermal devices as specified.

2.19 Telephone

(a) Telephone and communication conduit systems shall have separate junction boxes and pull fittings.

(b) Outlet boxes for wall concealed telephone and signaling systems shall be 4” (100 mm) square by 1-1/2”(38 mm) deep, minimum. Furnish with plaster ring and cover plate.

3. EXECUTION:

3.1 Raceway Installation

3.1.1 General

(a) Except where otherwise indicated or specified, raceways shall be rigid steel conduit.

(b) No conduit smaller than 19mm (3/4-inch) diameter trade size shall be used unless specifically indicated. Wherever no conduit size is shown on the Drawings, the conduit size shall be taken to be 19mm (3/4-inch) diameter.

(c) Conduit runs shall have no more than 270 degrees of bends (the equivalent of three 90degree bends) between pull points. Bends shall be long radius type unless specifically approved by the Engineer. Bends may be either factory-made bends or field bends using suitable bending apparatus.

(d) Other raceways may be supported by trapeze or other hangers approved by the Engineer. Trapeze hangers shall be hot-dip galvanized steel channels or stainless steel channels except that in the wet pit atmosphere, below grade. Stainless steel shall be used with conduits held in place with heavy-duty U-bolts, nuts and lock washers. Trapeze hangers shall be hang using threaded galvanized or stainless steel rods not less than 3/8-inch diameter and appropriate anchors or by other means approved by the Engineer.

(e) Threaded raceway joints shall be made with a conductive compound applied to the male threads. Threads shall be made to avoid butting and to avoid exposed threads. In no case will running threads be allowed.

(f) Conduit reducers shall be provided as required for conduit terminations at equipment.

(g) Unless otherwise indicated, conduits terminating at cast or malleable iron boxes or in sheet steel boxes below grade shall be terminated in conduit hubs. Hubs may be integral to the box or may be installed separately. Non-integral hubs or integral hubs which do not provide a flared, smooth entry shall not be used where conductors are 21 square mm (No. 4 AWG) or larger, in compliance with NEC Article 373-6(c), and in these cases two locknuts and an insulating bushing shall be used.

(h) Threaded conduits terminating at sheet metal boxes or enclosures above grade, or where bushings cannot be brought into firm contact with the box or enclosure or where insulating bushings are required by the NEC, shall terminate with two locknuts and an insulating bushing. Conduit bushings constructed wholly of an insulating material shall not be used to secure a raceway.

(i) Expansion fittings, as specified herein, shall be installed in all raceway runs crossing structural expansion joints. The structural, architectural and electrical drawings shall be examined to determine complete extent of expansion joints.

3.1.2 Exposed Raceways

(a) Unless otherwise indicated, exposed raceways shall be run straight, parallel to walls and floors except those conduits shall be pitched slightly to drain to the nearest box or fitting wherever possible. Exposed runs shall be grouped together as much as possible.

3.1.3 Embedded Raceways

(a) Raceway runs installed embedded in concrete or masonry shall be installed in a way that will not detract from the structural integrity or watertightness of the structure.

The raceways shall be placed in the approximate center of walls, floors, etc. The location of raceways within poured concrete shall be maintained by the use of spacers designed for the purpose. Raceways in poured concrete shall not be in contact with reinforcing steel.

(b) Concrete-tight split couplings may be used in lieu of union type couplings for conduit embedded in poured concrete. The couplings shall be installed tight to assure good metal-to-metal continuity.

(c) Raceways installed below slabs on grade shall be encased in not less than 3-inches of concrete all around. The concrete shall be monolithic with the floor slab and shall be tied to the floor slab with reinforcing steel as per floor slab construction.

3.1.4 Underground Raceway Installation

(a) Unless otherwise indicated, conduit runs installed underground shall be rigid non-metallic conduit as specified encased in concrete. This shall not be taken to include conduit pushed or installed in trench to facilitate wiring of roadway lighting, which shall be as otherwise indicated or specified.

(b) Underground conduit runs for electric utility service entrance cables shall be rigid steel conduits as specified, unless specifically required by the utility.

(c) Underground raceways, encased in concrete, shall have steel reinforcing where installed below roadway or other paved vehicle areas and the reinforcement shall extend not less than 1500 mm (5 feet) additional from the edge of pavement unless otherwise indicated. Steel reinforcing shall also be provided where otherwise indicated.

(d) Underground concrete-encased raceways shall be supported on plastic spacers specifically designed for the purpose spaced along the length of the run as recommended by the manufacturer. Spacing between raceways within a common duct bank shall be not less than 50 mm (2 inches) and concrete cover overall shall be not less than 75 mm (3 inches) on all outside faces of the encased run. Care shall be exercised during concrete placement to assure that these are no voids and that spacers are undisturbed so that conduit spacing is maintained.

(e) Unless otherwise indicated, underground raceways shall be installed not less than 900 mm (36 inches) below grade and they shall be pitched to drain to the nearest manhole or handhole as applicable and shall generally be pitched away from structures.

Underground raceway runs shall be placed to avoid interference with underground piping and utilities.

(f) Underground raceways entering structures shall be sealed with duct seal or other similar material approved by the Engineer.

(g) Raceways shall be protected from mechanical and corrosion damage during construction. Open ends shall be capped or fitted with plugs. Before cables are installed, raceways shall be cleared of all obstruction, moisture and burrs or rough edges. Conduits that have had mud, dirt or water inside shall be cleaned with a dry swab.

3.1.5 Wall Seals

(a) Unless otherwise indicated, conduit wall seals as specified herein shall be provided in all conduit runs penetrating exterior walls below grade. Handholes and manholes shall not have wall seals.

3.1.6 Flexible Conduit

(a) Unless otherwise indicated all flexible conduit shall be liquid-tight flexible metal conduit as specified herein.

(b) Flexible conduit shall be used for raceway terminations where vibration will be present, such as at motors, limit switches, electric damper motors, solenoid valves and the like and the length of these flexible conduit terminations shall not exceed 900 mm (3 feet).

(c) All fittings used with flexible conduit shall be suitable for the conduit in conformance with the conduit manufacturer's requirements.

(d) Flexible conduits larger than 32 mm (1-1/4-inch) trade size shall be installed complete with an external bare copper grounding conductor complete with suitable terminating fittings at each end.

3.1.7 Support of Raceways

(a) The raceway installation shall include all raceway supports and anchors as required and as specified herein.

(b) Inserts in poured concrete used for the support of raceways shall be provided under this Division.

(c) Unless otherwise indicated or specified, surface-mounted conduits shall be held in place by one-hole clamps and clamp backs. Conduits that are mounted to steel beams or columns shall be held in place by suitable beam clamps. Clamps, clamp backs and beam clamps shall be of electroplated malleable iron.

(d) Other raceways shall be supported by trapeze or other hangers approved by the Engineer. Trapeze hangers shall be hot-dip galvanized steel channels or angle irons with conduits held in place by heavy-duty U-bolts, nuts and lock washers. Trapeze hangers shall be hung using threaded galvanized or stainless steel rods not less than 10mm (3/8-inch) diameter and appropriate anchors or by other means approved by the Engineer.

(e) Raceways shall be supported from the structure and shall not be supported from piping, ductwork or equipment. The use of wire, chain, perforated straps and hangers designed for the support of piping will not be permitted.

(f) Fasteners for the support of raceways, for the attachment to the structure shall be as specified herein.

(g) Spacing of raceway supports shall be in conformance with NEC requirements for the respective type of raceway.

3.1.8 Junction and Pull Boxes

(a) Raceway runs shall include junction boxes and pull boxes indicated on the Drawings and shall also include all junction boxes, pull boxes and conduit fittings required to facilitate the installation.

(b) Unless otherwise indicated, all boxes that are less than 1800 cubic inches shall be cast boxes.

(c) Boxes installed concealed in masonry walls (not poured concrete) above grade may be sheet steel, square-corner type with suitable matching covers.

(d) Boxes, which are exposed to the weather, shall be NEMA 4.

(e) Boxes in which multiple devices are installed shall be multi-gang boxes sized such that one gang of box space is allocated for each device.

(f) Boxes which are surface mounted below grade and other boxes, where indicated, shall be mounted on spacers to provide not less than 10 mm (3/8-inch) of space between the box and the wall.

3.2 Fasteners

3.2.1 Fasteners used to mount conduit supports, panels and other items attached to the structure shall be suitable for the weight supported and shall be compatible with the structure material, i.e., wood screws shall be used for wood, toggle bolts shall be used for hollow masonry, expansion bolts or power-set studs shall be used for solid masonry or concrete and clamps shall be used for structural steel.

3.2.2 Expansion anchors shall not be less than 6mm (1/4-inch) trade size and shall extend at least 50 mm (2 inches) into the masonry or concrete.

3.2.3 Power-set anchors shall not be less than 6mm (1/4-inch) trade size and they shall extend at least 32 mm (1-1/4 inches) into masonry or concrete.

3.3 Wire and Cable Installation

3.3.1 Wires and cables shall be carefully installed to avoid damage to insulation and cable jackets.

3.3.2 Wire lubricant shall be used when pulling wires into conduits. The lubricant shall be non-injurious to conduits, conductors, insulation or jackets and the lubricant shall be UL listed. Documentation shall be submitted to confirm suitability of the lubricant for the cables used on the project.

3.3.3 Each run of cable shall have sufficient slack.

3.3.4 Where a number of wires are trained through a box, manhole or handhole, they shall be grouped by circuit where applicable and bundled using appropriate cable ties and supported to minimize pressure or strain on cable insulation.

3.3.5 Wire and cable shall not be bent to a radius less than the manufacturer's recommended bending radius, either in permanent placement or during installation.

3.3.6 Cable pulling apparatus shall have no sharp edges or protrusions that could damage cables or raceways.

3.4 Splicing Electrical Cables

3.4.1 Splices in electrical cables shall be made with materials that are compatible with conductors, insulation and any jackets of the associated cables.

3.4.2 Unless otherwise indicated, splices shall be made using compression type copper sleeves of the size and configuration required for the splice involved. The sleeves shall be made of tin-plated copper and shall be UL listed. The sleeves shall be installed with tools and methods recommended by the sleeve manufacturer.

3.4.3 Splices in branch circuits for interior lighting and receptacles operating at 240 volts or less may be made with screw-on spring pressure connectors (solderless). The connectors shall be suitable for the wire sizes involved. Springs shall be zinc-coated steel and shall be contained in a plastic insulated housing such that the ends of the conductors will not cut through the spring and housing.

Splices shall be well made pigtail splices that are mechanically secure before the connector is installed and conductors shall not be exposed beyond the connector skirt.

3.4.4 No splices shall be made in manholes, handholes or other similar locations.

3.4.5 All non-waterproof splices, including screw-on pressure connectors, shall be wrapped with not less than 3 wraps of half-lapped electrical tape.

3.5 Excavation and Backfill

3.5.1 Excavation and backfill for work under this Division shall be provided under this Division in conformance with Division 2.

3.6 Concrete

3.6.1 Concrete for equipment pads, conduit encasement, handholes, manholes and other work under this Division shall be provided under this Division in conformance with Division 3.

3.7 Cutting and Patching

3.7.1 All cutting and patching of building materials required for work under this Division shall be provided under this Division.

3.7.2 No structural members shall be removed, cut or otherwise modified without approval of the Engineer and any such work shall be done in a manner as directed by the Engineer.

3.7.3 Cutting and patching shall be performed in a neat and workmanlike manner, consistent with the best practices of the appropriate trade. All patching shall be done in a manner consistent with the building material being patched.

3.7.4 Holes made in concrete shall be made using a suitable core drill. The use of a star drill or air hammer will not be permitted.

3.7.5 In new construction, sleeves, chases, inserts and the like required for work under this Division shall be provided under this Division and the furnishing and placement of these items shall be fully coordinated with the other trades involved so as not to delay the new construction.

3.8 Hazardous Areas

3.8.1 The following areas are designed as Class I, Division 1, Group D hazardous areas as defined by the NEC.

(a) Pump Room

(b) Wet Well

(c) Trash Rack Room, Stair well and all other indoor areas except MCC Room.

END OF THIS SECTION

DIVISION 16 - ELECTRICAL

SECTION 16C - MAJOR ELECTRICAL EQUIPMENT

1. GENERAL:

1.1 Description

1.1.1 Major electrical equipment shall be the items of equipment specified herein.

1.1.2 The manufacturer of each specified item shall provide not less than four (4) hard-cover operation and maintenance manuals for the respective equipment item furnished. The manuals shall contain final, approved shop drawings and product data sheets (including any field additions or modifications), as well as recommended installation, testing, operation and maintenance procedures.

1.1.3 The manufacturer shall provide one set of any special tools, as applicable, required for the maintenance of the equipment, housed in a metal toolbox.

1.1.4 Equipment furnished under this section shall be complete with anchor bolts and associated hardware required to anchor equipment to concrete. Anchor bolts and all hardware shall be galvanized steel.

1.1.5 For each specified item, a representative of the manufacturer shall check the installation and submit, to the Engineer, three (3) certified, signed statements, addressed to the owner, that the equipment has been properly installed and is in good working order.

1.2 Related Sections

1.2.1 Section 3A - Cast-In-Place Concrete

1.2.2 Section 16A - General Electrical Provisions

1.2.3 Section 16B - Basic Electrical Materials and Methods

1.2.4 Section 16D - Supervisory Control and Data Acquisition (SCADA) Equipment

1.3 References

1.3.1 Codes and Standards referred to in this Section are:

(a) NEMA ICS-1 General Standards for Industrial Control and Systems

(b) UL 845 Motor Control Centers

(c) ISA Standards and Recommended Practices for Instrumentation and Control

1.4 Submittals

1.4.1 Provide shop drawings and product data under provisions of Section 1A.

1.4.2 Submittals of shop drawings and product data shall be particularly detailed and complete. Submittals shall be complete with the manufacturer's guarantee. Piecemeal submittals will be returned without review.

1.4.3 Submittal information shall include schematic diagrams, point-to-point internal wiring diagrams, point-to-point field wiring diagrams, and other necessary diagrams and installation requirements for the motor starters, motor control center, automatic transfer switch, control panel, combustible gas monitor, float control system, alarm annunciator panel, intrusion alarm system, SCADA system, panel layouts and other components and systems that are interfaced to these systems.

1.5 Guarantee

1.5.1 All electrical equipment shall be guaranteed from all defects of material and workmanship for the manufacturer's standard length of guarantee or for 1 year from the date of final acceptance, which is longer.

1.6 Delivery, Storage and Handling

1.6.1 Delivery, storage and handling shall be in accordance with the provisions of Section 1A.

1.7 Basis of Payment

1.7.1 The major electrical equipment work shall be paid for at the contract lump sum price for

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which shall be payment in full for the work described herein.

2. PRODUCTS:

2.1 Motor Control Centers

2.1.1 General

(a) The existing Square D Motor Control Center shall be modified in accordance with rehabilitation project of Pump Station. To feed all new equipment the modification shall be as follow:
1) Two new Square D compartments (2A and 2J) shall be installed in section #2 of the existing South Bus MCC.
2) Starter for Drawdown Pump shall be relocated from the existing South Bus compartment 2N to new compartment in section #2 of the new East Bus MCC as shown on the Contract Drawings.
3) The starters in four existing compartments (1A, 2A, 3A and 4A) of the existing North Bus MCC shall be modified to make suitable use with 200 hp motors. This may require, but is not limited to replacing the existing 250 Amperes vertical bus with a 400 Amperes vertical bus, changing the circuit breakers, and changing the bus to starter connections.
4) Two new Square D vertical sections to be added (East Bus MCC). East Sections of MCC shall be freestanding assemblies of standardized, components arranged in multi-compartment vertical sections for control of circuits as indicated on the Contract Drawings.

(b) The equipment shall comply with all applicable requirements of ANSI for industrial control apparatus, IEEE Publication No. 15, and NEMA standards for industrial control, Publication No.ICS-1.

(c) New Sections and new Compartments shall be designed, manufactured and tested in accordance with the provisions of UL procedure 845. The UL label shall be displayed on each vertical section and on individual compartments wherever possible.

(d) New Sections and Compartments shall be NEMA Class I-S, Type B. Enclosures shall be as otherwise specified herein.

(e) New Sections and Compartments shall be the finished product of Square D manufacturer who shall be the manufacturer of the starters installed within.

(f) New Sections and Compartments of MCC shall be complete, including all main and auxiliary bus work, door interlocks, internal wiring and other equipment required for the control and protection of associated circuits.

(g) New Sections of MCC shall be completely tested at the factory, in accordance with ANSI and NEMA standards, including operating and high potential tests. A record of the tests shall be furnished to the owner prior to delivery of the equipment.

2.1.2 Enclosures

(a) Enclosures shall be dust-tight and drip-proof, with gasketed doors, NEMA 12.

(b) Each vertical section shall be nominally 20 inches wide by 20 inches deep by 90 inches high.

(c) The equipment shall be dead-front construction, unless otherwise specifically indicated.

(d) Enclosures shall incorporate individual unit compartments as generally indicated on the drawings, separated from each other by means of metal pans, structure walls and baffles, designed and tested to dissipate and limit communication of fault currents. Unless otherwise specifically indicated, structures shall have individual compartments arranged in a manner to accommodate not more than six NEMA size 1 starters in a vertical section.

(e) Each utilized compartment and each usable space unit shall have an individual flush door, a concealed hinge, and captive, spring-loaded quarter-turn fasteners. Each unusable space shall have a matching flush plate attached with machine screws or as otherwise approved by the Engineer. Doors on combination motor starter or overcurrent device units shall have mechanical interlocks, with hidden override, to prevent the doors from being opened unless the respective circuit protective device is in the off position.

(f) Usable space units shall not be less in number and size than indicated on the drawings and each space unit shall be equipped with bus work and rails, sized for the maximum possible future load possible for that space, ready for the future installation of a combination starter or overcurrent device.

(g) New Sections structures shall have a top horizontal wireway, isolated from the horizontal bus, accessible via removable covers. Adequate top and bottom conduit and cable entry without structural interference shall be part of the motor control center design. Wiring shall be safely accessible without disrupting service.

(h) Each vertical section shall have an individual vertical wireway with a hinged door or doors held closed with captive spring-loaded quarter-turn fasteners.

Vertical wireways shall be isolated from the unit compartments.

(i) Unit disconnects (unit overcurrent devices which are for feeders or which are part of combination starters) shall be operable via a separate mechanical operating mechanism which is not part of the device and which is operable with the unit door closed. The operator shall have a position indicating handle and it shall be possible to pad lock the handle in the "on" or "off" position. When the unit door is open, an interlock shall be provided to prevent closing the disconnect. An interlock shall prevent reinsertion of a draw-out unit while the disconnect is in the "on" position.

(j) The manufacturer shall make particular note of the requirements of NEC Article 380-8. Where indicated on the drawings, motor control centers shall be installed on 4-inch high concrete pads. The arrangement of unit compartments and overcurrent device operators within compartments shall keep all operating handles, when in their highest position, no higher than 6.5 feet above the finished floor and this limitation shall take into account concrete pads as applicable.

(k) New Sections of motor control center shall have a steel channel base and shall be complete with end plates to cover base openings at the ends.

(l) New Sections of motor control center shall have shipping splits, coordinated as required to assure ease of building entry and ease of installation. The manufacturer shall assemble the complete line-up at the factory to assure matching of sections and shall appropriately mark and ship all parts and hardware required for re-assembly at the project site.

(m) Motor control centers shall be chemically cleaned and treated to remove all dirt and grease and shall be prepared to assure a good paint finish. Enclosures shall be factory painted inside and outside. The type of paint finish shall be the manufacturer's standard. The colors of the motor control center enclosure shall be the manufacturer's standard internal color and the manufacturer's standard light gray external color.

(n) Each motor control center section, including all auxiliary sections, shall be equipped with 120volt space heater to minimize condensation. The heaters shall be thermostatically controlled. The heaters shall be energized upon delivery to the site.

