POGGEMEYER
DESIGN GROUP

PROPOSAL, CONTRACT DOCUMENTS, AND TECHNICAL SPECIFICATIONS

FOR

WASTEWATER TREATMENT PLANT IMPROVEMENTS

200290187

FOR THE

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200290189

VILLAGE OF GROVER HILL, OHIO

OHIO DEPARTMENT OF COMMERCE
DIVISION OF INDUSTRIAL COMPLIANCE
BUREAU OF
CONSTRUCTION COMPLIANCE
APPROVED
~~WITH ADDENDUM~~
DATE: 3/21/2002
PLAN
EXAMINER:
LIMITATION: (SEE ADDENDUM)
1993 OBBC

JOB NO. 1457-003

MARCH, 2002

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TABLE OF CONTENTS

SECTION 01010

SUMMARY OF THE WORK

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDE

A. The work to be performed consists of furnishing all the labor, material, equipment, transportation, and necessary services required by the contract drawings and specifications to complete the construction of the:

Wastewater Treatment Plant Improvements
Village of Grover Hill, Ohio

1.2 RELATED REQUIREMENTS

A. General and Supplementary Conditions.

PART 2 SCOPE OF WORK

2.1 GENERAL CONTRACT

A. The **General Contract** will include the following specific work items as well as all incidental work required to accomplish the intent of the Contract Documents:

B. The scope of work consists of furnishing all labor, material, equipment, and supervision to complete the work as shown on the Drawings and as specified in Divisions 1 through 15.

C. This contract includes: diffused aeration equipment, precast concrete secondary clarifiers, precast septage receiving tank with manual bar screen, septage grinder pumps, one pre-engineered wood frame building, one belt filter press, sludge dewatering system, one sludge transfer pump, ductile iron piping, FPP grating, heating and ventilating work, and miscellaneous appurtenances for a complete and operational installation.

2.2 ELECTRICAL CONTRACT

A. The **Electrical Contract** will include the following specific work items as well as all incidental work required to accomplish the intent of the Contract Documents:

B. The scope of work consists of furnishing all labor, material, equipment, and supervision to complete the work as specified in Division 1 - General Requirements and Division 16 - Electrical Specifications and as shown on the Drawings.

C. This contract includes all electrical work including but not limited to power, lighting, instrumentation, and control wiring for a complete installation.

PART 3 SCHEDULING THE WORK

3.1 The General Contractor shall be responsible for scheduling the work to allow the project to be completed by the dates indicated in the contract including allowances for bad weather. Provide the Owner with weekly updates on the progress of the project and any change in projected completion date. Project shall start immediately following award of contracts.

3.2 At no time shall the Contractor interfere or inhibit any other ongoing operations at the plant unless approved by the Owner. The wastewater treatment plant is an operating facility and must remain in operation at all times.

PART 4 DEFINITIONS

4.1 The "Owner" refers to the Village of Grover Hill, P.O. Box 3A, 301 West Walnut Street, Grover Hill, Ohio 45849.

4.2 The "Architect/Engineer" refers to the firm of Poggemeyer Design Group, Inc., 1168 North Main Street, Bowling Green, Ohio 43402 or their authorized representatives.

PART 5 LAYING OUT WORK

5.1 Before ordering any material or performing any of the work each Contractor or Subcontractor shall field verify all dimensions and be responsible for correctness of same. No extra charge or compensation will be allowed because of the difference between actual dimensions and measurements indicated on the drawings. Any difference which may be found shall be indicated to the Architect/Engineer for consideration before proceeding with the work. If there should be any discrepancy in dimensions in the drawings, the correct dimensions shall be determined by field conditions.

PART 6 STANDARDS AND SUBSTITUTIONS

6.1 For a material, product or equipment of another manufacturer or supplier to be considered, the change must be submitted on the Substitution Sheet, stating specifically the make and include any descriptive literature or data sufficient for the Architect/Engineer to evaluate the proposal. The amount shall be added to or deducted from the base bid and indicated accordingly.

6.2 All proposals for substitution must be made prior to the bid and again prior to the award of the contracts and are subject to approval or rejection by the Architect/Engineer.

PART 7 UNCORRECTED WORK

7.1 If the Owner deems it expedient to accept the work injured or not done in accordance with the contract, an equitable adjustment will be made with a proper deduction from the contract prior for unsatisfactory work.