2.1.3. Busses

(a) There are two South and North Busses in the existing MCC. No changes are required for the horizontal busses.

Main Lugs section – 600 amperes shall be installed in new East Section MCC. These lugs shall be fed from 200-ampere feeder breaker to be installed in South MCC section #2, compartment 2A.

(b) East Section MCC.

1) Unless otherwise indicated, main horizontal bus shall not be less than 600 amperes.

2) Vertical bus shall be sized appropriately for the arrangement of circuits but shall not be less than 300 amperes.

3) A copper ground bus having a cross-sectional area of not less than 0.375 square inches shall extend for the full length of each motor control center. It shall have adequate lugs for the connection of grounding conductors and it shall be bonded to each vertical section. The motor control center shall be grounded to the nearest main water pipe.

4) All bus work shall be mechanically secure. Buses, insulators and supports shall be rated to withstand a short circuit of not less than 65,000 RMS symmetrical amperes without damage. All bus joints shall be fronting accessible for ease of maintenance.

5) For line-ups to be mounted with backs against walls, all bus bolts, etc. shall be completely accessible from the front.

6) Buses (horizontal and vertical) shall be isolated from unit compartments and wireways and from each other, including phase-to-phase isolation. Locations for stabs for starter units and the like shall be equipped with removable plugs.

2.1.4 Motor Starter Units

(a) Unless otherwise indicated motor starters shall be full-voltage non-reversing starters.

(b) Unless otherwise indicated motor starters shall be combination type, complete with motor circuit protector type short circuit overcurrent protective devices as specified herein.

(c) Starters shall be sized for the motor to be connected, but shall not be smaller than NEMA size 1. Starter size shall be carefully coordinated based on the motor characteristics of the motor actually to be connected and the manufacturer's starter ratings. Where special pumps are involved, horsepower alone may not be sufficient to fully coordinate starter sizing. Horsepower ratings shown on the drawings are approximate.

(d) All full-voltage non-reversing starter units through NEMA size 4 shall be of the draw-out type complete with guide rails and stab alignment means.

(e) All starter units shall be equipped with pull-apart terminal blocks for control wiring and, for starter units through NEMA size 4, pull-apart terminal blocks shall be provided for power wiring.

(f) Starters shall be electrically operated, electrically held, 3-pole, with arc-extinguishing characteristics and renewable silver-to-silver contacts. Each starter shall have an overload relay assembly with a thermal bimetallic overload element for each phase that shall be sized to the specific motor nameplate load data. Unless otherwise indicated, overload relay shall be resetable via an insulated button on the unit compartment door.

(g) As a minimum, each starter shall be equipped with two normally open (N.O.) auxiliary contacts in addition to a starter seal-in (holding) contact. Additional contacts shall be provided as indicated or required for the control circuits indicated. An auxiliary relay shall be provided where the number of contacts required exceed the number, which can be mounted on the starter. Unused contacts shall be spare.

(h) Unless otherwise indicated, control circuits shall operate at 120 volts derived from a control transformer integral to the combination starter. The control transformer shall have a fused secondary and shall be sized adequately for the starter and all connected control devices but in no case shall the transformer be sized less than 50 volt-amperes over the capacity required to operate the starter. Control transformers shall be NEMA type AA, dry, with a temperature rise not exceeding 55 degrees C. above a 40 degrees C. ambient temperature at continuous rated load. Data submitted for approval shall include starter coil load data and total VA rating of control transformers.

(i) Starters shall be complete with control devices as required for the control of circuits, as indicated control devices shall be as specified herein. Control devices where indicated, shall be mounted on the unit compartment door and all control devices shall be arranged such that they do not interfere with access to starter wiring. Control device contact blocks shall not separate from the device operator when the compartment door is opened.

2.1.5 Circuit Protective Devices

(a) Unless otherwise indicated, protective devices for incoming supply and downstream feeder circuits shall be circuit breakers as specified herein.

(b) Circuit Breakers

1) Circuit breakers shall be UL listed, molded case, thermal-magnetic, manually operated circuit breakers of the trip ratings shown or indicated.

2) Unless otherwise indicated, circuit breakers shall be 3-pole.

3) Unless otherwise indicated, circuit breakers shall be rated for use on 480 volt circuits.

4) Multi-pole circuit breakers shall have a common trip and single operating handles. Handles shall be trip free. Circuit breakers in 250 ampere frames and above shall have an adjustable magnetic trip setting.

5) The circuit breakers shall indicate "ON", "OFF", and "TRIPPED" conditions.

6) Unless otherwise indicated, circuit breakers shall have a UL listed interrupting rating of not less than 65,000 RMS symmetrical amperes at 480 volts.

7) Where indicated or where required for indicated functions, circuit breakers shall be equipped with accessories such as shunt trips, alarm switches, auxiliary switches, and under voltage release.

8) As a minimum, each circuit breaker shall be equipped with one normally open (N.O.) and one normally (NC) closed auxiliary contacts.

(c) Unless otherwise indicated, protective devices for use in combination starter units shall be motor circuit protectors as specified herein.

(d) Motor Circuit Protectors

1) Motor Circuit protectors shall be manually operated and shall have a magnetic trip level adjustment. Trip ratings shown on the Drawings are approximate and the trip rating provided shall be as recommended by the device manufacturer for the characteristics of each respective motor. The Contractor shall coordinate device selection with motors provided under other Divisions.

2) Motor circuit protectors shall be 3-pole, for use on 480 volt circuits, with common trip and with position-indicating handles.

3) Motor circuit protectors shall be rated for use within a motor control center having an available fault current of 65,000 RMS symmetrical amperes. In order to meet this requirement, the devices may be equipped with bolt-on fuse type current limiting devices if required.

4) Unless otherwise indicated, each motor circuit protector shall be complete with both an alarm switch to close a contact whenever the breaker is tripped and an auxiliary switch to close a contact whenever the breaker is open. (The auxiliary switch may also close upon trip, but even when so operating, the separate alarm for trip shall also be provided.) Contacts shall be rated not less than 7 amperes.

2.1.6 Control Devices

(a) Unless otherwise specifically indicated, pushbuttons, selector switches, indicating lights and other control devices shall be heavy-duty oil tight types.

(b) Contact blocks for pushbuttons and selector switches shall have not less than one double pole double throw (DPDT) contact. Pushbuttons shall be color-coded and shall be black for "start" and red for "stop" and as indicated or selected by the Engineer for other functions.

(c) Indicating lights shall have built-in transformers, 6-volt miniature bayonet base incandescent lamps and lenses of the colors indicated. Unless otherwise indicated, indicating lights shall be push-to-test type.

(d) Legend plates shall be provided on all oil tight control devices. Unless otherwise indicated, green indicating lights shall have "RUNNING" legend plates and legend plates for other indicating lights shall be as indicated or as selected by the Engineer.

(e) Where indicated, or where control functions are not possible with oil-tight units, instrument-grade multi-position control switches having pistol-grip handles.

(f) Control Relays

Control relays shall be hermetically sealed, with 4 pole Form C, high reliability contacts rated not less than 5 amperes resistive. Provide relaying clips to hold relay in place.

(g) Synchronous Motor Time Delay Relays

Synchronous motor driven time delay relays shall have a nominal 4-inch square face, shall be "on-delay" or "off-delay" as indicated and shall be of the range indicated. They shall be suitable for flush panel mounting. Each relay shall plug into a permanently wired molded case assembly. Time shall be set by turning a knob with a pointer on the face of the relay. The relay shall have a cycle progress pointer which will advance clockwise from the setting back to zero during timing. The relays shall have instantaneous and delayed contacts as required for the functions indicated. Unless otherwise indicated the relays shall be for 120-volt operation.

(h) Solid State Time Delay Relays

Solid state time delay relays shall be "on-delay" or "off-delay" as indicated or may be of the convertible operation type. The relays shall have the dial range indicated and shall be complete with a permanently wired plug-in base. Where indicated, they shall be suitable for flush panel mounting, and shall then be complete with cycle progress pointer. When not indicated as for flush panel mounting, the relays shall be suitable for internal mounting and they shall then be equipped with retaining clips to keep them secure in their plug-in sockets. They shall have contacts as required for the functions indicated. Unless otherwise indicated, the relays shall be for 120-volt operation.

2.1.7 Meters and Instruments

(a) Meters, potential and current transformers, bus Circuit Breakers, bus tie Circuit Breaker, Modicon PLC and Power Unit are installed in the existing Square D SWGR. No additional changes are required.

2.1.8 Automatic Transfer Switches is existing, no change is required.

2.1.9 Micro Processor Based Metering System

(a) The motor control center main line metering system is existing, no change is required.

2.2 Control Panel and SCADA Panel

2.2.1 Control Panel

(a) The existing Control Panel is manufactured by Square D and shall be modified to control the upgraded pumping station. The following Square D products shall be installed in the Control Panel:

1) Eleven intrinsically safe relays for float control

2) Nine industrial control relays (8501 XO-40)

3) One Timing relay (8501 XO-00)

4) Nineteen 4-pole apart terminal blocks.

(b) Alternating relay

1) The existing alternating relay is designed for operation on six pumps system. Selector switch shall be installed in Control Panel to make it possible for the alternating relay to operate seven pumps.

2) Selector Switch shall be Electroswitch type 31909ME (seven position with nine decks) or approved equal. The contact arrangement and wiring shall be done as shown on the Contract Drawing.

2.2.2 SCADA

(a) The existing Analog and Contact inputs/outputs shall be revised and rewired as shown on the Contact Drawings.

(b) New Analog and Contact inputs/outputs shall be wired to the spare terminals of inputs and outputs as shown on the Contract drawings.

2.2.3 Wiring

(a) Wiring shall be brought to terminal strips near the bottom of enclosures and 10 percent spare terminals shall be provided in each. The identification of terminals shall conform to the schematic diagrams and shall consist of adhesive labels as manufactured by Brady, Thomas, or equal.

2.2.4. Float Control System

(a) The float control system is existing and designed for operation with six main and one low flow pumps.

(b) Eleven float switches are installed and they shall be direct acting 120 VAC, 20A SPST Normally Open mercury switch encapsulated in a #316 stainless steel, Teflon coated housing with required length of 3-conductor #14, 105 strand, water resistant, Type SO cable, pipe mounted, completed with mounting clamps.

(c) An intrinsically safe relay shall be provided for float. The relay shall be solid state electronic modules operated on 120V, 60Hz power supply, 13 volts sensing circuit suitable for application of float switches exposed in Class I, Division 1, Group C & D hazardous atmospheres, FM and U.L. approved. The relay shall have isolated 2 N.O. contacts or isolated 1 N.O. and 1 N.C. contacts rated 8 Amp at 250VAC. The relay shall be Square D or Warrick Controls Series 17, or approved equal.

(d) The system shall be intrinsically safe for installation of floating the wet well.

(e) The system shall be complete with control logic to produce the contact control and alarm functions indicated on the Contract Drawings.

(f) The existing Float Terminal Box shall be replaced with new explosion proof box. New cables and conduits shall be installed from Terminal Box to the existing Control Panel.

2.3 Combustible Gas Monitoring System

(a) The combustible gas monitoring system shall be a completely self-contained unit designed for continuous detection and monitoring of combustible gases, toxic gases or oxygen as shown on the drawings, using remote gas sensor/transmitters designed to measure the gas concentration.

(b) The combustible gas system shall include 6 sensors with integral transmitters as shown on the drawings, and shall integrate with 2 existing sensors and existing X3 transmitter as shown. The Altronix enclosure adjacent to the Ultima X3 transmitter shall be relocated to the new MCC room because it is not suitable for hazardous locations. At the contractor's option, the Altronix enclosure may be demolished entirely and its function replaced with functionality in the new monitoring panel, if applicable. In either case, the contractor shall maintain DC power to the existing Ultima X3 transmitter.

(c) The combustible gas monitoring system shall operate in the diffusion mode, but also can be used with Ultima Sampling Module in applications where it is necessary or more convenient to draw a sample from a remote location. The combustible gas monitoring system shall be Model 9020 as manufactured by Mine Safety Appliances Instruments Company (MSA), or approved equal.

(c) The gas monitoring system shall measure and display gas concentration. The system shall provide identifiable visual alarms when preset limits are exceeded. Relay outputs for alarms and analog signals representing gas concentrations shall be provided for transmitting an alarm to SCADA.

(d) The system shall consist of at least eight completely independent channels. An independent monitoring channel shall be provided with each sensor/transmitter having a full-scale range as specified. Each channel shall employ a three-digit LED display and three discrete alarm levels: caution, warning and alarm. Different color LED indicators shall differentiate alarm level: yellow for caution, amber for warning and red for alarm. A separate alarm relay output shall be provided for each alarm level. The alarm level shall be displayed by push-button. A second button, that also permits scrolling, permits easy change of the alarm levels. The sensor units shall be capable of being located remote from the monitor/readout unit by up to 5000 feet. Sensor unit shall receive power from and send signals corresponding to gas values to the monitor/readout unit. The catalytic type sensor units shall be in enclosures suitable for locations in Class I, Division 1, Group B, C&D classified areas. The sensor units shall have provisions for mounting to a wall or similar structure. The sensor for the pump room shall be an Ultima XE or approved equal, and the sensors in the stairwell, trashrack room, and wetwell shall be Ultima XIR or approved equal.

(e) The combustible gas Monitor shall be in NEMA 4X stainless steel enclosure, wall mountable assembly. All wiring connections shall be marked with functional designations such that connections can be made without the use of diagrams or tables. All connections must be easily accessible from the front.

(f) Alarms and relays at the monitoring/readout unit shall be set for the following levels of gas concentration:

1) Gas "WARNING" alarm - 20% LEL

2) Gas "ALARM" - 50% LEL

3) Trouble

(g) In response to a WARNING or ALARM signal from the gas detection system, due to a high concentration of gas in the monitored space, alarm relay energized and the ventilation system for the monitored space shall be activated.

(h) A calibration test kit for field checking the calibration of the gas detection system shall be furnished.

The kit shall be complete, including a lightweight carrying case, dispensing valve, regulator assembly and hose, test coils and necessary cylinder for type of calibrating gas. The test kit shall be stored in an approved cabinet adjacent to and match the air monitor panel.

(i) Spare parts shall be provided for the air monitoring equipment follows:

Spare Parts
One set of fuses
One set of lamps
One sensor head assembly
One sensor

(j) The services of a qualified representative of the manufacturer shall be provided to inspect the installation, make any adjustments, test the equipment, field calibrate the air monitoring equipment upon completion of the installation; after 24 hours of operation and again after one week; and instruct the operating personnel in the operation, calibration and maintenance of the equipment.

3. EXECUTION:

3.1 Examination

3.1.1 Verify layout of Control Panel, SCADA equipment and location of Combustible Gas Detection System and Fire Alarm System.

3.1.2 Verify that electrical power is available and have the correct characteristics.

3.2 Installation

3.2.1 Install system and components in accordance with manufacturer's specifications.

3.2.2 The installer shall provide all labor and perform all work to install and make operable all mechanical and electrical equipment necessary to assure safe and reliable operation.

3.3 Field Quality Control

3.3.1 Representative of the Manufacturer

(a) The services of a qualified representative of the manufacturer shall be provided to instruct on proper installation of the equipment, inspect the completed installation, make any necessary adjustments, participate in the startup of the equipment, participate in the field testing of the equipment, place the equipment in trouble-free operation, and instruct operating personnel in its operation and maintenance. This service shall include all equipment provided for this project including but not limited to combustible gas monitors.

(b) The manufacturer shall provide the written certification that equipment has been installed in accordance with their requirements.

(c) The start-up services for the following equipment shall be coordinated with IDOT and IDOT shall be notified at least one week in advance:

Motor Control Center including Automatic Transfer Switch.

SCADA Panel.

Combustible Gas Detector.

Intrusion Alarm Panel.

Fire Alarm Panel.

END OF THIS SECTION

DIVISION 16 - ELECTRICAL

SECTION 16D - SUPERVISORY, CONTROL AND DATA ACQUISITION (SCADA) EQUIPMENT

1. GENERAL:

1.1 Description

1.1.1 The existing SCADA Panel shall stay as is. No additional hardware equipment is required. Additional software may be needed to meet the monitoring and control requirement of the rehabilitation pumping station equipment.

1.1.2 The existing SCADA radio cabinet shall be relocated to the east wall in the control room. The existing antenna tower shall be relocated to the North of the extended parking lot as shown on the Contract drawings. The Contractor shall provide the required cables between the SCADA Panel and the SCADA radio cabinet, the SCADA radio cabinet and antenna. The Contractor shall test the radio signals.

1.1.3 The existing IDOT Pump Station SCADA is manufactured by TESCO Controls Inc. and shall be modified and reprogrammed in accordance with new Contract drawings. To ensure compatibility with the existing IDOT Pumping Station SCADA System, all SCADA software and application programs provided shall conform to the "Standard Specifications for the Pumping Station Supervisory, Control and Data Acquisition system" (PS-SCADA-886). The items shall be the product of TESCO Controls INC.
For specific details concerning these equipment items contact:

Meade Electric
9550 W. 55th Street, Suite A
McCook, Illinois 60525
Contact: Scott Myers
Telephone: (708) 588-2515
Fax: (708) 588-2501
Cell: (312) 208-1174

1.1.4 Charges for necessity equipment, including all items in Division 16D, shall be paid to the suppliers by the Contractor. The Contractor will be reimbursed the exact amount of these charges, as invoiced by the supplier under the pay item

PUMP STATION SCADA EQUIPMENT

An itemized copy of the supplier's invoice shall be submitted for approval to IDOT District 1, Bureau of Electrical Operations, as part of the submittal process.

For bidding purposes, this item shall be estimated at $70,000.00.

1.2 Related Sections

1.2.1 Section 16A - General Electrical Provisions

1.2.2 Section 16B - Basic Electrical Materials and Methods

1.2.3 Section 16C - Major Electrical Equipment

1.3 Reference

1.3.1 ISA Standards and Recommended Practices for Instrumentation and Control

1.4 Submittals

1.4.1 Provide updated shop drawings and product data under provisions of Section 1A.

1.4.2 Submittals of shop drawings and product data shall be particularly detailed and complete. Submittals shall be complete with the manufacturer's guarantee. Piecemeal submittals will be returned without review.

1.4.3 Submittal information shall include schematic diagrams, point-to-point internal wiring diagrams, point-to-point field wiring diagrams, and other necessary diagrams and installation requirements for the SCADA system and other components and systems that are interfaced to these systems.

1.5 Guarantee

1.5.1 Provide guarantee from all defects of material and workmanship for the manufacturer's standard length of guarantee or for 1 year from the date final acceptance, whichever is longer.

1.6 Deliver, Storage and Handling

1.6.1 Delivery, storage and handling shall be in accordance with the provisions of Section 1A.

1.7 Basis of Payment

1.7.1 Supervisory, Control and Data Acquisition (SCADA) equipment shall be paid for at the contract lump sum price for bidding purposes, this item shall be estimated at $70,000.00.

PUMP STATION SCADA EQUIPMENT

2. PRODUCTS:

2.1 Control Processor

2.1.1 The termination wiring shown on the Contract Drawings for the control processor shall be included in the basic PUMP STATION ELECTRICAL WORK. Any miscellaneous wiring, labor, etc. not included in the Contract Drawings, but necessary to provide a fully operational system shall be paid for under this item.

2.1.2 The existing Control Processor shall be complete with programming compatible with the features of Pump Station and shall include all field set-up, adjustment, calibration and testing.

2.1.3 All modifications to existing processors needed to integrate the Control Processor into the IDOT SCADA system for monitoring and control shall be provided.

2.2 Station Interface

2.2.1 The station shall be equipped with equipment and accessories to interface the control processor with other equipment at the stations as to accomplish the applicable functional features of the control processor, in conformance with the standard specifications (PS-SCADA-886).