PART 8 WEATHER PROTECTION

8.1 It is the intent of these specifications that the Contractor shall protect his work and existing or adjacent property against weather, to maintain their work, materials, apparatus, free from injury or damage in accordance with the General Conditions during the entire construction period. Work likely to be damaged shall be covered or protected at the end of each day's work. Any work damaged by failure to provide protection above required shall be removed and replaced with new work at the Contractor's expense.

PART 9 PROTECTION OF PREMISES

9.1 Every precaution shall be taken to protect the surrounding premises and buildings from damage during the course of construction. All damage to the premises or existing structures shall be replaced or repaired to the original condition at the expense of the Contractor causing the damage.

PART 10 SHORING AND BRACING

10.1 Each Contractor shall provide all shoring and bracing required for safety and proper execution of his work. He shall remove these items when the work is completed.

PART 11 CLEAN UP AND REMOVAL OF DEBRIS

11.1 Each Contractor and Subcontractor, upon completion of his portion of the work and at other times during construction as required by the Owner or Architect/Engineer, shall collect and remove all rubbish and debris pertaining to his work.

PART 12 TEMPORARY SUPPORT FACILITIES

12.1 Each Contractor shall provide whatever facilities and services may be needed to properly support primary construction process and meet compliance requirements and governing regulations. Provide miscellaneous facilities as needed including temporary ramps, ladders, runways, staging, shoring, scaffolding, bridges, railings, bracing, barriers, closures, platforms, dump chutes, receptacles, and similar items.

PART 13 WASTE MATERIALS

13.1 The General Contractor shall provide a 10 cubic yard dumpster at the site. The dumpster shall be available for use by all prime contractors and their subcontractors. The General Contractor is responsible for the cost of the dumpster.

13.2 In the event that the prime contractors do not maintain a clean job site to the Owner's and Engineer's satisfaction, the Owner reserves the right to have debris removed from the job site and deduct the cost of such from the prime contractors involved.

PART 14 SECURITY AND PROTECTION

14.1 The General Contractor shall provide facilities and services as necessary to effectively protect from losses and persons from injury during the course of construction.

14.2 Provide local approved barricades at hazardous locations, complete with the signs, general lighting, warning lights, and similar devices where appropriate or required. Barricades shall be provided to prevent casual entrance into the various construction areas by the public.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDED

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed Products list.

D. Product Data.

E. Shop Drawings.

F. Samples.

G. Test reports.

H. Certificates.

I. Manufacturer's instructions.

J. Manufacturer's field reports.

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Manufacturers' field services and reports.

B. Section 01700 - Contract Closeout: Contract warranties, manufacturers' certificates, closeout submittals.

1.3 REFERENCES

A. AGC (Associated General Contractors of America) publication "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry".

1.4 SUBMITTAL PROCEDURES

A. Transmit each submittal with an Architect/Engineer accepted form. A separate cover sheet for each submittal shall include the following information:

1. Transmitted to (PDG Project Representative)
2. Date
3. Project Name and PDG Job Number

4. Quantity, CSI Number and Description of each item transmitted. Please indicate on the first page of each individual item submitted the CSI and Description of the submittal.
5. Transmitted from (Firm, Project Representative, Address, Telephone Number)

EXAMPLE SUBMITTAL FORM			
Project Name:	XYZ Addition and Renovation		
PDG Project Job #:	1234-001		
Project Architect/Engineer:	John Jones	**Date:**	02/14/02
Firm, Project Representative, Address, & Telephone Number	ABC Construction Company Joe Smith 123 Main Street City, State, Zip Code		419-352-1111
Qty	**CSI No.**	**Description**	
6	10160	Toilet Room Partitions	
2	10160	Toilet Room Partitions - Mill Color Chart	
6	10800	Toilet & Bath Accessories	

B. Submit the six (6) copies to the Architect/Engineer for review. Four (4) copies will be returned to the Contractor, **one (1) copy of which will be incorporated into the Contractor's Close-Out Manual**. The remaining two (2) copies of the original six (6) copies shall be retained by the Architect/Engineer.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to Architect/Engineer at business address, or as determined at Preconstruction Meeting. Coordinate submission of related items.

F. For each submittal for review, allow 15 days excluding delivery time to and from the contractor.

G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor and Architect/Engineer review stamps.

I. When revised for resubmission, identify all changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

K. Submittals not requested will not be recognized or processed.

1.5 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within 15 calendar days after date of Owner-Contractor Agreement.