2.2.2 All necessary transformers, contacts, relays and signals converters for interfacing the control processor into the pumping station, which are not otherwise specified or provided by work shown, shall be provided by the contractor. In the existing SCADA Panel the sufficient spares are available for a variety of analog and contact inputs/outputs for equipment items as shown on the contract Drawings and will provide many of the interface needs.

2.2.3 Certain conduit and wiring shown on the Contract Drawings facilitate the interface work and cost for this wiring shall not be included in this item.

3. EXECUTION:

3.1 Inspection

3.1.1 Verify that field conditions are acceptable and are ready to receive work.

END OF THIS SECTION

APPROVAL OF PROPOSED BORROW AREAS, USE AREAS, AND/OR WASTE AREAS INSIDE ILLINOIS STATE BORDERS (BDE)
Effective: November 1, 2008

Revise the title of Article 107.22 of the Standard Specifications to read:

"**107.22 Approval of Proposed Borrow Areas, Use Areas, and/or Waste Areas Inside Illinois State Borders.**"

Add the following sentence to the end of the first paragraph of Article 107.22 of the Standard Specifications:

"Proposed borrow areas, use areas, and/or waste areas outside of Illinois shall comply with Article 107.01."

CEMENT (BDE)
Effective: January 1, 2007 Revised: April 1, 2009

Revise Section 1001 of the Standard Specifications to read:

"**SECTION 1001. CEMENT**

1001.01 Cement Types. Cement shall be according to the following.

(a) Portland Cement. Acceptance of portland cement shall be according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants".

Portland cement shall be according to ASTM C 150, and shall meet the standard physical and chemical requirements. Type I or Type II may be used for cast-in-place, precast, and precast prestressed concrete. Type III may be used according to Article 1020.04, or when approved by the Engineer. All other cements referenced in ASTM C 150 may be used when approved by the Engineer.

The total of all organic processing additions shall be a maximum of 1.0 percent by weight (mass) of the cement. The total of all inorganic processing additions shall be a maximum of 4.0 percent by weight (mass) of the cement. However, a cement kiln dust inorganic processing addition shall be limited to a maximum of 1.0 percent. Organic processing additions shall be limited to grinding aids that improve the flowability of cement, reduce pack set, and improve grinding efficiency. Inorganic processing additions shall be limited to granulated blast-furnace slag according to the chemical requirements of AASHTO M 302, Class C fly ash according to the chemical requirements of AASHTO M 295, and cement kiln dust.

(b) Portland-Pozzolan Cement. Acceptance of portland-pozzolan cement shall be according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants".

Portland-pozzolan cement shall be according to ASTM C 595 and shall meet the standard physical and chemical requirements. Type IP may be used for cast-in-place, precast, and precast prestressed concrete, except when Class PP concrete is used. The pozzolan constituent for Type IP shall be a maximum of 21 percent of the weight (mass) of the portland-pozzolan cement.

For cast-in-place construction, portland-pozzolan cement shall not be used in concrete mixtures when the air temperature is below 40 ºF (4 ºC) without permission of the Engineer. If permission is given, the mix design strength requirement may require the Contractor to increase the cement or eliminate the cement factor reduction for a water-reducing or high range water-reducing admixture which is permitted according to Article 1020.05(b).

The total of all organic processing additions shall be a maximum of 1.0 percent by weight (mass) of the cement. Organic processing additions shall be limited to grinding aids as defined in (a) above. Inorganic processing additions shall be limited to cement kiln dust at a maximum of 1.0 percent.

(c) Portland Blast-Furnace Slag Cement. Acceptance of portland blast-furnace slag cement shall be according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants".

Portland blast-furnace slag cement shall be according to ASTM C 595 and shall meet the standard physical and chemical requirements. Type IS portland blast-furnace slag cement may be used for cast-in-place, precast, and precast prestressed concrete, except when Class PP concrete is used. The blast-furnace slag constituent for Type IS shall be a maximum of 25 percent of the weight (mass) of the portland blast-furnace slag cement.

For cast-in-place construction, portland blast-furnace slag cement shall not be used in concrete mixtures when the air temperature is below 40 ºF (4 ºC) without permission of the Engineer. If permission is given, the mix design strength requirement may require the Contractor to increase the cement or eliminate the cement factor reduction for a water-reducing or high range water-reducing admixture which is permitted according to Article 1020.05(b).

The total of all organic processing additions shall be a maximum of 1.0 percent by weight (mass) of the cement. Organic processing additions shall be limited to grinding aids as defined in (a) above. Inorganic processing additions shall be limited to cement kiln dust at a maximum of 1.0 percent.

(d) Rapid Hardening Cement. Rapid hardening cement shall be used according to Article 1020.04 or when approved by the Engineer. The cement shall be on the Department's current "Approved List of Packaged, Dry, Rapid Hardening Cementitious Materials for Concrete Repairs", and shall be according to the following.

(1) The cement shall have a maximum final set of 25 minutes, according to Illinois Modified ASTM C 191.

(2) The cement shall have a minimum compressive strength of 2000 psi (13,800 kPa) at 3.0 hours, 3200 psi (22,100 kPa) at 6.0 hours, and 4000 psi (27,600 kPa) at 24.0 hours, according to Illinois Modified ASTM C 109.

(3) The cement shall have a maximum drying shrinkage of 0.050 percent at seven days, according to Illinois Modified ASTM C 596.

(4) The cement shall have a maximum expansion of 0.020 percent at 14 days, according to Illinois Modified ASTM C 1038.

(5) The cement shall have a minimum 80 percent relative dynamic modulus of elasticity; and shall not have a weight (mass) gain in excess of 0.15 percent or a weight (mass) loss in excess of 1.0 percent, after 100 cycles, according to AASHTO T 161, Procedure B.

(e) Calcium Aluminate Cement. Calcium aluminate cement shall be used only where specified by the Engineer. The cement shall meet the standard physical requirements for Type I cement according to ASTM C 150, except the time of setting shall not apply. The chemical requirements shall be determined according to ASTM C 114 and shall be as follows: minimum 38 percent aluminum oxide (Al_2O_3), maximum 42 percent calcium oxide (CaO), maximum 1 percent magnesium oxide (MgO), maximum 0.4 percent sulfur trioxide (SO_3), maximum 1 percent loss on ignition, and maximum 3.5 percent insoluble residue.

1001.02 Uniformity of Color. Cement contained in single loads or in shipments of several loads to the same project shall not have visible differences in color.

1001.03 Mixing Brands and Types. Different brands or different types of cement from the same manufacturing plant, or the same brand or type from different plants shall not be mixed or used alternately in the same item of construction unless approved by the Engineer.

1001.04 Storage. Cement shall be stored and protected against damage, such as dampness which may cause partial set or hardened lumps. Different brands or different types of cement from the same manufacturing plant, or the same brand or type from different plants shall be kept separate."

CONCRETE ADMIXTURES (BDE)
Effective: January 1, 2003 Revised: April 1, 2009

Replace the first paragraph of Article 1020.05(b) of the Standard Specifications to read:

"(b) Admixtures. The use of admixtures to increase the workability or to accelerate the hardening of the concrete will be permitted when approved by the Engineer. Admixture dosages shall result in the mixture meeting the specified plastic and hardened properties. The Department will maintain an Approved List of Corrosion Inhibitors. Corrosion inhibitor dosage rates shall be according to Article 1020.05(b)(12). The Department will also maintain an Approved List of Concrete Admixtures, and an admixture technical representative shall be consulted when determining an admixture dosage from this list. The dosage shall be within the range indicated on the approved list unless the influence by other admixtures, jobsite conditions (such as a very short haul time), or other circumstances warrant a dosage outside the range. The Engineer shall be notified when a dosage is proposed outside the range. To determine an admixture dosage, air temperature, concrete temperature, cement source and quantity, finely divided mineral sources(s) and quantity, influence of other admixtures, haul time, placement conditions, and other factors as appropriate shall be considered. The Engineer may request the Contractor to have a batch of concrete mixed in the lab or field to verify the admixture dosage is correct. An admixture dosage or combination of admixture dosages shall not delay the initial set of concrete by more than one hour. When a retarding admixture is required or appropriate for a bridge deck or bridge deck overlay pour, the initial set time shall be delayed until the deflections due to the concrete dead load are no longer a concern for inducing cracks in the completed work. However, a retarding admixture shall not be used to further extend the pour time and justify the alteration of a bridge deck pour sequence.

When determining water in admixtures for water/cement ratio, the Contractor shall calculate 70 percent of the admixture dosage as water, except a value of 50 percent shall be used for a latex admixture used in bridge deck latex concrete overlays."

Revise Section 1021 of the Standard Specifications to read:

"**SECTION 1021. CONCRETE ADMIXTURES**

1021.01 **General.** Admixtures shall be furnished in liquid form ready for use. The admixtures shall be delivered in the manufacturer's original containers, bulk tank trucks or such containers or tanks as are acceptable to the Engineer. Delivery shall be accompanied by a ticket which clearly identifies the manufacturer and trade name of the material. Containers shall be readily identifiable as to manufacturer and trade name of the material they contain.

Corrosion inhibitors will be maintained on the Department's Approved List of Corrosion Inhibitors. All other concrete admixture products will be maintained on the Department's Approved List of Concrete Admixtures. For the admixture submittal, a report prepared by an independent laboratory accredited by the AASHTO Materials Reference Laboratory (AMRL) for Portland Cement Concrete shall be provided. The report shall show the results of physical tests conducted no more than five years prior to the time of submittal, according to applicable specifications. However, for corrosion inhibitors the ASTM G 109 test information specified in ASTM C 1582 is not required to be from and independent lab. All other information in ASTM C 1582 shall be from and independent lab.

Tests shall be conducted using materials and methods specified on a "test" concrete and a "reference" concrete, together with a certification that no changes have been made in the formulation of the material since the performance of the tests. Per the manufacturer's option, the cement content for all required tests shall either be according to applicable specifications or 5.65 cwt/cu yd (335 kg/cu m). Compressive strength test results for six months and one year will not be required.

Prior to the approval of an admixture, the Engineer reserves the right to request a sample for testing. The test and reference concrete mixtures tested by the Engineer will contain a cement content of 5.65 cwt/cu yd (335 kg/cu m). For freeze-thaw testing, the Department will perform the test according to AASHTO T 161, Procedure B. The flexural strength test will be performed according to AASHTO T 177. If the Engineer decides to test the admixture, the manufacturer shall submit AASHTO T 197 water content and set time test results on the standard cement used by the Department. The test and reference concrete mixture shall contain a cement content of 5.65 cwt/cu yd (335 kg/cu m). The manufacturer may select their lab or an independent lab to perform this testing. The laboratory is not required to be accredited by AASHTO.

The manufacturer shall include in the submittal the following admixture information: the manufacturing range for specific gravity, the midpoint and manufacturing range for residue by oven drying, and the manufacturing range for pH. The submittal shall also include an infrared spectrophotometer trace no more than five years old.

For air-entraining admixtures according to Article 1021.02, the specific gravity allowable manufacturing range shall be established by the manufacturer and the test method shall be according to ASTM C 494. For residue by oven drying and pH, the allowable manufacturing range and test methods shall be according to ASTM C 260.

For admixtures according to Articles 1021.03, 1021.04, 1021.05, 1021.06, and 1021.07, the pH allowable manufacturing range shall be established by the manufacturer and the test method shall be according to ASTM E 70. For specific gravity and residue by oven drying, the allowable manufacturing range and test methods shall be according to ASTM C 494.

When test results are more than seven years old, the manufacturer shall re-submit the infrared spectrophotometer trace and the report prepared by an independent laboratory accredited by AASHTO.

All admixtures, except chloride-based accelerators, shall contain a maximum of 0.3 percent chloride by weight (mass).

Random field samples may be taken by the Department to verify an admixture meets specification. A split sample will be provided to the manufacturer if requested. Admixtures that do not meet specification requirements or an allowable manufacturing range established by the manufacturer shall be replaced with new material.

1021.02 Air-Entraining Admixtures. Air-entraining admixtures shall be according to AASHTO M 154.

1021.03 Retarding and Water-Reducing Admixtures. The admixture shall be according to the following.

(a) The retarding admixture shall be according to AASHTO M 194, Type B (retarding) or Type D (water-reducing and retarding).
(b) The water-reducing admixture shall be according to AASHTO M 194, Type A.
(c) The high range water-reducing admixture shall be according to AASHTO M 194, Type F (high range water-reducing) or Type G (high range water-reducing and retarding).

1021.04 Accelerating Admixtures. The admixture shall be according to AASHTO M 194, Type C (accelerating) or Type E (water reducing and accelerating).

1021.05 Self-Consolidating Admixtures. The self-consolidating admixture system shall consist of either a high range water-reducing admixture only or a high range water-reducing admixture combined with a separate viscosity modifying admixture. The one or two component admixture system shall be capable of producing a concrete mixture that can flow around reinforcement and consolidate under its own weight without additional effort and without segregation.

The high range water-reducing admixture shall be according to AASHTO M 194, Type F.

The viscosity modifying admixture shall be according to ASTM C 494, Type S (specific performance).

1021.06 Rheology-Controlling Admixture. The rheology-controlling admixture shall be capable of producing a concrete mixture with a lower yield stress that will consolidate easier for slipform applications used by the Contractor. The rheology-controlling admixture shall be according to ASTM C 494, Type S (specific performance).

1021.07 Corrosion Inhibitor. The corrosion inhibitor shall be according to one of the following.

(a) Calcium Nitrite. The corrosion inhibitor shall contain a minimum 30 percent calcium nitrite by weight (mass) of solution, and shall comply with the requirements of AASHTO M 194, Type C (accelerating).

(b) Other Materials. The corrosion inhibitor shall be according to ASTM C 1582."

CONSTRUCTION AIR QUALITY – DIESEL RETROFIT (BDE)
Effective: June 1, 2010

The reduction of emissions of particulate matter (PM) for off-road equipment shall be accomplished by installing retrofit emission control devices. The term "equipment" refers to diesel fuel powered devices rated at 50 hp and above, to be used on the jobsite in excess of seven calendar days over the course of the construction period on the jobsite (including rental equipment).

Contractor and subcontractor diesel powered off-road equipment assigned to the contract shall be retrofitted using the phased in approach shown below. Equipment that is of a model year older than the year given for that equipment's respective horsepower range shall be retrofitted:

Effective Dates	Horsepower Range	Model Year
June 1, 2010 1/	600-749	2002
	750 and up	2006
June 1, 2011 2/	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006
June 1, 2012 2/	50-99	2004
	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006

1/ Effective dates apply to Contractor diesel powered off-road equipment assigned to the contract.
2/ Effective dates apply to Contractor and subcontractor diesel powered off-road equipment assigned to the contract.

The retrofit emission control devices shall achieve a minimum PM emission reduction of 50 percent and shall be:

a) Included on the U.S. Environmental Protection Agency (USEPA) *Verified Retrofit Technology List* (http://www.epa.gov/otaq/retrofit/verif-list.htm), or verified by the California Air Resources Board (CARB) (http://www.arb.ca.gov/diesel/verde/verdev.htm); or
b) Retrofitted with a non-verified diesel retrofit emission control device if verified retrofit emission control devices are not available for equipment proposed to be used on the project, and if the Contractor has obtained a performance certification from the retrofit device manufacturer that the emission control device provides a minimum PM emission reduction of 50 percent.

Note: Large cranes (Crawler mounted cranes) which are responsible for critical lift operations are exempt from installing retrofit emission control devices if such devices adversely affect equipment operation.

Diesel powered off-road equipment with engine ratings of 50 hp and above, which are unable to be retrofitted with verified emission control devices or if performance certifications are not available which will achieve a minimum 50 percent PM reduction, may be granted a waiver by the Department if documentation is provided showing good faith efforts were made by the Contractor to retrofit the equipment.

Construction shall not proceed until the Contractor submits a certified list of the diesel powered off-road equipment that will be used, and as necessary, retrofitted with emission control devices. The list(s) shall include (1) the equipment number, type, make, Contractor/rental company name; and (2) the emission control devices make, model, USEPA or CARB verification number, or performance certification from the retrofit device manufacturer. Equipment reported as fitted with emissions control devices shall be made available to the Engineer for visual inspection of the device installation, prior to being used on the jobsite.

The Contractor shall submit an updated list of retrofitted off-road construction equipment as retrofitted equipment changes or comes on to the jobsite. The addition or deletion of any diesel powered equipment shall be included on the updated list.

If any diesel powered off-road equipment is found to be in non-compliance with any portion of this special provision, the Engineer will issue the Contractor a diesel retrofit deficiency deduction.

Any costs associated with retrofitting any diesel powered off-road equipment with emission control devices shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall not be grounds for a claim.

Diesel Retrofit Deficiency Deduction

When the Engineer determines that a diesel retrofit deficiency exists, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be $1,000.00 for each deficiency identified.

The deficiency will be based on lack of diesel retrofit emissions control.

If a Contractor accumulates three diesel retrofit deficiency deductions for the same piece of equipment in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of the contract time, waiver of penalties, or be grounds for any claim.

CONSTRUCTION AIR QUALITY - DIESEL VEHICLE EMISSIONS CONTROL (BDE)
Effective: April 1, 2009 Revised: July 1, 2009

Diesel Vehicle Emissions Control. The reduction of construction air emissions shall be accomplished by using cleaner burning diesel fuel. The term “equipment” refers to any and all diesel fuel powered devices rated at 50 hp and above, to be used on the project site in excess of seven calendar days over the course of the construction period on the project site (including any “rental” equipment).

All equipment on the jobsite, with engine ratings of 50 hp and above, shall be required to: use Ultra Low Sulfur Diesel fuel (ULSD) exclusively (15 ppm sulfur content or less).

Diesel powered equipment in non-compliance will not be allowed to be used on the project site, and is also subject to a notice of non-compliance as outlined below.

The Contractor shall submit copies of monthly summary reports and include certified copies of the ULSD diesel fuel delivery slips for diesel fuel delivered to the jobsite for the reporting time period, noting the quantity of diesel fuel used.

If any diesel powered equipment is found to be in non-compliance with any portion of this specification, the Engineer will issue the Contractor a notice of non-compliance and identify an appropriate period of time, as outlined below under environmental deficiency deduction, in which to bring the equipment into compliance or remove it from the project site.

Any costs associated with bringing any diesel powered equipment into compliance with these diesel vehicle emissions controls shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall also not be grounds for a claim.

Environmental Deficiency Deduction. When the Engineer is notified, or determines that an environmental control deficiency exists, he/she will notify the Contractor in writing, and direct the Contractor to correct the deficiency within a specified time period. The specified time-period, which begins upon Contractor notification, will be from 1/2 hour to 24 hours long, based on the urgency of the situation and the nature of the deficiency. The Engineer shall be the sole judge regarding the time period.

The deficiency will be based on lack of repair, maintenance and diesel vehicle emissions control.

If the Contractor fails to correct the deficiency within the specified time frame, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be $1,000.00 for each deficiency identified.

If a Contractor or subcontractor accumulates three environmental deficiency deductions in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of contract time, waiver of penalties, or be grounds for any claim.

CONSTRUCTION AIR QUALITY - IDLING RESTRICTIONS (BDE)
Effective: April 1, 2009

Idling Restrictions. The Contractor shall establish truck-staging areas for all diesel powered vehicles that are waiting to load or unload material at the jobsite. Staging areas shall be located where the diesel emissions from the equipment will have a minimum impact on adjacent sensitive receptors. The Department will review the selection of staging areas, whether within or outside the existing highway right-of-way, to avoid locations near sensitive areas or populations to the extent possible. Sensitive receptors include, but are not limited to, hospitals, schools, residences, motels, hotels, daycare facilities, elderly housing and convalescent facilities. Diesel powered engines shall also be located as far away as possible from fresh air intakes, air conditioners, and windows. The Engineer will approve staging areas before implementation.

Diesel powered vehicle operators may not cause or allow the motor vehicle, when it is not in motion, to idle for more than a total of 10 minutes within any 60 minute period, except under any of the following circumstances:

1) The motor vehicle has a gross vehicle weight rating of less than 8000 lb (3630 kg).
2) The motor vehicle idles while forced to remain motionless because of on-highway traffic, an official traffic control device or signal, or at the direction of a law enforcement official.
3) The motor vehicle idles when operating defrosters, heaters, air conditioners, or other equipment solely to prevent a safety or health emergency.
4) A police, fire, ambulance, public safety, other emergency or law enforcement motor vehicle, or any motor vehicle used in an emergency capacity, idles while in an emergency or training mode and not for the convenience of the vehicle operator.
5) The primary propulsion engine idles for maintenance, servicing, repairing, or diagnostic purposes if idling is necessary for such activity.
6) A motor vehicle idles as part of a government inspection to verify that all equipment is in good working order, provided idling is required as part of the inspection.
7) When idling of the motor vehicle is required to operate auxiliary equipment to accomplish the intended use of the vehicle (such as loading, unloading, mixing, or processing cargo; controlling cargo temperature; construction operations, lumbering operations; oil or gas well servicing; or farming operations), provided that this exemption does not apply when the vehicle is idling solely for cabin comfort or to operate non-essential equipment such as air conditioning, heating, microwave ovens, or televisions.
8) When the motor vehicle idles due to mechanical difficulties over which the operator has no control.
9) The outdoor temperature is less than 32 °F (0 °C) or greater than 80 °F (26 °C).

When the outdoor temperature is greater than or equal to 32 °F (0 °C) or less than or equal to 80 °F (26 °C), a person who operates a motor vehicle operating on diesel fuel shall not cause or allow the motor vehicle to idle for a period greater than 30 minutes in any 60 minute period while waiting to weigh, load, or unload cargo or freight, unless the vehicle is in a line of vehicles that regularly and periodically moves forward.

The above requirements do not prohibit the operation of an auxiliary power unit or generator set as an alternative to idling the main engine of a motor vehicle operating on diesel fuel.

Environmental Deficiency Deduction. When the Engineer is notified, or determines that an environmental control deficiency exists based on non-compliance with the idling restrictions, he/she will notify the Contractor, and direct the Contractor to correct the deficiency.

If the Contractor fails to correct the deficiency a monetary deduction will be imposed. The monetary deduction will be $1,000.00 for each deficiency identified.

DETERMINATION OF THICKNESS (BDE)
Effective: April 1, 2009

Revise Articles 353.12 and 353.13 of the Standard Specifications to Articles 353.13 and 353.14 respectively.

Add the following Article to the Standard Specifications:

"**353.12 Tolerance in Thickness.** The thickness of base course pay items that individually contain at least 1000 sq yd (840 sq m) of contiguous area, except for temporary construction, bike paths, and individual locations less than 500 ft (150 m) long, will be evaluated. Temporary construction is defined as those areas constructed and removed under the same contract. If the base course cannot be cored for thickness prior to placement of the cover layer(s), the Engineer will determine the thickness of the cover layer(s), and subtract them from the measured core thickness to determine the base course thickness.

The procedure described in Article 407.10(b) will be followed, except the option of correcting deficient pavement with additional lift(s) shall not apply."

Revise Article 354.09 of the Standard Specifications to read:

"**354.09 Tolerance in Thickness.** The thickness of base course widening pay items that individually contain at least 1000 sq yd (840 sq m) of contiguous area, except for temporary construction; bike paths and individual locations less than 3 ft (1 m) wide or 1000 ft (300 m) long, will be evaluated. Temporary construction is defined as those areas constructed and removed under the same contract. If the base course widening cannot be cored for thickness prior to placement of the cover layer(s), the Engineer will determine the thickness of the cover layer(s), and subtract them from the measured core thickness to determine the base course widening thickness.

The procedure described in Article 407.10(b) will be followed, except:

(a) The width of a unit shall be the width of the widening along one edge of the pavement.
(b) The length of the unit shall be 1000 ft (300 m).
(c) The option of correcting deficient pavement with additional lift(s) shall not apply."

Revise Article 355.09 of the Standard Specifications to read:

"**355.09 Tolerance in Thickness.** The thickness of HMA base course pay items that individually contain at least 1000 sq yd (840 sq m) of contiguous area, except for temporary construction; bike paths and individual locations less than 500 ft (150 m) long, will be evaluated according to Article 407.10(b).

Temporary construction is defined as those areas constructed and removed under the same contract. If the base course cannot be cored for thickness prior to placement of the cover layer(s), the Engineer will determine the thickness of the cover layer(s), and subtract them from the measured core thickness to determine the base course thickness."

Revise Article 356.07 of the Standard Specifications to read:

"**356.07 Tolerance in Thickness.** The thickness of HMA base course widening pay items that individually contain at least 1000 sq yd (840 sq m) of contiguous area, except for temporary construction; bike paths and individual locations less than 3 ft (1 m) wide or 1000 ft (300 m) long, will be evaluated according to Article 407.10(b) except, the width of a unit shall be the width of the widening along one edge of the pavement and the length of a unit shall be 1000 ft (300 m). Temporary locations are defined as those constructed and removed under the same contract. If the base course widening cannot be cored for thickness prior to placement of the cover layer(s), the Engineer will determine the thickness of the cover layer(s)and subtract them from the measured core thickness to determine the base course widening thickness."

Revise Article 407.10 of the Standard Specifications to read:

"**407.10 Tolerance in Thickness.** Determination of pavement thickness shall be performed after the pavement surface tests and corrective action have been completed according to Article 407.09. Pay adjustments made for pavement thickness will be in addition to and independent of those made for pavement smoothness. Pavement pay items that individually contain at least 1000 sq yd (840 sq m) of contiguous pavement shall be evaluated with the following exclusions: temporary pavements; variable width pavements; radius returns; short lengths of contiguous pavements less than 500 ft (125 m) in length; and constant width portions of turn lanes less than 500 ft (125 m) in length. Temporary pavements are defined as pavements constructed and removed under the same contract.

The method described in Article 407.10(a), shall be used except for those pavements constructed in areas where access to side streets and entrances necessitates construction in segments less than 1000 ft (300 m). The method described in Article 407.10(b) shall be used in areas where access to side streets and entrances necessitates construction in segments less than 1000 ft (300 m).

(a) Percent Within Limits. The percent within limits (PWL) method shall be as follows.

(1) Lots and Sublots. The pavement will be divided into approximately equal lots of not more than 5000 ft (1500 m) in length. When the length of a continuous strip of pavement is 500 ft (150 m) or greater but less than 5000 ft (1500 m), these short lengths of pavement, ramps, turn lanes, and other short sections of continuous pavement will be grouped together to form lots approximately 5000 ft (1500 m) in length. Short segments between structures will be measured continuously with the structure segments omitted. Each lot will be subdivided into ten equal sublots. The width of a sublot and lot will be the width from the pavement edge to the adjacent lane line, from one lane line to the next, or between pavement edges for single-lane pavements.

(2) Cores. Cores 2 in. (50 mm) in diameter shall be taken from the pavement by the Contractor, at locations selected by the Engineer. The exact location for each core will be selected at random, but will result in one core per sublot. Core locations will be specified prior to beginning the coring operations.

The Contractor and the Engineer shall witness the coring operations, as well as the measuring and recording of the core lengths. The cores will be measured with a device supplied by the Department immediately upon removal from the core bit and prior to moving to the next core location. Upon concurrence of the length, the core samples shall be disposed of according to Article 202.03.

Upon completion of each core, all water shall be removed from the hole and the hole then filled with a rapid hardening mortar or concrete. The material shall be mixed in a separate container, placed in the hole, consolidated by rodding, and struck-off flush with the adjacent pavement.

(3) Deficient Sublot. When the length of the core in a sublot is deficient by more than ten percent of plan thickness, the Contractor may take three additional cores within that sublot at locations selected at random by the Engineer. If the Contractor chooses not to take additional cores, the pavement in that sublot shall be removed and replaced.

When the three additional cores are taken, the length of those cores will be averaged with the original core length. If the average shows the sublot to be deficient by ten percent or less, no additional action is necessary. If the average shows the sublot to be deficient by more than ten percent, the pavement in that sublot shall be removed and replaced; however, when requested in writing by the Contractor, the Engineer may permit in writing such deficient sublots to remain in place. For deficient sublots allowed to remain in place, additional lift(s) may be placed, at no additional cost to the Department, to bring the deficient pavement to plan thickness when the Engineer determines grade control conditions will permit such lift(s). The area(s) to be overlaid, material to be used, thickness(es) of the lift(s), and method of placement will be approved by the Engineer.

When a deficient sublot is removed and replaced, or additional lifts are placed, the corrected sublot shall be retested for thickness. The length of the new core taken in the sublot will be used in determining the PWL for the lot.

When a deficient sublot is left in place, and no additional lift(s) are placed, no payment will be made for the deficient sublot. The length of the original core taken in the sublot will be used in determining the PWL for the lot.

(4) Deficient Lot. After addressing deficient sublots, the PWL for each lot will be determined. When the PWL of a lot is 60 percent or less, the pavement in that lot shall be removed and replaced; however, when requested in writing by the Contractor, the Engineer may permit in writing such deficient lots to remain in place. For deficient lots allowed to remain in place, additional lift(s) may be placed, at no additional cost to the Department, to bring the deficient pavement to plan thickness when the Engineer determines grade control conditions will permit such lift(s).

The area(s) to be overlaid, material to be used, thickness(es) of the lift(s), and method of placement will be approved by the Engineer.

When a deficient lot is removed and replaced, or additional lifts are placed, the corrected lot shall be retested for thickness. The PWL for the lot will then be recalculated based upon the new cores; however, the pay factor for the lot shall be a maximum of 100 percent.

When a deficient lot is left in place, and no additional lift(s) are placed, the PWL for the lot will not be recalculated.

(5) Right of Discovery. When the Engineer has reason to believe the random core selection process will not accurately represent the true conditions of the work, he/she may order additional cores. The additional cores shall be taken at specific locations determined by the Engineer. The Engineer will provide notice to the Contractor containing an explanation of the reasons for his/her action. The need for, and location of, additional cores will be determined prior to commencement of coring operations.

When the additional cores show the pavement to be deficient by more than ten percent of plan thickness, more additional cores shall be taken to determine the limits of the deficient pavement and that area shall be removed and replaced; however, when requested in writing by the Contractor, the Engineer may permit in writing such areas of deficient pavement to remain in place. The area of deficient pavement will be defined using the length between two acceptable cores and the full width of the sublot. An acceptable core is a core with a length of at least 90 percent of plan thickness.

For deficient areas allowed to remain in place, additional lift(s) may be placed, at no additional cost to the Department, to bring the deficient pavement to plan thickness when the Engineer determines grade control conditions will permit such lift(s). The area(s) to be overlaid, material to be used, thickness(es) of the lift(s), and method of placement will be approved by the Engineer.

When an area of deficient pavement is removed and replaced, or additional lifts are placed, the corrected pavement shall be retested for thickness.

When an area of deficient pavement is left in place, and no additional lift(s) are placed, no payment will be made for the deficient pavement.

When the additional cores show the pavement to be at least 90 percent of plan thickness, the additional cores will be paid for according to Article 109.04.

(6) Profile Index Adjustment. After any area of pavement is removed and replaced or any additional lifts are placed, the corrected areas shall be retested for pavement smoothness and any necessary profile index adjustments and/or corrections will be made based on these final profile readings prior to retesting for thickness.

(7) Determination of PWL. The PWL for each lot will be determined as follows.

Definitions:

x_i = Individual values (core lengths) under consideration
n = Number of individual values under consideration (10 per lot)
$\bar{x}$ = Average of the values under consideration
LSL = Lower Specification Limit (98% of plan thickness)
Q_L = Lower Quality Index
S = Sample Standard Deviation
PWL = Percent Within Limits

Determine $\bar{x}$ for the lot to the nearest two decimal places.

Determine S for the lot to the nearest three decimal places using:

$$S = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}} \quad \text{where} \quad \sum (x_i - \bar{x})^2 = (x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + \ldots\ldots + (x_{10} - \bar{x})^2$$

Determine Q_L for the lot to the nearest two decimal places using:

$$Q_L = \frac{(\bar{x} - LSL)}{S}$$

Determine PWL for the lot using the Q_L and the following table. For Q_L values less than zero the value shown in the table must be subtracted from 100 to obtain PWL.

(8) Pay Factors. The pay factor (PF) for each lot will be determined, to the nearest two decimal places, using:

PF (in percent) = 55 + 0.5 (PWL)

If $\bar{x}$ for a lot is less than the plan thickness, the maximum PF for that lot shall be 100 percent.

(9) Payment. Payment of incentive or disincentive for pay items subject to the PWL method will be calculated using:

Payment = (((TPF/100)-1) x CUP) x (TOTPAVT - DEFPAVT)

TPF = Total Pay Factor
CUP = Contract Unit Price
TOTPAVT = Area of Pavement Subject to Coring
DEFPAVT = Area of Deficient Pavement

The TPF for the pavement shall be the average of the PF for all the lots; however, the TPF shall not exceed 102 percent.

Area of Deficient pavement (DEFPAVT) is defined as an area of pavement represented by a sublot deficient by more than ten percent which is left in place with no additional thickness added.

Area of Pavement Subject to Coring (TOTPAVT) is defined as those pavement areas included in lots for pavement thickness determination.

PERCENT WITHIN LIMITS							
Quality Index (Q_L)*	Percent Within Limits (PWL)	Quality Index (Q_L)*	Percent Within Limits (PWL)	Quality Index (Q_L)*	Percent Within Limits (PWL)	Quality Index (Q_L)*	Percent Within Limits (PWL)
0.00	50.00	0.40	65.07	0.80	78.43	1.20	88.76
0.01	50.38	0.41	65.43	0.81	78.72	1.21	88.97
0.02	50.77	0.42	65.79	0.82	79.02	1.22	89.17
0.03	51.15	0.43	66.15	0.83	79.31	1.23	89.38
0.04	51.54	0.44	66.51	0.84	79.61	1.24	89.58
0.05	51.92	0.45	66.87	0.85	79.90	1.25	89.79
0.06	52.30	0.46	67.22	0.86	80.19	1.26	89.99
0.07	52.69	0.47	67.57	0.87	80.47	1.27	90.19
0.08	53.07	0.48	67.93	0.88	80.76	1.28	90.38
0.09	53.46	0.49	68.28	0.89	81.04	1.29	90.58
0.10	53.84	0.50	68.63	0.90	81.33	1.30	90.78
0.11	54.22	0.51	68.98	0.91	81.61	1.31	90.96
0.12	54.60	0.52	69.32	0.92	81.88	1.32	91.15
0.13	54.99	0.53	69.67	0.93	82.16	1.33	91.33
0.14	55.37	0.54	70.01	0.94	82.43	1.34	91.52
0.15	55.75	0.55	70.36	0.95	82.71	1.35	91.70
0.16	56.13	0.56	70.70	0.96	82.97	1.36	91.87
0.17	56.51	0.57	71.04	0.97	83.24	1.37	92.04
0.18	56.89	0.58	71.38	0.98	83.50	1.38	92.22
0.19	57.27	0.59	71.72	0.99	83.77	1.39	92.39
0.20	57.65	0.60	72.06	1.00	84.03	1.40	92.56
0.21	58.03	0.61	72.39	1.01	84.28	1.41	92.72
0.22	58.40	0.62	72.72	1.02	84.53	1.42	92.88
0.23	58.78	0.63	73.06	1.03	84.79	1.43	93.05
0.24	59.15	0.64	73.39	1.04	85.04	1.44	93.21
0.25	59.53	0.65	73.72	1.05	85.29	1.45	93.37
0.26	59.90	0.66	74.04	1.06	85.53	1.46	93.52
0.27	60.28	0.67	74.36	1.07	85.77	1.47	93.67
0.28	60.65	0.68	74.69	1.08	86.02	1.48	93.83
0.29	61.03	0.69	75.01	1.09	86.26	1.49	93.98
0.30	61.40	0.70	75.33	1.10	86.50	1.50	94.13
0.31	61.77	0.71	75.64	1.11	86.73	1.51	94.27
0.32	62.14	0.72	75.96	1.12	86.96	1.52	94.41
0.33	62.51	0.73	76.27	1.13	87.20	1.53	94.54
0.34	62.88	0.74	76.59	1.14	87.43	1.54	94.68
0.35	63.25	0.75	76.90	1.15	87.66	1.55	94.82
0.36	63.61	0.76	77.21	1.16	87.88	1.56	94.95
0.37	63.98	0.77	77.51	1.17	88.10	1.57	95.08
0.38	64.34	0.78	77.82	1.18	88.32	1.58	95.20
0.39	64.71	0.79	78.12	1.19	88.54	1.59	95.33

*For Q_L values less than zero, subtract the table value from 100 to obtain PWL

PERCENT WITHIN LIMITS (continued)					
Quality Index (Q_L)*	Percent Within Limits (PWL)	Quality Index (Q_L)*	Percent Within Limits (PWL)	Quality Index (Q_L)*	Percent Within Limits (PWL)
1.60	95.46	2.00	98.83	2.40	99.89
1.61	95.58	2.01	98.88	2.41	99.90
1.62	95.70	2.02	98.92	2.42	99.91
1.63	95.81	2.03	98.97	2.43	99.91
1.64	95.93	2.04	99.01	2.44	99.92
1.65	96.05	2.05	99.06	2.45	99.93
1.66	96.16	2.06	99.10	2.46	99.94
1.67	96.27	2.07	99.14	2.47	99.94
1.68	96.37	2.08	99.18	2.48	99.95
1.69	96.48	2.09	99.22	2.49	99.95
1.70	96.59	2.10	99.26	2.50	99.96
1.71	96.69	2.11	99.29	2.51	99.96
1.72	96.78	2.12	99.32	2.52	99.97
1.73	96.88	2.13	99.36	2.53	99.97
1.74	96.97	2.14	99.39	2.54	99.98
1.75	97.07	2.15	99.42	2.55	99.98
1.76	97.16	2.16	99.45	2.56	99.98
1.77	97.25	2.17	99.48	2.57	99.98
1.78	97.33	2.18	99.50	2.58	99.99
1.79	97.42	2.19	99.53	2.59	99.99
1.80	97.51	2.20	99.56	2.60	99.99
1.81	97.59	2.21	99.58	2.61	99.99
1.82	97.67	2.22	99.61	2.62	99.99
1.83	97.75	2.23	99.63	2.63	100.00
1.84	97.83	2.22	99.66	2.64	100.00
1.85	97.91	2.25	99.68	≥ 2.65	100.00
1.86	97.98	2.26	99.70		
1.87	98.05	2.27	99.72		
1.88	98.11	2.28	99.73		
1.89	98.18	2.29	99.75		
1.90	98.25	2.30	99.77		
1.91	98.31	2.31	99.78		
1.92	98.37	2.32	99.80		
1.93	98.44	2.33	99.81		
1.94	98.50	2.34	99.83		
1.95	98.56	2.35	99.84		
1.96	98.61	2.36	99.85		
1.97	98.67	2.37	99.86		
1.98	98.72	2.38	99.87		
1.99	98.78	2.39	99.88		

*For Q_L values less than zero, subtract the table value from 100 to obtain PWL

(b) Minimum Thickness. The minimum thickness method shall be as follows.

(1) Length of Units. The length of a unit will be a continuous strip of pavement 500 ft (150 m) in length.

(2) Width of Units. The width of a unit will be the width from the pavement edge to the adjacent lane line, from one lane line to the next, or between pavement edges for single-lane pavements.

(3) Thickness Measurements. Pavement thickness will be based on 2 in. (50 mm) diameter cores.

Cores shall be taken from the pavement by the Contractor at locations selected by the Engineer. When determining the thickness of a unit, one core shall be taken in each unit.

The Contractor and the Engineer shall witness the coring operations, as well as the measuring and recording of the cores. Core measurements will be determined immediately upon removal from the core bit and prior to moving to the next core location. Upon concurrence of the length, the core samples may be disposed of according to Article 202.03.