B. Submit revised schedules with each Application for Payment, identifying changes since previous version.

C. Submit a horizontal bar chart with separate line for each section of Work, identifying first work day of each week.

D. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

E. Indicate estimated percentage of completion for each item of Work at each submission.

F. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by Allowances.

1.6 PROPOSED PRODUCTS LIST

A. Within 15 calendar days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.7 PRODUCT DATA

A. Product Data For Review:

1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
2. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.

B. Product Data For Information:

1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

C. Product Data For Project Close-out:

1. Submitted for the Owner's benefit during and after project completion.

D. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

E. Indicate Product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

F. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700 - CONTRACT CLOSEOUT.

1.8 SHOP DRAWINGS

A. Shop Drawings For Review:

1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
2. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.

B. Shop Drawings For Information:

1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

C. Shop Drawings For Project Close-out:

1. Submitted for the Owner's benefit during and after project completion.

D. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.9 SAMPLES

A. Samples For Review:

1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
2. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.

B. Samples For Information:

1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

C. Samples For Selection:

1. Submitted to Architect/Engineer for aesthetic, color, or finish selection.
2. Submit two (2) samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect/Engineer selection.
3. After selection, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.

D. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

E. Include identification on each sample, with full Project information.

F. Submit the number of samples specified in individual specification sections; one of which will be retained by Architect/Engineer.

G. Reviewed samples which may be used in the Work are indicated in individual specification sections.

H. Samples will not be used for testing purposes unless specifically stated in the specification section.

1.10 TEST REPORTS

A. Submit for the Architect/Engineer's knowledge as contract administrator, for the Owner.

B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.11 CERTIFICATES

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.12 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up (if applicable), adjusting, and finishing, to Architect/Engineer for delivery to owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

C. Refer to Section 01400 - Quality Control, Manufacturers' Field Services article.

1.13 MANUFACTURER'S FIELD REPORTS

A. Submit reports for the Architect/Engineer's benefit as contract administrator for the Owner.

B. Submit report in duplicate within 20 days of observation to Architect/Engineer for information.

C. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance - control of installation.

B. Tolerances

C. References and standards.

D. Mock-up.

E. Inspecting and testing laboratory services.

F. Manufacturers' field services.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals: Submission of manufacturers' instructions and certificates.

B. Section 01600 - Material and Equipment: Requirements for material and product quality.

C. Section 01650 - Starting of Systems.

1.3 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.4 TOLERANCES

A. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.5 REFERENCES AND STANDARDS

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date for receiving bids, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect/Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.6 MOCK-UP

A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

1.7 TESTING SERVICES

A. Contractor shall appoint, employ, and pay for specified services of an independent firm to perform testing.

B. The independent firm will perform tests and other services specified in individual specification sections and as required by the Architect/Engineer.

C. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Architect/Engineer or the Owner.

D. Reports will be submitted by the independent firm to the Architect/Engineer and Contractor, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.

2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

F. Testing does not relieve Contractor to perform Work to contract requirements.

G. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Sum/Price.

1.8 INSPECTION SERVICES

A. Contractor appoint, employ, and pay for specified services of an independent firm to perform inspection.

B. The independent firm will perform inspections and other services specified in individual specification sections and as required by the Architect/Engineer.

C. Inspecting may occur on or off the project site. Perform off-site inspecting as required by the Architect/Engineer or the Owner.

D. Reports will be submitted by the independent firm to the Architect/Engineer and Contractor, indicating inspection observations and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish safe access and assistance by incidental labor as requested.

1. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.

F. Inspecting does not relieve Contractor to perform Work to contract requirements.

1.9 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, and test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer subject to approval of Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Refer to Section 01300 - SUBMITTALS, MANUFACTURERS' FIELD REPORTS article.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Selection and payment.

B. Contractor submittals.

C. Laboratory responsibilities.

D. Laboratory reports.

E. Limits on testing laboratory authority.

F. Contractor responsibilities.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals: Manufacturer's certificates.

B. Section 01700 - Contract Closeout: Project Record Documents.

C. Individual Specification Sections: Inspections and tests required, and standards for testing.

1.3 REFERENCES

A. ASTM C802 - Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction.

B. ASTM C1021 - Practice for Laboratories Engaged in the Testing of Building Sealants.

C. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

D. ASTM C1093 - Practice for Accreditation of Testing Agencies for Unit Masonry.

E. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

F. ASTM E329 - Practice for Use in the Evaluation of Inspection and Testing Agencies as Used in Construction.

G. ASTM E543 - Practice for Determining the Qualification of Nondestructive Testing Agencies.

H. ASTM E548 - Practice for Preparation of Criteria for Use in the Evaluation of Testing Laboratories and Inspection Bodies.