Upon completion of each core, all water shall be removed from the hole and the hole then filled with a rapid hardening mortar or concrete. The material shall be mixed in a separate container, placed in the hole, consolidated by rodding, and struck-off flush with the adjacent pavement.

(4) Unit Deficient in Thickness. In considering any portion of the pavement that is deficient, the entire limits of the unit will be used in computing the deficiency or determining the remedial action required.

(5) Thickness Equals or Exceeds Specified Thickness. When the thickness of a unit equals or exceeds the specified plan thickness, payment will be made at the contract unit price per square yard (square meter) for the specified thickness.

(6) Thickness Deficient by Ten Percent or Less. When the thickness of a unit is less than the specified plan thickness by ten percent or less, a deficiency deduction will be assessed against payment for the item involved. The deficiency will be a percentage of the contract unit price as given in the following table.

Percent Deficiency (of Plan Thickness)	Percent Deduction (of Contract Unit Price)
0.0 to 2.0	0
2.1 to 3.0	20
3.1 to 4.0	28
4.1 to 5.0	32
5.1 to 7.5	43
7.6 to 10.0	50

(7) Thickness Deficient by More than Ten Percent. When a core shows the pavement to be deficient by more than ten percent of plan thickness, additional cores shall be taken on each side of the deficient core, at stations selected by the Contractor and offsets selected by the Engineer, to determine the limits of the deficient pavement.

No core shall be located within 5 ft (1.5 m) of a previous core obtained for thickness determination. The first acceptable core obtained on each side of a deficient core will be used to determine the length of the deficient pavement. An acceptable core is a core with a thickness of at least 90 percent of plan thickness. The area of deficient pavement will be defined using the length between two acceptable cores and the full width of the unit. The area of deficient pavement shall be removed and replaced; however, when requested in writing by the Contractor, the Engineer may permit in writing such areas of deficient pavement to remain in place. For deficient areas allowed to remain in place, additional lift(s) may be placed, at no additional cost to the Department, to bring the deficient pavement to plan thickness when the Engineer determines grade control conditions will permit such lift(s). The area(s) to be overlaid, material to be used, thickness(es) of the lift(s), and method of placement will be approved by the Engineer.

When an area of deficient pavement is removed and replaced, or additional lifts are placed, the corrected pavement shall be retested for thickness. The thickness of the new core will be used to determine the pay factor for the corrected area.

When an area of deficient pavement is left in place, and no additional lift(s) are placed, no payment will be made for the deficient pavement. In addition, an amount equal to two times the contract cost of the deficient pavement will be deducted from the compensation due the Contractor.

The thickness of the first acceptable core on each side of the core more than ten percent deficient will be used to determine any needed pay adjustments for the remaining areas on each side of the area deficient by more than ten percent. The pay adjustment will be determined according to Article 407.10(b)(6).

(8) Right of Discovery. When the Engineer has reason to believe any core location does not accurately represent the true conditions of the work, he/she may order additional cores. These additional cores shall be taken at specific locations determined by the Engineer. The Engineer will provide notice to the Contractor containing an explanation of the reasons for his/her action.

When the additional cores show the pavement to be deficient by more than ten percent of plan thickness, the procedures outlined in Article 407.10(b)(7) shall be followed, except the Engineer will determine the additional core locations.

When the additional cores, ordered by the Engineer, show the pavement to be at least 90 percent of plan thickness, the additional cores will be paid for according to Article 109.04.

(9) Profile Index Adjustment. After any area of pavement is removed and replaced or any additional lifts are added, the corrected areas shall be retested for pavement smoothness and any necessary profile index adjustments and/or corrections will be made based on these final profile readings prior to retesting for thickness."

Revise Article 482.06 of the Standard Specifications to read:

"**482.06 Tolerance in Thickness.** The shoulder shall be constructed to the thickness shown on the plans. When the contract includes square yards (square meters) as the unit of measurement for HMA shoulder, thickness determinations shall be made according to Article 407.10(b)(3) and the following.

(a) Length of the Units. The length of a unit shall be a continuous strip of shoulder 2500 ft (750 m) long.

(b) Width of the Units. The width of the unit shall be the full width of the shoulder.

(c) Thickness Deficient by More than Ten Percent. When a core shows the shoulder to be deficient by more than ten percent of plan thickness, additional cores shall be taken on each side of the deficient core, at stations selected by the Contractor and offsets selected by the Engineer, to determine the limits of the deficient shoulder. No core shall be located within 5 ft (1.5 m) of a previous core obtained for thickness determination. The first acceptable core obtained on each side of a deficient core will be used to determine the length of the deficient shoulder. An acceptable core is a core with a thickness of at least 90 percent of plan thickness. The area of deficient shoulder will be defined using the length between two acceptable cores and the full width of the unit. The area of deficient shoulder shall be brought to specified thickness by the addition of the applicable mixture, at no additional cost to the Department and subject to the lift thickness requirements of Article 312.05, or by removal and replacement with a new mixture. However, the surface elevation of the completed shoulder shall not exceed by more than 1/8 in. (3 mm) the surface elevation of the adjacent pavement. When requested in writing by the Contractor, the Engineer may permit in writing such thin shoulder to remain in place. When an area of thin shoulder is left in place, and no additional lift(s) are placed, no payment will be made for the thin shoulder. In addition, an amount equal to two times the contract unit price of the shoulder will be deducted from the compensation due the Contractor.

When an area of deficient shoulder is removed and replaced, or additional lifts are placed, the corrected pavement shall be retested for thickness.

(d) Right of Discovery. When the Engineer has reason to believe any core location does not accurately represent the true conditions of the work, he/she may order additional cores. When the additional cores, ordered by the Engineer, show the shoulder to be at least 90 percent of plan thickness, the additional cores will be paid for according to Article 109.04. When the additional core shows the shoulder to be less than 90 percent of plan thickness, the procedure in (c), above shall be followed."

Revise Article 483.07 of the Standard Specifications to read:

"**483.07 Tolerance in Thickness.** The shoulder shall be constructed to the thickness shown on the plans. Thickness determinations shall be made according to Article 482.06 except the option of correcting deficient pavement with additional lift(s) shall not apply."

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)
Effective: September 1, 2000 Revised: January 1, 2010

FEDERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory.

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract that the Contractor signs with a subcontractor:

The Contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined that the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. This determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates that, in the absence of unlawful discrimination, and in an arena of fair and open competition, DBE companies can be expected to perform **0.0%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work.

A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set forth in this Special Provision:

(a) The bidder documents that enough DBE participation has been obtained to meet the goal; or
(b) The bidder documents that a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders may consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217)785-4611, or by visiting the Department's web site at www.dot.il.gov.

BIDDING PROCEDURES. Compliance with this Special Provision is a material bidding requirement. The failure of the bidder to comply will render the bid not responsive.

(a) The bidder shall submit a Disadvantaged Business Utilization Plan on Department forms SBE 2025 and 2026 with the bid.

(b) The Utilization Plan shall indicate that the bidder either has obtained sufficient DBE participation commitments to meet the contract goal or has not obtained enough DBE participation commitments in spite of a good faith effort to meet the goal. The Utilization Plan shall further provide the name, telephone number, and telefax number of a responsible official of the bidder designated for purposes of notification of plan approval or disapproval under the procedures of this Special Provision.

(c) The Utilization Plan shall include a DBE Participation Commitment Statement, Department form SBE 2025, for each DBE proposed for the performance of work to achieve the contract goal. For bidding purposes, submission of the completed SBE 2025 forms, signed by the DBEs and faxed to the bidder will be acceptable as long as the original is available and provided upon request. All elements of information indicated on the said form shall be provided, including but not limited to the following:

(1) The names and addresses of DBE firms that will participate in the contract;

(2) A description, including pay item numbers, of the work each DBE will perform;

(3) The dollar amount of the participation of each DBE firm participating. The dollar amount of participation for identified work shall specifically state the quantity, unit price, and total subcontract price for the work to be completed by the DBE. If partial pay items are to be performed by the DBE, indicate the portion of each item, a unit price where appropriate and the subcontract price amount;

(4) DBE Participation Commitment Statements, form SBE 2025, signed by the bidder and each participating DBE firm documenting the commitment to use the DBE subcontractors whose participation is submitted to meet the contract goal;

(5) If the bidder is a joint venture comprised of DBE companies and non-DBE companies, the plan must also include a clear identification of the portion of the work to be performed by the DBE partner(s); and,

(6) If the contract goal is not met, evidence of good faith efforts.

GOOD FAITH EFFORT PROCEDURES. The contract will not be awarded until the Utilization Plan submitted by the apparent successful bidder is approved. All information submitted by the bidder must be complete, accurate and adequately document the good faith efforts of the bidder before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan commits sufficient commercially useful DBE work performance to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR part 26, Appendix A. The Utilization Plan will not be approved by the Department if the Utilization Plan does not commit sufficient DBE participation to meet the contract goal unless the apparent successful bidder documented in the Utilization Plan that it made a good faith effort to meet the goal. This means that the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts that the bidder has made. Mere *pro forma* efforts, in other words, efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

(a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases, and will be considered by the Department.

(1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.

(2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime Contractor might otherwise prefer to perform these work items with its own forces.

(3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(4) a. Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.

b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable.

(5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

(6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.

(7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.

(8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.

(b) If the Department determines that the apparent successful bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided that it is otherwise eligible for award. If the Department determines that the bidder has failed to meet the requirements of this Special Provision and that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification shall include a statement of reasons why good faith efforts have not been found.

(c) The bidder may request administrative reconsideration of a determination adverse to the bidder within the five working days after receipt of the notification date of the determination by delivering the request to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764 (Telefax: (217)785-1524).

Deposit of the request in the United States mail on or before the fifth business day shall not be deemed delivery. The determination shall become final if a request is not made and delivered. A request may provide additional written documentation and/or argument concerning the issue of whether an adequate good faith effort was made to meet the contract goal. The request will be forwarded to the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person in order to consider all issues of whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR part 26.55(c) on questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR part 26.55, the provisions of which govern over the summary contained herein.

(a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE does not count toward the DBE goals.

(b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.

(c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the prime Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE does not count toward the DBE goal.

(d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contact. Credit will be given for the following:

(1) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.

(2) The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement.

(e) DBE as a material supplier:

(1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.
(2) 100 percent goal credit for the cost of materials or supplies obtained from a DBE manufacturer.
(3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a regular dealer or manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal.

(a) No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be submitted to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764. Telephone number (217) 785-4611. Telefax number (217) 785-1524.

(b) The Contractor must notify and obtain written approval from the Department's Bureau of Small Business Enterprises prior to replacing a DBE or making any change in the participation of a DBE. Approval for replacement will be granted only if it is demonstrated that the DBE is unable or unwilling to perform. The Contractor must make every good faith effort to find another certified DBE subcontractor to substitute for the original DBE. The good faith efforts shall be directed at finding another DBE to perform at least the same amount of work under the contract as the original DBE, to the extent needed to meet the contract goal.

(c) Any deviation from the DBE condition-of-award or contract specifications must be approved, in writing, by the Department. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract.

(d) In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals.

Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:

(1) That the replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or

(2) That the DBE is aware that its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or

(3) That the DBE is not capable of performing the replacement work or has declined to perform the work at a reasonably competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.

(e) Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A, must be signed and submitted.

(f) If the commitment of work is in the form of additional tasks assigned to an existing subcontract, than a new Request for Approval of Subcontractor shall not be required. However, the Contractor must document efforts to assure that the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.

(g) All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the Participation Statement. The Contractor shall not terminate for convenience a DBE listed in the Utilization Plan and then perform the work of the terminated DBE with its own forces, those of an affiliate or those of another subcontractor, whether DBE or not, without first obtaining the written consent of the Bureau of Small Business Enterprises to amend the Utilization Plan. The Contractor shall notify the Bureau of Small Business Enterprises of any termination for reasons other than convenience, and shall obtain approval for inclusion of the substitute DBE in the Utilization Plan. If good faith efforts following a termination of a DBE for cause are not successful, the Contractor shall contact the Bureau of Small Business Enterprises and provide a full accounting of the efforts undertaken to obtain substitute DBE participation. The Bureau of Small Business Enterprises will evaluate the good faith efforts in light of all circumstances surrounding the performance status of the contract, and determine whether the contract goal should be amended.

(h) The Contractor shall maintain a record of payments for work performed to the DBE participants. The records shall be made available to the Department for inspection upon request. After the performance of the final item of work or delivery of material by a DBE and final payment therefore to the DBE by the Contractor, but not later than thirty calendar days after payment has been made by the Department to the Contractor for such work or material, the Contractor shall submit a DBE Payment Agreement on Department form SBE 2115 to the Regional Engineer.

If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes that the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (j) of this part.

(i) The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.

(j) Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of "Good Faith Effort Procedures" of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department.

DOWEL BARS (BDE)
Effective: April 1, 2007 Revised: January 1, 2008

Revise the fifth and sixth sentences of Article 1006.11(b) of the Standard Specifications to read:

"The bars shall be epoxy coated according to AASHTO M 284, except the thickness of the epoxy shall be 7 to 12 mils (0.18 to 0.30 mm) and patching of the ends will not be required. The epoxy coating applicator shall be certified according to the current Bureau of Materials and Physical Research Policy Memorandum, "Epoxy Coating Plant Certification Procedure". The Department will maintain an approved list."

ENGINEER'S FIELD OFFICE TYPE A (BDE)
Effective: April 1, 2007 Revised: August 1, 2008

Revise Article 670.02 of the Standard Specifications to read:

"**670.02 Engineer's Field Office Type A.** Type A field offices shall have a minimum ceiling height of 7 ft (2 m) and a minimum floor space 450 sq ft (42 sq m). The office shall be provided with sufficient heat, natural and artificial light, and air conditioning.

The office shall have an electronic security system that will respond to any breach of exterior doors and windows. Doors and windows shall be equipped with locks. Doors shall also be equipped with dead bolt locks or other secondary locking device.

Windows shall be equipped with exterior screens to allow adequate ventilation. All windows shall be equipped with interior shades, curtains, or blinds. Adequate all-weather parking space shall be available to accommodate a minimum of ten vehicles.

Suitable on-site sanitary facilities meeting Federal, State, and local health department requirements shall be provided, maintained clean and in good working condition, and shall be stocked with lavatory and sanitary supplies at all times.

Sanitary facilities shall include hot and cold potable running water, lavatory and toilet as an integral part of the office where available. Solid waste disposal consisting of two waste baskets and an outside trash container of sufficient size to accommodate a weekly provided pick-up service.

In addition, the following furniture and equipment shall be furnished.

(a) Four desks with minimum working surface 42 x 30 in. (1.1 m x 750 mm) each and five non-folding chairs with upholstered seats and backs.

(b) One desk with minimum working surface 48 x 72 in. (1.2 x 1.8 m) with height adjustment of 23 to 30 in. (585 to 750 mm).

(c) One four-post drafting table with minimum top size of 37 1/2 x 48 in. (950 mm x 1.2 m). The top shall be basswood or equivalent and capable of being tilted through an angle of 50 degrees. An adjustable height drafting stool with upholstered seat and back shall also be provided.

(d) Two free standing four drawer legal size file cabinet with lock and an underwriters' laboratories insulated file device 350 degrees one hour rating.

(e) One 6 ft (1.8 m) folding table with six folding chairs.

(f) One equipment cabinet of minimum inside dimension of 44 in. (1100 mm) high x 24 in. (600 mm) wide x 30 in. (750 mm) deep with lock. The walls shall be of steel with a 3/32 in. (2 mm) minimum thickness with concealed hinges and enclosed lock constructed in such a manner as to prevent entry by force. The cabinet assembly shall be permanently attached to a structural element of the field office in a manner to prevent theft of the entire cabinet.

(g) One refrigerator with a minimum size of 16 cu ft (0.45 cu m) with a freezer unit.

(h) One electric desk type tape printing calculator.

(i) A minimum of two communication paths. The configuration shall include:

    (1) Internet Connection. An internet service connection using telephone DSL, cable broadband, or CDMA wireless technology. Additionally, an 802.11g/N wireless router shall be provided, which will allow connection by the Engineer and up to four Department staff.
    (2) Telephone Lines. Three separate telephone lines.

(j) One plain paper copy machine capable of reproducing prints up to 11 x 17 in. (280 x 432 mm) with an automatic feed tray capable of storing 30 sheets of paper. Letter size and 11 x 17 in. (280 x 432 mm) paper shall be provided.

(k) One plain paper fax machine with paper.

(l) Two telephones, with touch tone, where available, and a digital telephone answering machine, for exclusive use by the Engineer.

(m) One electric water cooler dispenser.

(n) One first-aid cabinet fully equipped.

(o) One microwave oven, 1 cu ft (0.03 cu m) minimum capacity.

(p) One fire-proof safe, 0.5 cu ft (0.01 cu m) minimum capacity.

(q) One electric paper shredder.

(r) One post mounted rain gauge, located on the project site for each 5 miles (8 km) of project length."

Revise the first sentence of the first paragraph of Article 670.07 of the Standard Specifications to read:

"The building or buildings fully equipped as specified will be paid for on a monthly basis until the building or buildings are released by the Engineer."

Revise the last sentence of the first paragraph of Article 670.07 of the Standard Specifications to read:

"This price shall include all utility costs and shall reflect the salvage value of the building or buildings, equipment, and furniture which become the property of the Contractor after release by the Engineer, except that the Department will pay that portion of the monthly long distance telephone bills that, when combined, exceed $150."

EQUIPMENT RENTAL RATES (BDE)
Effective: August 2, 2007 Revised: January 2, 2008

Replace the second and third paragraphs of Article 105.07(b)(4)a. of the Standard Specifications with the following:

"Equipment idled which cannot be used on other work, and which is authorized to standby on the project site by the Engineer, will be paid for according to Article 109.04(b)(4)."

Replace Article 109.04(b)(4) of the Standard Specifications with the following:

"(4) Equipment. Equipment used for extra work shall be authorized by the Engineer. The equipment shall be specifically described, be of suitable size and capacity for the work to be performed, and be in good operating condition. For such equipment, the Contractor will be paid as follows.

a. Contractor Owned Equipment. Contractor owned equipment will be paid for by the hour using the applicable FHWA hourly rate from the "Equipment Watch Rental Rate Blue Book" (Blue Book) in effect when the force account work begins. The FHWA hourly rate is calculated as follows.

FHWA hourly rate = (monthly rate/176) x (model year adj.) x (Illinois adj.) + EOC

Where: EOC = Estimated Operating Costs per hour (from the Blue Book)

The time allowed will be the actual time the equipment is operating on the extra work. For the time required to move the equipment to and from the site of the extra work and any authorized idle (standby) time, payment will be made at the following hourly rate: 0.5 x (FHWA hourly rate - EOC).

All time allowed shall fall within the working hours authorized for the extra work.

The rates above include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs, overhaul and maintenance of any kind, depreciation, storage, overhead, profits, insurance, and all incidentals. The rates do not include labor.

The Contractor shall submit to the Engineer sufficient information for each piece of equipment and its attachments to enable the Engineer to determine the proper equipment category. If a rate is not established in the Blue Book for a particular piece of equipment, the Engineer will establish a rate for that piece of equipment that is consistent with its cost and use in the industry.

b. Rented Equipment. Whenever it is necessary for the Contractor to rent equipment to perform extra work, the rental and transportation costs of the equipment plus five percent for overhead will be paid. In no case shall the rental rates exceed those of established distributors or equipment rental agencies.

All prices shall be agreed to in writing before the equipment is used."

HOT-MIX ASPHALT – ANTI-STRIPPING ADDITIVE (BDE)
Effective: November 1, 2009

Revise the first and second paragraphs of Article 1030.04(c) of the Standard Specifications to read:

"(c) Determination of Need for Anti-Stripping Additive. The mixture designer shall determine if an additive is needed in the mix to prevent stripping. The determination will be made on the basis of tests performed according to Illinois Modified AASHTO T 283.

To be considered acceptable by the Department as a mixture not susceptible to stripping, the conditioned to unconditioned split tensile strength ratio (TSR) shall be equal to or greater than 0.85 for 6 in. (150 mm) specimens. Mixtures, either with or without an additive, with TSRs less than 0.85 for 6 in. (150 mm) specimens will be considered unacceptable. Also, the conditioned tensile strength for mixtures containing an anti-strip additive shall not be lower than the original conditioned tensile strength determined for the same mixture without the anti-strip additive.

If it is determined that an additive is required, the additive may be hydrated lime, slaked quicklime, or a liquid additive, at the Contractor's option."

HOT-MIX ASPHALT - DENSITY TESTING OF LONGITUDINAL JOINTS (BDE)
Effective: January 1, 2010

Description. This work shall consist of testing the density of longitudinal joints as part of the quality control/quality assurance (QC/QA) of hot-mix asphalt (HMA). Work shall be according to Section 1030 of the Standard Specifications except as follows.

Quality Control/Quality Assurance (QC/QA). Delete the second and third sentence of the third paragraph of Article 1030.05(d)(3) of the Standard Specifications.

Add the following paragraphs to the end of Article 1030.05(d)(3) of the Standard Specifications:

"Longitudinal joint density testing shall be performed at each random density test location. Longitudinal joint testing shall be located at a distance equal to the lift thickness or a minimum of 2 in. (50 mm), from each pavement edge. (i.e. for a 4 in. (100 mm) lift the near edge of the density gauge or core barrel shall be within 4 in. (100 mm) from the edge of pavement.) Longitudinal joint density testing shall be performed using either a correlated nuclear gauge or cores.

a. Confined Edge. Each confined edge density shall be represented by a one-minute nuclear density reading or a core density and shall be included in the average of density readings or core densities taken across the mat which represents the Individual Test.

b. Unconfined Edge. Each unconfined edge joint density shall be represented by an average of three one-minute density readings or a single core density at the given density test location and shall meet the density requirements specified herein. The three one-minute readings shall be spaced ten feet apart longitudinally along the unconfined pavement edge and centered at the random density test location."

Revise the Density Control Limits table in Article 1030.05(d)(4) of the Standard Specifications to read:

"Mixture Composition	Parameter	Individual Test (includes confined edges)	Unconfined Edge Joint Density Minimum
IL-9.5, IL-12.5	Ndesign ≥ 90	92.0 – 96.0%	90.0%
IL-9.5,IL-9.5L, IL-12.5	Ndesign < 90	92.5 – 97.4%	90.0%
IL-19.0, IL-25.0	Ndesign ≥ 90	93.0 – 96.0%	90.0%
IL-19.0, IL-19.0L, IL-25.0	Ndesign < 90	93.0 – 97.4%	90.0%
SMA	Ndesign = 50 & 80	93.5 – 97.4%	91.0%
All Other	Ndesign = 30	93.0 - 97.4%	90.0%"

HOT-MIX ASPHALT – DROP-OFFS (BDE)
Effective: January 1, 2010

Revise the third paragraph of Article 701.07 of the Standard Specifications to read:

"At locations where construction operations result in a differential in elevation exceeding 3 in. (75 mm) between the edge of pavement or edge of shoulder within 3 ft (900 mm) of the edge of the pavement and the earth or aggregate shoulders, Type I or II barricades or vertical panels shall be placed at 100 ft (30 m) centers on roadways where the posted speed limit is 45 mph or greater and at 50 ft (15 m) centers on roadways where the posted speed limit is less than 45 mph."

HOT-MIX ASPHALT – PLANT TEST FREQUENCY (BDE)
Effective: April 1, 2008 Revised: January 1, 2010

Revise the table in Article 1030.05(d)(2)a. of the Standard Specifications to read:

"Parameter	Frequency of Tests High ESAL Mixture Low ESAL Mixture	Frequency of Tests All Other Mixtures	Test Method See Manual of Test Procedures for Materials
Aggregate Gradation % passing sieves: 1/2 in. (12.5 mm), No. 4 (4.75 mm), No. 8 (2.36 mm), No. 30 (600 μm) No. 200 (75 μm) Note 1.	1 washed ignition oven test on the mix per half day of production Note 4.	1 washed ignition oven test on the mix per day of production Note 4.	Illinois Procedure

Asphalt Binder Content by Ignition Oven Note 2.	1 per half day of production	1 per day	Illinois-Modified AASHTO T 308
VMA Note 3.	Day's production ≥ 1200 tons: 1 per half day of production	N/A	Illinois Modified AASHTO R 35
	Day's production < 1200 tons: 1 per half day of production for first 2 days and 1 per day thereafter (first sample of the day)		
Air Voids Bulk Specific Gravity of Gyratory Sample	Day's production ≥ 1200 tons: 1 per half day of production	1 per day	Illinois-Modified AASHTO T 312
	Day's production < 1200 tons: 1 per half day of production for first 2 days and 1 per day thereafter (first sample of the day)		
Maximum Specific Gravity of Mixture	Day's production ≥ 1200 tons: 1 per half day of production	1 per day	Illinois-Modified AASHTO T 209
	Day's production < 1200 tons: 1 per half day of production for first 2 days and 1 per day thereafter (first sample of the day)		

Note 1. The No. 8 (2.36 mm) and No. 30 (600 μm) sieves are not required for All Other Mixtures.

Note 2. The Engineer may waive the ignition oven requirement for asphalt binder content if the aggregates to be used are known to have ignition asphalt binder content calibration factors which exceed 1.5 percent. If the ignition oven requirement is waived, other Department approved methods shall be used to determine the asphalt binder content.

Note 3. The G_{sb} used in the voids in the mineral aggregate (VMA) calculation shall be the same average G_{sb} value listed in the mix design.

Note 4. The Engineer reserves the right to require additional hot bin gradations for batch plants if control problems are evident."

HOT-MIX ASPHALT – QC/QA ACCEPTANCE CRITERIA (BDE)
Effective: January 1, 2010

Revise Article 1030.05(f)(3) of the Standard Specifications to read:

"(3) Department assurance tests for voids, field VMA, and density."

HOT-MIX ASPHALT – TRANSPORTATION (BDE)
Effective: April 1, 2008

Revise Article 1030.08 of the Standard Specifications to read:

"**1030.08 Transportation.** Vehicles used in transporting HMA shall have clean and tight beds. The beds shall be sprayed with asphalt release agents from the Department's approved list. In lieu of a release agent, the Contractor may use a light spray of water with a light scatter of manufactured sand (FA 20 or FA 21) evenly distributed over the bed of the vehicle. After spraying, the bed of the vehicle shall be in a completely raised position and it shall remain in this position until all excess asphalt release agent or water has been drained.

When the air temperature is below 60 ºF (15 ºC), the bed, including the end, endgate, sides and bottom shall be insulated with fiberboard, plywood or other approved insulating material and shall have a thickness of not less than 3/4 in (20 mm). When the insulation is placed inside the bed, the insulation shall be covered with sheet steel approved by the Engineer. Each vehicle shall be equipped with a cover of canvas or other suitable material meeting the approval of the Engineer which shall be used if any one of the following conditions is present.

(a) Ambient air temperature is below 60 ºF (15 ºC).
(b) The weather is inclement.
(c) The temperature of the HMA immediately behind the paver screed is below 250 ºF (120 ºC).

The cover shall extend down over the sides and ends of the bed for a distance of approximately 12 in. (300 mm) and shall be fastened securely. The covering shall be rolled back before the load is dumped into the finishing machine."

LIQUIDATED DAMAGES (BDE)
Effective: April 1, 2009

Revise the table in Article 108.09 of the Standard Specifications to read:

"Schedule of Deductions for Each Day of Overrun in Contract Time			
Original Contract Amount		Daily Charges	
From More Than	To and Including	Calendar Day	Work Day
$ 0	$ 100,000	$ 375	$ 500
100,000	500,000	625	875
500,000	1,000,000	1,025	1,425
1,000,000	3,000,000	1,125	1,550
3,000,000	5,000,000	1,425	1,950
5,000,000	10,000,000	1,700	2,350
10,000,000	And over	3,325	4,650"

METAL HARDWARE CAST INTO CONCRETE (BDE)
Effective: April 1, 2008 Revised: April 1, 2009

Add the following to Article 503.02 of the Standard Specifications:

"(g) Metal Hardware Cast into Concrete ..... 1006.13"

Add the following to Article 504.02 of the Standard Specifications:

"(j) Metal Hardware Cast into Concrete ..... 1006.13"

Revise Article 1006.13 of the Standard Specifications to read:

"**1006.13 Metal Hardware Cast into Concrete.** Unless otherwise noted, all steel hardware cast into concrete, such as inserts, brackets, cable clamps, metal casings for formed holes, and other miscellaneous items, shall be galvanized according to AASHTO M 232 or AASHTO M 111. Aluminum inserts will not be allowed. Zinc alloy inserts shall be according to ASTM B 86, Alloys 3, 5, or 7.

The inserts shall be UNC threaded type anchorages having the following minimum certified proof load.

Insert Diameter	Proof Load
5/8 in. (16 mm)	6600 lb (29.4 kN)
3/4 in. (19 mm)	6600 lb (29.4 kN)
1 in. (25 mm)	9240 lb (41.1 kN)"

MONTHLY EMPLOYMENT REPORT (BDE)
Effective: April 1, 2009 Revised: January 1, 2010

In addition to any other reporting required by the contract, the Contractor shall provide to the Engineer an employment summary for all employees working on the contract from the contract execution date to the last full pay period each month for the duration of the contract. The report may include but is not limited to:

a) Total number of employees.
b) The total hours worked.
c) Total payroll.

The report shall be completed by the Contractor. The Contractor shall also report for each subcontractor. Employee hours worked from home office or other off-site office hours worked related directly to this contract shall be included. Engineering consulting firms performing construction layout and material testing for the Contractor shall also be included.

Hours worked for material suppliers, services provided by purchase orders, Department employees or consulting firms performing inspection or testing for the Department shall not be included in the report.

The report shall contain all hours worked under the contract from the start of the month to the last full pay period each month and shall be submitted no later than five business days after the end of each month.

The report shall be submitted electronically by accessing the Department's website (http://www.dot.il.gov/stimulus/index.html).

Any costs associated with complying with this provision shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM / EROSION AND SEDIMENT CONTROL DEFICIENCY DEDUCTION (BDE)
Effective: April 1, 2007 Revised: November 1, 2009

Revise Article 105.03(a) of the Standard Specifications to read:

"(a) National Pollutant Discharge Elimination System (NPDES) / Erosion and Sediment Control Deficiency Deduction When the Engineer is notified or determines an erosion and/or sediment control deficiency(s) exists, or the Contractor's activities represents a violation of the Department's NPDES permits, the Engineer will notify and direct the Contractor to correct the deficiency within a specified time. The specified time, which begins upon notification to the Contractor, will be from 1/2 hour to 1 week based on the urgency of the situation and the nature of the work effort required. The Engineer will be the sole judge.

A deficiency may be any lack of repair, maintenance, or implementation of erosion and/or sediment control devices included in the contract, or any failure to comply with the conditions of the Department's NPDES permits. A deficiency may also be applied to situations where corrective action is not an option such as the failure to participate in a jobsite inspection of the project, failure to install required measures prior to initiating earth moving operations, disregard of concrete washout requirements, or other disregard of the NPDES permit.

If the Contractor fails to correct a deficiency within the specified time, a daily monetary deduction will be imposed for each calendar day or portion of a calendar day until the deficiency is corrected to the satisfaction of the Engineer. The calendar day(s) will begin with notification to the Contractor and end with the Engineer's acceptance of the correction. The base value of the daily monetary deduction is $1000.00 and will be applied to each location for which a deficiency exists. The value of the deficiency deduction assessed for each infraction will be determined by multiplying the base value by a Gravity Adjustment Factor provided in Table A. Except for failure to participate in a required jobsite inspection of the project prior to initiating earthmoving operations which will be based on the total acreage of planned disturbance at the following multipliers: <5 Acres: 1; 5-10 Acres: 2; >10-25 Acres: 3; >25 Acres: 5. For those deficiencies where corrective action was not an option, the monetary deduction will be immediate and will be valued at one calendar day multiplied by a Gravity Adjustment Factor.

Table A Deficiency Deduction Gravity Adjustment Factors				
Types of Violations	Soil Disturbed and Not Permanently Stabilized At Time of Violation			
	< 5 Acres	5 - 10 Acres	>10 - 25 Acres	> 25 Acres
Failure to Install or Properly Maintain BMP	0.1 - 0.5	0.2 - 1.0	0.5 - 2.5	1.0 - 5
Careless Destruction of BMP	0.2 - 1	0.5 - 2.5	1.0 - 5.	1.0 - 5
Intrusion into Protected Resource	1.0 - 5	1.0 - 5	2.0 - 10	2.0 - 10
Failure to properly manage Chemicals, Concrete Washouts or Residuals, Litter or other Wastes	0.2 - 1	0.2 - 1	0.5 - 2.5	1.0 - 5
Improper Vehicle and Equipment Maintenance, Fueling or Cleaning	0.1 - 0.5	0.2 - 1	0.2 - 1	0.5 - 2.5
Failure to Provide or Update Written or Graphic Plans Required by SWPPP	0.2 - 1	0.5 - 2.5	1.0 - 5	1.0 - 5
Failure to comply with Other Provisions of the NPDES Permit	0.1 - 0.5	0.2 - 1	0.2 - 1	0.5 - 2.5”

PAVEMENT PATCHING (BDE)
Effective: January 1, 2010

Revise the first sentence of the second paragraph of Article 701.17(e)(1) of the Standard Specifications to read:

“In addition to the traffic control and protection shown elsewhere in the contract for pavement, two devices shall be placed immediately in front of each open patch, open hole, and broken pavement where temporary concrete barriers are not used to separate traffic from the work area.”

PAYMENTS TO SUBCONTRACTORS (BDE)
Effective: June 1, 2000 Revised: January 1, 2006

Federal regulations found at 49 CFR §26.29 mandate the Department to establish a contract clause to require Contractors to pay subcontractors for satisfactory performance of their subcontracts and to set the time for such payments.

State law also addresses the timing of payments to be made to subcontractors and material suppliers. Section 7 of the Prompt Payment Act, 30 ILCS 540/7, requires that when a Contractor receives any payment from the Department, the Contractor shall make corresponding, proportional payments to each subcontractor and material supplier performing work or supplying material within 15 calendar days after receipt of the Department payment. Section 7 of the Act further provides that interest in the amount of two percent per month, in addition to the payment due, shall be paid to any subcontractor or material supplier by the Contractor if the payment required by the Act is withheld or delayed without reasonable cause.

The Act also provides that the time for payment required and the calculation of any interest due applies to transactions between subcontractors and lower-tier subcontractors and material suppliers throughout the contracting chain.

This Special Provision establishes the required federal contract clause, and adopts the 15 calendar day requirement of the State Prompt Payment Act for purposes of compliance with the federal regulation regarding payments to subcontractors. This contract is subject to the following payment obligations.

When progress payments are made to the Contractor according to Article 109.07 of the Standard Specifications, the Contractor shall make a corresponding payment to each subcontractor and material supplier in proportion to the work satisfactorily completed by each subcontractor and for the material supplied to perform any work of the contract. The proportionate amount of partial payment due to each subcontractor and material supplier throughout the contracting chain shall be determined by the quantities measured or otherwise determined as eligible for payment by the Department and included in the progress payment to the Contractor. Subcontractors and material suppliers shall be paid by the Contractor within 15 calendar days after the receipt of payment from the Department. The Contractor shall not hold retainage from the subcontractors. These obligations shall also apply to any payments made by subcontractors and material suppliers to their subcontractors and material suppliers; and to all payments made to lower tier subcontractors and material suppliers throughout the contracting chain. Any payment or portion of a payment subject to this provision may only be withheld from the subcontractor or material supplier to whom it is due for reasonable cause.

This Special Provision does not create any rights in favor of any subcontractor or material supplier against the State or authorize any cause of action against the State on account of any payment, nonpayment, delayed payment, or interest claimed by application of the State Prompt Payment Act. The Department will not approve any delay or postponement of the 15 day requirement except for reasonable cause shown after notice and hearing pursuant to Section 7(b) of the State Prompt Payment Act. State law creates other and additional remedies available to any subcontractor or material supplier, regardless of tier, who has not been paid for work properly performed or material furnished. These remedies are a lien against public funds set forth in Section 23(c) of the Mechanics Lien Act, 770 ILCS 60/23(c), and a recovery on the Contractor's payment bond according to the Public Construction Bond Act, 30 ILCS 550.

PERSONAL PROTECTIVE EQUIPMENT (BDE)
Effective: November 1, 2008

Revise the first sentence of Article 701.12 of the Standard Specifications to read:

"All personnel on foot, excluding flaggers, within the highway right-of-way shall wear a fluorescent orange, fluorescent yellow/green, or a combination of fluorescent orange and fluorescent yellow/green vest meeting the requirements of ANSI/ISEA 107-2004 for Conspicuity Class 2 garments."

PORTLAND CEMENT CONCRETE PLANTS (BDE)
Effective: January 1, 2007

Add the following to Article 1020.11(a) of the Standard Specifications.

"(9) Use of Multiple Plants in the Same Construction Item. The Contractor may simultaneously use central-mixed, truck-mixed, and shrink-mixed concrete from more than one plant, for the same construction item, on the same day, and in the same pour. However, the following criteria shall be met.

a. Each plant shall use the same cement, finely divided minerals, aggregates, admixtures, and fibers.

b. Each plant shall use the same mix design. However, material proportions may be altered slightly in the field to meet slump and air content criteria. Field water adjustments shall not result in a difference that exceeds 0.02 between plants for water/cement ratio. The required cement factor for central-mixed concrete shall be increased to match truck-mixed or shrink-mixed concrete, if the latter two types of mixed concrete are used in the same pour.

c. The maximum slump difference between deliveries of concrete shall be 3/4 in. (19 mm) when tested at the jobsite. If the difference is exceeded, but test results are within specification limits, the concrete may be used. The Contractor shall take immediate corrective action and shall test subsequent deliveries of concrete until the slump difference is corrected. For each day, the first three truck loads of delivered concrete from each plant shall be tested for slump by the Contractor. Thereafter, when a specified test frequency for slump is to be performed, it shall be conducted for each plant at the same time.

d. The maximum air content difference between deliveries of concrete shall be 1.5 percent when tested at the jobsite. If the difference is exceeded, but test results are within specification limits, the concrete may be used. The Contractor shall take immediate corrective action and shall test subsequent deliveries of concrete until the air content difference is corrected. For each day, the first three truck loads of delivered concrete from each plant shall be tested for air content by the Contractor. Thereafter, when a specified test frequency for air content is to be performed, it shall be conducted for each plant at the same time.

e. Strength tests shall be performed and taken at the jobsite for each plant. When a specified strength test is to be performed, it shall be conducted for each plant at the same time. The difference between plants for their mean strength shall not exceed 450 psi (3100 kPa) compressive and 80 psi (550 kPa) flexural. The strength standard deviation for each plant shall not exceed 650 psi (4480 kPa) compressive and 110 psi (760 kPa) flexural. The mean and standard deviation requirements shall apply to the test of record. If the strength difference requirements are exceeded, the Contractor shall take corrective action.

f. The maximum haul time difference between deliveries of concrete shall be 15 minutes. If the difference is exceeded, but haul time is within specification limits, the concrete may be used. The Contractor shall take immediate corrective action and check subsequent deliveries of concrete until the haul time difference is corrected."

PRECAST CONCRETE HANDLING HOLES (BDE)
Effective: January 1, 2007

Add the following to Article 540.02 of the Standard Specifications:

"(g) Handling Hole Plugs 1042.16"

Add the following paragraph after the sixth paragraph of Article 540.06 of the Standard Specifications:

"Handling holes shall be filled with a precast concrete plug and sealed with mastic or mortar, or filled with a polyethylene plug. The plug shall not project beyond the inside surface after installation. When metal lifting inserts are used, their sockets shall be filled with mastic or mortar."