I. ASTM E699 - Practice for Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

1.4 SELECTION AND PAYMENT

A. Contractor shall employ and pay for services of an independent testing laboratory to perform specified inspection and testing.

B. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.5 QUALITY ASSURANCE

A. Comply with requirements of referenced ASTM sections.

B. Laboratory: Authorized to operate in state in which Project is located.

C. Laboratory Staff: Maintain a full time specialist on staff to review services.

D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.6 CONTRACTOR SUBMITTALS

A. Prior to start of Work, submit testing laboratory name, address, telephone number, and responsible officer.

1.7 LABORATORY RESPONSIBILITIES

A. Test samples of mixes submitted by Contractor.

B. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.

C. Perform specified inspection, sampling, and testing of Products in accordance with specified standards.

D. Ascertain compliance of materials and mixes with requirements of Contract Documents.

E. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or Products.

F. Perform additional inspections and tests required by Architect/Engineer.

1.8 LABORATORY REPORTS

A. After each inspection and test, promptly submit two copies of laboratory report to Architect/Engineer, and to Contractor.

B. Include:

1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product.
6. Location in the Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

C. When requested by Architect/Engineer, provide interpretation of test results.

1.9 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Laboratory may not approve or accept any portion of the Work.

C. Laboratory may not assume any duties of Contractor.

D. Laboratory has no authority to stop the Work.

1.10 CONTRACTOR RESPONSIBILITIES

A. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.

B. Cooperate with laboratory personnel, and provide access to the Work.

C. Provide incidental labor and facilities:

1. to provide access to Work to be tested,
2. to obtain and handle samples at the site or at source of products to be tested,
3. to facilitate tests and inspections,
4. storage and curing of test samples.

D. Notify Architect/Engineer and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water, and sanitary facilities.

B. Temporary Controls: Barriers, enclosures and fencing, protection of the Work, and water control.

C. Construction Facilities: Access roads, parking, progress cleaning, project signage, and temporary buildings.

1.2 TEMPORARY ELECTRICITY

A. The General Contractor shall pay for the cost of the monthly consumption, demand, and billing charges for the temporary service."

B. The Electrical Contractor shall arrange and install the temporary electrical service per the requirements of Division 16 - Electrical and specifically Section 16008 - Temporary Service.

1.3 TEMPORARY LIGHTING

A. Electrical Contractor shall provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.

B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.

C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

D. Maintain lighting and provide routine repairs.

E. Permanent building lighting may be utilized during construction. Clean and/or replace damaged devices before final completion.

1.4 TEMPORARY HEAT

A. General Contractor shall provide and pay for heat devices and heat as required to maintain specified conditions for construction operations.

B. Maintain minimum ambient temperatures of 50°F in areas where construction is in progress and 60°F in areas where finishes are being installed, unless indicated otherwise in specifications.

C. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, extended warranty, and regular replacement of filters and worn or consumed parts; specified warranty periods shall begin at turn-over.

1.5 TEMPORARY VENTILATION

A. General Contractor shall ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.6 TELEPHONE SERVICE

A. General Contractor shall provide, maintain and pay for telephone service to field office at time of project mobilization. Each contractor shall be responsible for reimbursement for their long distance calls.

1.7 TEMPORARY WATER SERVICE

A. General Contractor shall provide, maintain and pay for suitable quality water service required for construction operations.

B. Extend branch piping with outlets located so water is available by hoses with threaded connections.

1.8 TEMPORARY SANITARY FACILITIES

A. General Contractor shall provide and maintain required facilities and enclosures.

B. At end of construction, return facilities to same or better condition as originally found.

1.9 BARRIERS

A. General Contractor shall provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities, completed work, and adjacent properties from damage during construction operations.

B. Provide protection for plant life designated to remain. Replace damaged plant life.

C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.10 FENCING

A. Construction: Contractor's option.

B. Safety: Per OSHA requirements.

1.11 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.12 EXTERIOR ENCLOSURES

A. General Contractor shall provide temporary weather-tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.13 INTERIOR ENCLOSURES

A. General Contractor shall provide temporary partitions and ceilings as indicated or required to separate work areas, and to prevent damage to materials and equipment already in place.