Add the following to Article 542.02 of the Standard Specifications:

"(ee) Handling Hole Plugs 1042.16"

Revise the fifth paragraph of Article 542.04(d) of the Standard Specifications to read:

"Handling holes in concrete pipe shall be filled with a precast concrete plug and sealed with mastic or mortar; or filled with a polyethylene plug. The plug shall not project beyond the inside surface after installation."

Add the following to Article 550.02 of the Standard Specifications:

"(o) Handling Hole Plugs 1042.16"

Replace the fourth sentence of the fifth paragraph of Article 550.06 of the Standard Specifications with the following:

"Handling holes in concrete pipe shall be filled with a precast concrete plug and sealed with mastic or mortar; or filled with a polyethylene plug. The plug shall not project beyond the inside surface after installation."

Add the following to Article 602.02 of the Standard Specifications:

"(p) Handling Hole Plugs 1042.16(a)"

Replace the fifth sentence of the first paragraph of Article 602.07 of the Standard Specifications with the following:

"Handling holes shall be filled with a precast concrete plug and sealed with mastic or mortar. The plug shall not project beyond the inside surface after installation. When metal lifting inserts are used, their sockets shall be filled with mastic or mortar."

Add the following to Section 1042 of the Standard Specifications:

"**1042.16 Handling Hole Plugs.** Plugs for handling holes in precast concrete products shall be as follows.

(a) Precast Concrete Plug. The precast concrete plug shall have a tapered shape and shall have a minimum compressive strength of 3000 psi (20,700 kPa) at 28 days.

(b) Polyethylene Plug. The polyethylene plug shall have a "mushroom" shape with a flat round top and a stem with three different size ribs. The plug shall fit snuggly and cover the handling hole.

The plug shall be according to the following.

Mechanical Properties	Test Method	Value (min.)
Flexural Modulus	ASTM D 790	3300 psi (22,750 kPa)
Tensile Strength (Break)	ASTM D 638	1600 psi (11,030 kPa)
Tensile Strength (Yield)	ASTM D 638	1200 psi (8270 kPa)

Thermal Properties	Test Method	Value (min.)
Brittle Temperature	ASTM D 746	-49 ºF (-45 ºC)
Vicat Softening Point	ASTM D 1525	194 ºF (90 ºC)"

REFLECTIVE SHEETING ON CHANNELIZING DEVICES (BDE)
Effective: April 1, 2007 Revised: November 1, 2008

Revise the seventh paragraph of Article 1106.02 of the Standard Specifications to read:

"At the time of manufacturing, the retroreflective prismatic sheeting used on channelizing devices shall meet or exceed the initial minimum coefficient of retroreflection as specified in the following table. Measurements shall be conducted according to ASTM E 810, without averaging. Sheeting used on cones, drums and flexible delineators shall be reboundable as tested according to ASTM D 4956. Prestriped sheeting for rigid substrates on barricades shall be white and orange. The sheeting shall be uniform in color and devoid of streaks throughout the length of each roll. The color shall conform to the latest appropriate standard color tolerance chart issued by the U.S. Department of Transportation, Federal Highway Administration, and to the daytime and nighttime color requirements of ASTM D 4956.

Initial Minimum Coefficient of Retroreflection candelas/foot candle/sq ft (candelas/lux/sq m) of material				
Observation Angle (deg.)	Entrance Angle (deg.)	White	Orange	Fluorescent Orange
0.2	-4	365	160	150
0.2	+30	175	80	70
0.5	-4	245	100	95
0.5	+30	100	50	40"

Revise the first sentence of the first paragraph of Article 1106.02(c) of the Standard Specifications to read:

"Barricades and vertical panels shall have alternating white and orange stripes sloping downward at 45 degrees toward the side on which traffic will pass."

Revise the third sentence of the first paragraph of Article 1106.02(d) of the Standard Specifications to read:

"The bottom panels shall be 8 x 24 in. (200 x 600 mm) with alternating white and orange stripes sloping downward at 45 degrees toward the side on which traffic will pass."

REINFORCEMENT BARS - STORAGE AND PROTECTION (BDE)
Effective: August 1, 2008 Revised: April 1, 2009

Revise Article 508.03 of the Standard Specifications to read:

"**508.03 Storage and Protection.** Reinforcement bars shall be stored off the ground using platforms, skids, or other supports; and shall be protected from mechanical injury and from deterioration by exposure. Epoxy coated bars shall be stored on wooden or padded steel cribbing and all systems for handling shall have padded contact areas. The bars or bundles shall not be dragged or dropped.

When epoxy coated bars are stored in a manner where they will be exposed to the weather more than 60 days prior to use, they shall be protected from deterioration such as that caused by sunlight, salt spray, and weather exposure. The protection shall consist of covering with opaque polyethylene sheeting or other suitable opaque material. The covering shall be secured and allow for air circulation around the bars to minimize condensation under the cover.

Covering of the epoxy coated bars will not be required when the bars are installed and tied, or when they are partially incorporated into the concrete."

SELF-CONSOLIDATING CONCRETE FOR PRECAST PRODUCTS (BDE)
Effective: July 1, 2004 Revised: January 1, 2007

Definition. Self-consolidating concrete is a flowable mixture that does not require mechanical vibration for consolidation.

Usage. Self-consolidating concrete may be used for precast concrete products.

Materials. Materials shall be according to Section 1021 of the Standard Specifications.

Mix Design Criteria. The mix design criteria shall be as follows:

(a) The minimum cement factor shall be according to Article 1020.04 of the Standard Specifications. If the maximum cement factor is not specified, it shall not exceed 7.05 cwt/cu yd (418 kg/cu m).

(b) The maximum allowable water/cement ratio shall be according to Article 1020.04 of the Standard Specifications or 0.44, whichever is lower.

(c) The slump requirements of Article 1020.04 of the Standard Specifications shall not apply.

(d) The coarse aggregate gradations shall be CA 13, CA 14, CA 16, or a blend of these gradations. CA 11 may be used when the Contractor provides satisfactory evidence to the Engineer that the mix will not segregate. The fine aggregate proportion shall be a maximum 50 percent by weight (mass) of the total aggregate used.

(e) The slump flow range shall be ± 2 in. (± 50 mm) of the Contractor target value, and within the overall Department range of 20 in. (510 mm) minimum to 28 in. (710 mm) maximum.

(f) The visual stability index shall be a maximum of 1.

(g) The J-ring value shall be a maximum of 4 in. (100 mm). The Contractor may specify a lower maximum in the mix design.

(h) The L-box blocking ratio shall be a minimum of 60 percent. The Contractor may specify a higher minimum in the mix design.

(i) The column segregation index shall be a maximum 15 percent.

(j) The hardened visual stability index shall be a maximum of 1.

Placing and Consolidating. The maximum distance of horizontal flow from the point of deposit shall be 25 ft (7.6 m), unless approved otherwise by the Engineer.

Concrete shall be rodded with a piece of lumber, conduit, or vibrator if the material has lost its fluidity prior to placement of additional concrete. The vibrator shall be the pencil head type with a maximum diameter or width of 1 in. (25 mm). Any other method for restoring the fluidity of the concrete shall be approved by the Engineer.

Mix Design Approval. The Contractor shall obtain mix design approval according to the Department's Policy Memorandum "Quality Control/Quality Assurance Program for Precast Concrete Products".

SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)
Effective: April 2, 2005

To account for the preparatory work and operations necessary for the movement of subcontractor personnel, equipment, supplies, and incidentals to the project site and for all other work or operations that must be performed or costs incurred when beginning work approved for subcontracting in accordance with Article 108.01 of the Standard Specifications, the Contractor shall make a mobilization payment to each subcontractor.

This mobilization payment shall be made at least 14 days prior to the subcontractor starting work. The amount paid shall be equal to 3 percent of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor's work.

This provision shall be incorporated directly or by reference into each subcontract approved by the Department.

STEEL COST ADJUSTMENT (BDE) (RETURN FORM WITH BID)
Effective: April 2, 2004 Revised: April 1, 2009

Description. Steel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in steel prices when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form or failure to indicate contract number, company name, and sign and date the form shall make this contract exempt of steel cost adjustments for all items of steel. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment.

Types of Steel Products. An adjustment will be made for fluctuations in the cost of steel used in the manufacture of the following items:

Metal Piling (excluding temporary sheet piling)
Structural Steel
Reinforcing Steel

Other steel materials such as dowel bars, tie bars, mesh reinforcement, guardrail, steel traffic signal and light poles, towers and mast arms, metal railings (excluding wire fence), and frames and grates will be subject to a steel cost adjustment when the pay items they are used in has a contract value of $10,000 or greater.

Documentation. Sufficient documentation shall be furnished to the Engineer to verify the following:

(a) The dates and quantity of steel, in lb (kg), shipped from the mill to the fabricator.

(b) The quantity of steel, in lb (kg), incorporated into the various items of work covered by this special provision. The Department reserves the right to verify submitted quantities.

Method of Adjustment. Steel cost adjustments will be computed as follows:

SCA = Q X D

Where: SCA = steel cost adjustment, in dollars
Q = quantity of steel incorporated into the work, in lb (kg)
D = price factor, in dollars per lb (kg)

$D = MPI_M - MPI_L$

Where: MPI_M = The Materials Cost Index for steel as published by the Engineering News-Record for the month the steel is shipped from the mill. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

MPI_L = The Materials Cost Index for steel as published by the Engineering News-Record for the month prior to the letting. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

The unit weights (masses) of steel that will be used to calculate the steel cost adjustment for the various items are shown in the attached table.

No steel cost adjustment will be made for any products manufactured from steel having a mill shipping date prior to the letting date.

If the Contractor fails to provide the required documentation, the method of adjustment will be calculated as described above; however, the MPI_M will be based on the date the steel arrives at the job site. In this case, an adjustment will only be made when there is a decrease in steel costs.

Basis of Payment. Steel cost adjustments may be positive or negative but will only be made when there is a difference between the MPI_L and MPI_M in excess of five percent, as calculated by:

Percent Difference = $\{(MPI_L - MPI_M) \div MPI_L\} \times 100$

Steel cost adjustments will be calculated by the Engineer and will be paid or deducted when all other contract requirements for the items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Attachment

Item	Unit Mass (Weight)
Metal Piling (excluding temporary sheet piling)	
Furnishing Metal Pile Shells 12 in. (305 mm), 0.179 in. (3.80 mm) wall thickness)	23 lb/ft (34 kg/m)
Furnishing Metal Pile Shells 12 in. (305 mm), 0.250 in. (6.35 mm) wall thickness)	32 lb/ft (48 kg/m)
Furnishing Metal Pile Shells 14 in. (356 mm), 0.250 in. (6.35 mm) wall thickness)	37 lb/ft (55 kg/m)
Other piling	See plans
Structural Steel	See plans for weights (masses)
Reinforcing Steel	See plans for weights (masses)
Dowel Bars and Tie Bars	6 lb (3 kg) each
Mesh Reinforcement	63 lb/100 sq ft (310 kg/sq m)
Guardrail	
Steel Plate Beam Guardrail, Type A w/steel posts	20 lb/ft (30 kg/m)
Steel Plate Beam Guardrail, Type B w/steel posts	30 lb/ft (45 kg/m)
Steel Plate Beam Guardrail, Types A and B w/wood posts	8 lb/ft (12 kg/m)
Steel Plate Beam Guardrail, Type 2	305 lb (140 kg) each
Steel Plate Beam Guardrail, Type 6	1260 lb (570 kg) each
Traffic Barrier Terminal, Type 1 Special (Tangent)	730 lb (330 kg) each
Traffic Barrier Terminal, Type 1 Special (Flared)	410 lb (185 kg) each
Steel Traffic Signal and Light Poles, Towers and Mast Arms	
Traffic Signal Post	11 lb/ft (16 kg/m)
Light Pole, Tenon Mount and Twin Mount, 30 - 40 ft (9 – 12 m)	14 lb/ft (21 kg/m)
Light Pole, Tenon Mount and Twin Mount, 45 - 55 ft (13.5 – 16.5 m)	21 lb/ft (31 kg/m)
Light Pole w/Mast Arm, 30 - 50 ft (9 – 15.2 m)	13 lb/ft (19 kg/m)
Light Pole w/Mast Arm, 55 - 60 ft (16.5 – 18 m)	19 lb/ft (28 kg/m)
Light Tower w/Luminaire Mount, 80 - 110 ft (24 – 33.5 m)	31 lb/ft (46 kg/m)
Light Tower w/Luminaire Mount, 120 - 140 ft (36.5 – 42.5 m)	65 lb/ft (97 kg/m)
Light Tower w/Luminaire Mount, 150 - 160 ft (45.5 – 48.5 m)	80 lb/ft (119 kg/m)
Metal Railings (excluding wire fence)	
Steel Railing, Type SM	64 lb/ft (95 kg/m)
Steel Railing, Type S-1	39 lb/ft (58 kg/m)
Steel Railing, Type T-1	53 lb/ft (79 kg/m)
Steel Bridge Rail	52 lb/ft (77 kg/m)
Frames and Grates	
Frame	250 lb (115 kg)
Lids and Grates	150 lb (70 kg)

RETURN WITH BID

ILLINOIS DEPARTMENT OF TRANSPORTATION

OPTION FOR STEEL COST ADJUSTMENT

The bidder shall submit this completed form with his/her bid. Failure to submit the form or properly complete contract number, company name, and sign and date the form shall make this contract exempt of steel cost adjustments for all items of steel. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment. After award, this form, when submitted shall become part of the contract.

Contract No.: _____

Company Name:_____

Contractor's Option:

Is your company opting to include this special provision as part of the contract plans for the following items of work?

Metal Piling	Yes	☐
Structural Steel	Yes	☐
Reinforcing Steel	Yes	☐
Dowel Bars, Tie Bars and Mesh Reinforcement	Yes	☐
Guardrail	Yes	☐
Steel Traffic Signal and Light Poles, Towers and Mast Arms	Yes	☐
Metal Railings (excluding wire fence)	Yes	☐
Frames and Grates	Yes	☐

Signature: _____ **Date:** _____

ILLINOIS DEPARTMENT OF LABOR

PREVAILING WAGES FOR
COOK COUNTY
EFFECTIVE MAY 2010

The Prevailing rates of wages are included in the Contract proposals which are subject to Check Sheet #5 of the Supplemental Specifications and Recurring Special Provisions. The rates have been ascertained and certified by the Illinois Department of Labor for the locality in which the work is to be performed and for each craft or type of work or mechanic needed to execute the work of the Contract. As required by Prevailing Wage Act (820 ILCS 130/0.01, et seq.) and Check Sheet #5 of the Contract, not less than the rates of wages ascertained by the Illinois Department of Labor and as revised during the performance of a Contract shall be paid to all laborers, workers and mechanics performing work under the Contract. Post the scale of wages in a prominent and easily accessible place at the site of work.

If the Illinois Department of Labor revises the prevailing rates of wages to be paid as listed in the specification of rates, the contractor shall post the revised rates of wages and shall pay not less than the revised rates of wages. Current wage rate information shall be obtained by visiting the Illinois Department of Labor web site at http://www.state.il.us/agency/idol/ or by calling 312-793-2814. It is the responsibility of the contractor to review the rates applicable to the work of the contract at regular intervals in order to insure the timely payment of current rates. Provision of this information to the contractor by means of the Illinois Department of Labor web site satisfies the notification of revisions by the Department to the contractor pursuant to the Act, and the contractor agrees that no additional notice is required. The contractor shall notify each of its subcontractors of the revised rates of wages.

Cook County Prevailing Wage for May 2010

Trade Name	RG	TYP	C	Base	FRMAN	*M-F>8	OSA	OSH	H/W	Pensn	Vac	Trng
ASBESTOS ABT-GEN		ALL		35.200	35.700	1.5	1.5	2.0	9.130	8.370	0.000	0.400
ASBESTOS ABT-MEC		BLD		31.540	0.000	1.5	1.5	2.0	9.670	9.610	0.000	0.520
BOILERMAKER		BLD		43.020	46.890	2.0	2.0	2.0	6.720	9.890	0.000	0.350
BRICK MASON		BLD		39.030	42.930	1.5	1.5	2.0	8.800	10.67	0.000	0.740
CARPENTER		ALL		40.770	42.770	1.5	1.5	2.0	9.840	9.790	0.000	0.490
CEMENT MASON		ALL		41.850	43.850	1.5	1.5	2.0	8.600	9.810	0.000	0.220
CERAMIC TILE FNSHER		BLD		33.600	0.000	2.0	1.5	2.0	6.950	8.020	0.000	0.540
COMM. ELECT.		BLD		36.440	38.940	1.5	1.5	2.0	7.650	7.750	0.000	0.700
ELECTRIC PWR EQMT OP		ALL		39.850	46.430	1.5	1.5	2.0	9.870	12.40	0.000	0.300
ELECTRIC PWR GRNDMAN		ALL		31.080	46.430	1.5	1.5	2.0	7.700	9.680	0.000	0.240
ELECTRIC PWR LINEMAN		ALL		39.850	46.430	1.5	1.5	2.0	9.870	12.40	0.000	0.300
ELECTRICIAN		ALL		40.400	43.000	1.5	1.5	2.0	11.33	9.420	0.000	0.750
ELEVATOR CONSTRUCTOR		BLD		46.160	51.930	2.0	2.0	2.0	10.03	9.460	2.770	0.000
FENCE ERECTOR		ALL		30.700	32.200	1.5	1.5	2.0	7.950	8.430	0.000	0.500
GLAZIER		BLD		37.000	38.500	1.5	1.5	2.0	7.340	12.05	0.000	0.740
HT/FROST INSULATOR		BLD		42.050	44.550	1.5	1.5	2.0	9.670	10.81	0.000	0.520
IRON WORKER		ALL		40.750	42.750	2.0	2.0	2.0	11.00	15.99	0.000	0.300
LABORER		ALL		35.200	35.950	1.5	1.5	2.0	9.130	8.370	0.000	0.400
LATHER		ALL		40.770	42.770	1.5	1.5	2.0	9.840	9.790	0.000	0.490
MACHINIST		BLD		42.770	44.770	1.5	1.5	2.0	7.750	8.690	0.650	0.000
MARBLE FINISHERS		ALL		29.100	0.000	1.5	1.5	2.0	8.800	10.67	0.000	0.740
MARBLE MASON		BLD		39.030	42.930	1.5	1.5	2.0	8.800	10.67	0.000	0.740
MATERIAL TESTER I		ALL		25.200	0.000	1.5	1.5	2.0	9.130	8.370	0.000	0.400
MATERIALS TESTER II		ALL		30.200	0.000	1.5	1.5	2.0	9.130	8.370	0.000	0.400
MILLWRIGHT		ALL		40.770	42.770	1.5	1.5	2.0	9.840	9.790	0.000	0.490
OPERATING ENGINEER		BLD	1	45.100	49.100	2.0	2.0	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		BLD	2	43.800	49.100	2.0	2.0	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		BLD	3	41.250	49.100	2.0	2.0	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		BLD	4	39.500	49.100	2.0	2.0	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		BLD	5	48.850	49.100	2.0	2.0	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		BLD	6	46.100	49.100	2.0	2.0	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		BLD	7	48.100	49.100	2.0	2.0	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		FLT	1	51.300	51.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		FLT	2	49.800	51.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		FLT	3	44.350	51.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		FLT	4	36.850	51.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		HWY	1	43.300	47.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		HWY	2	42.750	47.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		HWY	3	40.700	47.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		HWY	4	39.300	47.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		HWY	5	38.100	47.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		HWY	6	46.300	47.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
OPERATING ENGINEER		HWY	7	44.300	47.300	1.5	1.5	2.0	11.70	8.050	1.900	1.150
ORNAMNTL IRON WORKER		ALL		40.200	42.450	2.0	2.0	2.0	8.700	14.04	0.000	0.500
PAINTER		ALL		38.000	42.750	1.5	1.5	1.5	8.350	9.400	0.000	0.670
PAINTER SIGNS		BLD		31.740	35.640	1.5	1.5	1.5	2.600	2.540	0.000	0.000
PILEDRIVER		ALL		40.770	42.770	1.5	1.5	2.0	9.840	9.790	0.000	0.490
PIPEFITTER		BLD		43.150	46.150	1.5	1.5	2.0	7.660	9.550	0.000	1.570
PLASTERER		BLD		38.550	40.860	1.5	1.5	2.0	9.000	9.690	0.000	0.450
PLUMBER		BLD		44.000	46.000	1.5	1.5	2.0	9.860	7.090	0.000	1.030
ROOFER		BLD		37.000	40.000	1.5	1.5	2.0	7.500	6.020	0.000	0.330
SHEETMETAL WORKER		BLD		40.460	43.700	1.5	1.5	2.0	9.580	12.35	0.000	0.610
SIGN HANGER		BLD		28.210	29.060	1.5	1.5	2.0	4.450	2.880	0.000	0.000
SPRINKLER FITTER		BLD		40.500	42.500	1.5	1.5	2.0	8.500	6.850	0.000	0.500
STEEL ERECTOR		ALL		40.750	42.750	2.0	2.0	2.0	10.95	15.99	0.000	0.300
STONE MASON		BLD		39.030	42.930	1.5	1.5	2.0	8.800	10.67	0.000	0.740
TERRAZZO FINISHER		BLD		35.150	0.000	1.5	1.5	2.0	6.950	10.57	0.000	0.380
TERRAZZO MASON		BLD		39.010	42.010	1.5	1.5	2.0	6.950	11.91	0.000	0.510