B. Construction: Framing and reinforced polyethylene, plywood or gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces.

1.14 PROTECTION OF INSTALLED WORK - BY EACH CONTRACTOR

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

1.15 SECURITY

A. General Contractor shall provide security and facilities to protect work and Owner's operations from unauthorized entry, vandalism, or theft.

B. Each contractor shall be responsible for their own tools and materials.

1.16 ACCESS ROADS

A. General Contractor shall construct and maintain temporary roads accessing public thoroughfares to serve construction area.

B. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Designated existing on-site roads may be used for construction traffic.

1.17 PARKING

A. Arrange temporary parking areas to accommodate construction personnel.

1.18 PROGRESS CLEANING

A. The General Contractor shall provide a 10 cubic yard dumpster at the site. The dumpster shall be available for

use by all prime contractors and their subcontractors. The General Contractor is responsible for the cost of the dumpster.

B. Each Contractor shall maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

C. Respective Contractors shall remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

D. General Contractor shall broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

E. Each Contractor shall collect and remove waste materials, debris, and rubbish from work area periodically and General Contractor shall dispose off-site.

F. In the event that the prime contractors do not maintain a clean job site to the Owner's and Engineer's satisfaction, the Owner reserves the right to have debris removed from the job site and deduct the cost of such from the prime contractors involved.

1.19 PROJECT IDENTIFICATION

A. General Contractor shall provide 8' wide x 4' high project sign of exterior grade plywood and wood frame construction, painted, to Architect/Engineer's design and colors.

B. List title of project, names of Owner, Architect/Engineer, and Contractors.

C. Erect on site at location established by Architect/Engineer.

D. No other signs are allowed without Owner's permission except those required by law.

1.20 FIELD OFFICES AND SHEDS - BY GENERAL CONTRACTOR

A. The General Contractor shall furnish an office for the Owner's and Engineer's Field Representative. The field office shall be a minimum of 120 square feet and a minimum of 8 feet wide. The General Contractor may provide this office space as part of the General Contractor office trailer but it must be completely separated from the General Contractor's office space and have a separate outside entrance.

B. Field Representative's Office: Weather-tight, with lighting, electrical outlets, HVAC equipment, as necessary to maintain temperature between 65-75°F, and equipped with sturdy furniture, drawing rack and drawing display table.

C. The General Contractor shall provide space for project meetings, with table and chairs to accommodate three (3) persons per prime contract, plus six (6) additional persons.

D. Meeting space shall be available to other prime contractors for coordination meetings throughout the duration of the project.

1.21 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Each Contractor shall remove temporary above grade or buried utilities, equipment, facilities, materials, etc. as related to their portion of the work prior to Substantial Completion.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Transportation and handling.

C. Storage and protection.

D. Product options.

E. Substitutions.

1.2 RELATED SECTIONS

A. Document 00101 - Instructions to Bidders.

B. Section 01400 - Quality Control: Product quality monitoring.

1.3 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the contract documents.

C. Provide interchangeable components of the same manufacturer, for similar components.

1.4 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

C. For exterior storage of fabricated products, place on sloped supports, above ground.

D. Provide off-site storage and protection when site does not permit on-site storage or protection. Verify bonding requirements.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of products.

F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable conditions.

1.5 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.

B. Store sensitive products in weather-tight, climate controlled enclosures.

C. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

1.6 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.7 SUBSTITUTIONS

A. Instructions to Bidders specify time restrictions for submitting requests for proposed substitutions during the

bidding period, and for the requirements specified in this Section.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Bidder:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the Substitution as for the specified product.
3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse the Owner for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:

1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on the proposer.
3. The Architect/Engineer will notify Contractor, in writing, of decision to accept or reject request.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01650

STARTING OF SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Starting systems.

B. Demonstration and instructions.

C. Testing, adjusting, and balancing.

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Manufacturers field reports.

B. Section 01700 - Contract Closeout: System operation and maintenance data and extra materials.

1.3 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect/Engineer seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative, Contractors' personnel, and Owner's representative in accordance with manufacturers' instructions.

G. Submit a written report in accordance with Section 01300 that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.5 TESTING, ADJUSTING, AND BALANCING

A. Designated Contractor shall appoint, employ, and pay for services of an independent firm to perform testing, adjusting and balancing.