TILE MASON		BLD	40.490	44.490	2.0	1.5	2.0	6.950	9.730	0.000	0.610
TRAFFIC SAFETY WRKR		HWY	24.300	25.900	1.5	1.5	2.0	3.780	1.875	0.000	0.000
TRUCK DRIVER	E	ALL 1	30.700	31.350	1.5	1.5	2.0	6.750	5.450	0.000	0.150
TRUCK DRIVER	E	ALL 2	30.950	31.350	1.5	1.5	2.0	6.750	5.450	0.000	0.150
TRUCK DRIVER	E	ALL 3	31.150	31.350	1.5	1.5	2.0	6.750	5.450	0.000	0.150
TRUCK DRIVER	E	ALL 4	31.350	31.350	1.5	1.5	2.0	6.750	5.450	0.000	0.150
TRUCK DRIVER	W	ALL 1	32.550	33.100	1.5	1.5	2.0	6.500	4.350	0.000	0.000
TRUCK DRIVER	W	ALL 2	32.700	33.100	1.5	1.5	2.0	6.500	4.350	0.000	0.000
TRUCK DRIVER	W	ALL 3	32.900	33.100	1.5	1.5	2.0	6.500	4.350	0.000	0.000
TRUCK DRIVER	W	ALL 4	33.100	33.100	1.5	1.5	2.0	6.500	4.350	0.000	0.000
TUCKPOINTER		BLD	39.200	40.200	1.5	1.5	2.0	7.830	10.25	0.000	0.770

Legend:

M-F>8 (Overtime is required for any hour greater than 8 worked each day, Monday through Friday.

OSA (Overtime is required for every hour worked on Saturday)

OSH (Overtime is required for every hour worked on Sunday and Holidays)

H/W (Health & Welfare Insurance)

Pensn (Pension)

Vac (Vacation)

Trng (Training)

Explanations

COOK COUNTY

TRUCK DRIVERS (WEST) - That part of the county West of Barrington Road.

The following list is considered as those days for which holiday rates of wages for work performed apply: New Years Day, Memorial/Decoration Day, Fourth of July, Labor Day, Veterans Day, Thanksgiving Day, Christmas Day. Generally, any of these holidays which fall on a Sunday is celebrated on the following Monday. This then makes work performed on that Monday payable at the appropriate overtime rate for holiday pay. Common practice in a given local may alter certain days of celebration such as the day after Thanksgiving for Veterans Day. If in doubt, please check with IDOL.

EXPLANATION OF CLASSES

ASBESTOS - GENERAL - removal of asbestos material/mold and hazardous materials from any place in a building, including mechanical systems where those mechanical systems are to be removed. This includes the removal of asbestos materials/mold and hazardous materials from ductwork or pipes in a building when the building is to be demolished at the time or at some close future date.
ASBESTOS - MECHANICAL - removal of asbestos material from mechanical systems, such as pipes, ducts, and boilers, where the mechanical systems are to remain.

CERAMIC TILE FINISHER

The grouting, cleaning, and polishing of all classes of tile, whether for interior or exterior purposes, all burned, glazed or unglazed products; all composition materials, granite tiles, warning detectable tiles, cement tiles, epoxy composite materials, pavers, glass, mosaics, fiberglass, and all substitute materials, for tile made in tile-like units; all mixtures in tile like form of cement, metals, and other materials that are for and intended for use as a finished floor surface, stair treads, promenade roofs, walks, walls, ceilings, swimming pools, and all other places where tile is to form a finished interior or exterior. The mixing of all setting mortars including but not limited to thin-set mortars, epoxies, wall mud, and any other sand and cement mixtures or adhesives when used in the preparation, installation, repair, or maintenance of tile and/or similar materials. The handling and unloading of all sand, cement, lime, tile, fixtures, equipment, adhesives, or any other materials to be used in the preparation, installation, repair, or maintenance of tile and/or similar materials. Ceramic Tile Finishers shall fill all joints and voids regardless of method on all tile work, particularly and especially after installation of said tile work. Application of any and all protective coverings to all types of tile installations including, but not be limited to, all soap compounds, paper products, tapes, and all polyethylene coverings, plywood, masonite, cardboard, and any new type of products that may be used to protect tile installations, Blastrac equipment, and all floor scarifying equipment used in preparing floors to receive tile. The clean up and removal of all waste and materials. All demolition of existing tile floors and walls to be re-tiled.

COMMUNICATIONS ELECTRICIAN

Installation, operation, inspection, maintenance, repair and service of radio, television, recording, voice sound vision production and reproduction, telephone and telephone interconnect, facsimile, data apparatus, coaxial, fibre optic and wireless equipment, appliances and systems used for the transmission and reception of signals of any nature, business, domestic, commercial, education, entertainment, and residential purposes, including but not limited to, communication and telephone, electronic and sound equipment, fibre optic and data communication systems, and the performance of any task directly related to such installation or service whether at new or existing sites, such tasks to include the placing of wire and cable and electrical power conduit or other raceway work within the equipment room and pulling wire and/or cable through conduit and the installation of any incidental conduit, such that the employees covered hereby can complete any job in full.

MARBLE FINISHER

Loading and unloading trucks, distribution of all materials (all stone, sand, etc.), stocking of floors with material, performing all rigging for heavy work, the handling of all material that may be needed for the installation of such materials, building of scaffolding, polishing if needed, patching, waxing of material if damaged, pointing up, caulking, grouting and cleaning of marble, holding water on diamond or Carborundum blade or saw for setters cutting, use of tub saw or any other saw needed for preparation of material, drilling of holes for wires that anchor material set by setters, mixing up of molding plaster for installation of material, mixing up thin set for the installation of material, mixing up of sand to cement for the installation of material and such other work as may be required in helping a Marble Setter in the handling of all material in the erection or installation of interior marble, slate, travertine, art marble, serpentine, alberene stone, blue stone,

granite and other stones (meaning as to stone any foreign or domestic materials as are specified and used in building interiors and exteriors and customarily known as stone in the trade), carrara, sanionyx, vitrolite and similar opaque glass and the laying of all marble tile, terrazzo tile, slate tile and precast tile, steps, risers treads, base, or any other materials that may be used as substitutes for any of the aforementioned materials and which are used on interior and exterior which are installed in a similar manner.

MATERIAL TESTER I: Hand coring and drilling for testing of materials; field inspection of uncured concrete and asphalt.

MATERIAL TESTER II: Field inspection of welds, structural steel, fireproofing, masonry, soil, facade, reinforcing steel, formwork, cured concrete, and concrete and asphalt batch plants; adjusting proportions of bituminous mixtures.

OPERATING ENGINEER - BUILDING

Class 1. Asphalt Plant; Asphalt Spreader; Autograde; Backhoes with Caisson Attachment; Batch Plant; Benoto (requires Two Engineers); Boiler and Throttle Valve; Caisson Rigs; Central Redi-Mix Plant; Combination Back Hoe Front End-loader Machine; Compressor and Throttle Valve; Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Conveyor (Truck Mounted); Concrete Paver Over 27E cu. ft; Concrete Paver 27E cu. ft. and Under: Concrete Placer; Concrete Placing Boom; Concrete Pump (Truck Mounted); Concrete Tower; Cranes, All; Cranes, Hammerhead; Cranes, (GCI and similar Type); Creter Crane; Crusher, Stone, etc.; Derricks, All; Derricks, Traveling; Formless Curb and Gutter Machine; Grader, Elevating; Grouting Machines; Highlift Shovels or Front Endloader 2-1/4 yd. and over; Hoists, Elevators, outside type rack and pinion and similar machines; Hoists, One, Two and Three Drum; Hoists, Two Tugger One Floor; Hydraulic Backhoes; Hydraulic Boom Trucks; Hydro Vac (and similar equipment); Locomotives, All; Motor Patrol; Lubrication Technician; Manipulators; Pile Drivers and Skid Rig; Post Hole Digger; Pre-Stress Machine; Pump Cretes Dual Ram; Pump Cretes: Squeeze Cretes-Screw Type Pumps; Gypsum Bulker and Pump; Raised and Blind Hole Drill; Roto Mill Grinder; Scoops - Tractor Drawn; Slip-Form Paver; Straddle Buggies; Tournapull; Tractor with Boom and Side Boom; Trenching Machines.

Class 2. Boilers; Broom, All Power Propelled; Bulldozers; Concrete Mixer (Two Bag and Over); Conveyor, Portable; Forklift Trucks; Highlift Shovels or Front Endloaders under 2-1/4 yd.; Hoists, Automatic; Hoists, Inside Elevators; Hoists, Sewer Dragging Machine; Hoists, Tugger Single Drum; Rock Drill (Self-Propelled); Rock Drill (Truck Mounted); Rollers, All; Steam Generators; Tractors, All; Tractor Drawn Vibratory Roller; Winch Trucks with "A" Frame.

Class 3. Air Compressor; Combination Small Equipment Operator; Generators; Heaters, Mechanical; Hoists, Inside Elevators; Hydraulic Power Units (Pile Driving, Extracting, and Drilling); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Low Boys; Pumps, Well Points; Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches; Bobcats (up to and including ¾ cu yd.) .

Class 4. Bobcats and/or other Skid Steer Loaders (other than bobcats up to and including ¾ cu yd.); Oilers; and Brick Forklift.

Class 5. Assistant Craft Foreman.

Class 6. Gradall .

Class 7. Mechanics.

OPERATING ENGINEERS - HIGHWAY CONSTRUCTION

Class 1. Asphalt Plant; Asphalt Heater and Planer Combination; Asphalt Heater Scarfire; Asphalt Spreader; Autograder/GOMACO or other similar type machines: ABG Paver; Backhoes with Caisson Attachment; Ballast Regulator; Belt Loader; Caisson Rigs; Car Dumper; Central Redi-Mix Plant; Combination Backhoe Front Endloader Machine, (1 cu. yd. Backhoe Bucket or over or with attachments); Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Paver over 27E cu. ft.; Concrete Placer; Concrete Tube Float; Cranes, all attachments; Cranes, Tower Cranes of all types: Creter Crane: Crusher, Stone, etc.; Derricks, All; Derrick Boats; Derricks, Traveling; Dowell Machine with Air Compressor; Dredges; Formless Curb and Gutter Machine; Grader, Elevating; Grader, Motor Grader, Motor Patrol, Auto Patrol, Form Grader, Pull Grader, Subgrader; Guard Rail Post Driver Truck Mounted; Hoists, One, Two and Three Drum; Hydraulic Backhoes; Backhoes with shear attachments; Lubrication Technician; Manipulators; Mucking Machine; Pile Drivers and Skid Rig; Pre-Stress Machine; Pump Cretes Dual Ram; Rock Drill - Crawler or Skid Rig; Rock Drill - Truck Mounted; Rock/Track Tamper; Roto Mill Grinder; Slip-Form Paver; Soil Test Drill Rig (Truck Mounted); Straddle Buggies; Hydraulic Telescoping Form (Tunnel); Tractor Drawn Belt Loader (with attached pusher - two engineers); Tractor with Boom; Tractaire with Attachments; Trenching Machine; Truck Mounted Concrete Pump with Boom; Raised or Blind Hole Drills (Tunnel Shaft); Underground Boring and/or Mining Machines 5 ft. in diameter and over tunnel, etc; Underground Boring and/or Mining Machines under 5 ft. in diameter; Wheel Excavator; Widener (APSCO).

Class 2. Batch Plant; Bituminous Mixer; Boiler and Throttle Valve; Bulldozers; Car Loader Trailing Conveyors; Combination Backhoe Front Endloader Machine (Less than 1 cu. yd. Backhoe Bucket or over or with attachments); Compressor and Throttle Valve; Compressor, Common Receiver (3); Concrete Breaker or Hydro Hammer; Concrete Grinding Machine; Concrete Mixer or Paver 7S Series to and including 27 cu. ft.; Concrete Spreader; Concrete Curing Machine, Burlap Machine, Belting Machine and Sealing Machine; Concrete Wheel Saw; Conveyor Muck Cars (Haglund or Similar Type); Drills, All; Finishing Machine - Concrete; Highlift Shovels or Front Endloader; Hoist - Sewer Dragging Machine; Hydraulic Boom Trucks (All Attachments); Hydro-Blaster; All Locomotives, Dinky; Off-Road Hauling Units (including articulating)/2 ton capacity or more; Non Self-Loading Ejection Dump; Pump Cretes: Squeeze Cretes - Screw Type Pumps, Gypsum Bulker and Pump; Roller, Asphalt; Rotary Snow Plows; Rototiller, Seaman, etc., self-propelled; Scoops - Tractor Drawn; Self-Propelled Compactor; Spreader - Chip - Stone, etc.; Scraper; Scraper - Prime Mover in Tandem (Regardless of Size): Tank Car Heater; Tractors, Push, Pulling Sheeps Foot, Disc, Compactor, etc.; Tug Boats.

Class 3. Boilers; Brooms, All Power Propelled; Cement Supply Tender; Compressor, Common Receiver (2); Concrete Mixer (Two Bag and Over); Conveyor, Portable; Farm-Type Tractors Used for Mowing, Seeding, etc.; Fireman on Boilers; Forklift Trucks; Grouting Machine; Hoists, Automatic; Hoists, All Elevators; Hoists, Tugger Single Drum; Jeep Diggers; Low Boys; Pipe Jacking Machines; Post-Hole Digger; Power Saw, Concrete Power Driven; Pug Mills; Rollers, other than Asphalt; Seed and Straw Blower; Steam Generators; Stump Machine; Winch Trucks with "A" Frame; Work Boats; Tamper-Form-Motor Driven.

Class 4. Air Compressor; Combination - Small Equipment Operator; Directional Boring Machine; Generators; Heaters, Mechanical; Hydraulic Power Unit (Pile Driving, Extracting, or Drilling); Hydro- Blaster; Light Plants, All (1 through 5); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Pumps, Well Points; Tractaire; Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 5. Bobcats (all); Brick Forklifts; Oilers.

Class 6. Field Mechanics and Field Welders

Class 7. Gradall and machines of like nature.

OPERATING ENGINEER - FLOATING

Class 1. Craft Foreman; Diver/Wet Tender; and Engineer (hydraulic dredge).

Class 2. Crane/Backhoe Operator; 70 Ton or over Tug Operator; Mechanic/Welder; Assistant Engineer (Hydraulic Dredge); Leverman (Hydraulic Dredge); Diver Tender; Friction and Lattice Boom Cranes.

Class 3. Deck Equipment Operator, Machineryman; Maintenance of Crane (over 50 ton capacity); Tug/Launch Operator; Loader/Dozer and like equipment on Barge; and Deck Machinery, etc.

Class 4. Deck Equipment Operator, Machineryman/Fireman (4 Equipment Units or More); Off Road Trucks (2 ton capacity or more); Deck Hand, Tug Engineer, Crane Maintenance 50 Ton Capacity and Under or Backhoe Weighing 115,000 pounds or less; and Assistant Tug Operator.

TERRAZZO FINISHER

The handling of sand, cement, marble chips, and all other materials that may be used by the Mosaic Terrazzo Mechanic, and the mixing, grinding, grouting, cleaning and sealing of all Marble, Mosaic, and Terrazzo work, floors, base, stairs, and wainscoting by hand or machine, and in addition, assisting and aiding Marble, Masonic, and Terrazzo Mechanics.

TRAFFIC SAFETY

Work associated with barricades, horses and drums used to reduce lane usage on highway work, the installation and removal of temporary lane markings, and the installation and removal of temporary road signs.

TRUCK DRIVER - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION - EAST & WEST

Class 1. Two or three Axle Trucks. A-frame Truck when used for transportation purposes; Air Compressors and Welding Machines, including those pulled by cars, pick-up trucks and tractors; Ambulances; Batch Gate Lockers; Batch Hopperman; Car and Truck Washers; Carry-alls; Fork Lifts and Hoisters; Helpers; Mechanics Helpers and Greasers; Oil Distributors 2-man operation; Pavement Breakers; Pole Trailer, up to 40 feet; Power Mower Tractors; Self-propelled Chip Spreader; Skipman; Slurry Trucks, 2-man operation; Slurry Truck Conveyor Operation, 2 or 3 man; TEamsters Unskilled dumpman; and Truck Drivers hauling warning lights, barricades, and portable toilets on the job site.

Class 2. Four axle trucks; Dump Crets and Adgetors under 7 yards; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnapulls or Turnatrailers when pulling other than self-loading equipment or

similar equipment under 16 cubic yards; Mixer Trucks under 7 yards; Ready-mix Plant Hopper Operator, and Winch Trucks, 2 Axles.

Class 3. Five axle trucks; Dump Crets and Adgetors 7 yards and over; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnatrailers or turnapulls when pulling other than self-loading equipment or similar equipment over 16 cubic yards; Explosives and/or Fission Material Trucks; Mixer Trucks 7 yards or over; Mobile Cranes while in transit; Oil Distributors, 1-man operation; Pole Trailer, over 40 feet; Pole and Expandable Trailers hauling material over 50 feet long; Slurry trucks, 1-man operation; Winch trucks, 3 axles or more; Mechanic--Truck Welder and Truck Painter.

Class 4. Six axle trucks; Dual-purpose vehicles, such as mounted crane trucks with hoist and accessories; Foreman; Master Mechanic; Self-loading equipment like P.B. and trucks with scoops on the front.

Other Classifications of Work:

For definitions of classifications not otherwise set out, the Department generally has on file such definitions which are available. If a task to be performed is not subject to one of the classifications of pay set out, the Department will upon being contacted state which neighboring county has such a classification and provide such rate, such rate being deemed to exist by reference in this document. If no neighboring county rate applies to the task, the Department shall undertake a special determination, such special determination being then deemed to have existed under this determination. If a project requires these, or any classification not listed, please contact IDOL at 217-782-1710 for wage rates or clarifications.

LANDSCAPING

Landscaping work falls under the existing classifications for laborer, operating engineer and truck driver. The work performed by landscape plantsman and landscape laborer is covered by the existing classification of laborer. The work performed by landscape operators (regardless of equipment used or its size) is covered by the classifications of operating engineer. The work performed by landscape truck drivers (regardless of size of truck driven) is covered by the classifications of truck driver.