B. Reports will be submitted by the independent firm to the Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Adjusting.

D. Project record documents.

E. Operation and maintenance data.

F. Spare parts and maintenance materials.

G. Warranties.

1.2 RELATED SECTIONS

A. Section 01500 - Construction Facilities and Temporary Controls: Progress cleaning.

B. Section 01650 - Starting of Systems: System start-up, testing, adjusting, and balancing.

1.3 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's inspection.

B. Provide submittals to Architect/Engineer that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.4 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

D. Replace filters of operating equipment.

E. Clean debris from drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on site, one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other Modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured depths of foundations in relation to finish main floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit two sets prior to final inspection, bound in 8-1/2 x 11 inch text pages, three D side ring binders with durable plastic covers.

B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, type on 24 pound white paper in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

a. Significant design criteria.
b. List of equipment.
c. Parts list for each component.
d. Operating instructions.

e. Maintenance instructions for equipment and systems.
f. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

a. Shop drawings and product data.
b. Air and water balance reports.
c. Certificates.
d. Photocopies of warranties and bonds.

E. Submit one draft copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with Architect/Engineer comments. Revise content of documents as required prior to final submittal.

F. Submit two sets of revised final volumes, within ten days after final inspection.

1.8 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide spare parts, maintenance and extra products in quantities specified in individual specification Sections.

B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

C. Secure Owner's agent signature as acknowledgment of receipt of spare parts and maintenance training/materials. Submit with final request for payment.

1.9 WARRANTIES

A. Each Contractor shall guarantee in writing to the Architect and Owner that work herein shall be free from defects in workmanship and materials, that apparatus will develop capacities and characteristics required on drawings, and that if during a period of one year after date of certificate of completion and acceptance of project, any such defects appear, he shall remedy same without any cost to Owner.

B. Provide duplicate notarized copies.

C. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.

D. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.

E. Submit prior to final Application for Payment.

F. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 02060

BUILDING DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Demolition of designated structures and removal of materials from site.

B. Demolition and removal of foundations and slabs-on-grade.

C. Disconnecting, capping, and removal of identified utilities.

D. Refer to items as scheduled at end of section and as indicated on drawings.

1.2 RELATED SECTIONS

A. Section 01039 - Coordination and Meetings

B. Section 01120 - Alteration Project Procedures: Re-installation of removed components and materials.

C. Section 01500 - Construction Facilities and Temporary Controls: Barriers, fences and landscape protection. Dust control.

D. Section 01600 - Material and Equipment.

E. Section 01700 - Contract Closeout: Project record documents.

F. Section 02072 - Minor Demolition for Remodeling.

G. Section 02110 - Site Clearing: Clearing outside periphery of structures.

H. Section 02205 - Soil Materials: Backfill materials.

1.3 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items; location and construction of barricades, fences and temporary work.

C. Record Documents: Accurately record actual locations of capped utilities, subsurface obstructions, and related conditions.

1.4 QUALIFICATIONS

A. Demolition Firm: Company specializing in performing the Work of this Section with minimum five years documented experience.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable codes for demolition of structures, safety of adjacent structures, dust control, runoff control, and disposal.

B. Obtain required permits from authorities.

C. Notify affected utility companies before starting work and comply with their requirements.

D. Do not close or obstruct roadways, sidewalks, or hydrants without permits.

E. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

F. Test soils around buried tanks for contamination.

1.6 SEQUENCING

A. Sequence work under the provisions of Section 01010.

1.7 SCHEDULING

A. Schedule work under the provisions of Section 01300.

B. Schedule Work to coincide with new construction.

C. Describe demolition removal procedures and schedule.

D. Perform work between the hours of 9:00 a.m. and 4:00 p.m.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. Fill Material: Type specified in Section 02205.

PART 3 EXECUTION

3.1 PREPARATION

A. Provide, erect, and maintain temporary barriers and security devices at locations indicated or required as directed.

B. Protect existing landscaping materials, appurtenances, and structures which are not to be demolished.

C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.

D. Mark location of utilities.

3.2 DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent structures.

B. Cease operations immediately if adjacent structures appear to be in danger. Notify Architect/Engineer. Do not resume operations until directed.

C. Conduct operations with minimum interference to public or private accesses. Maintain egress and access at all times.

D. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon or limit access to their property.

E. Sprinkle Work with water to minimize dust. Provide hoses and water connections for this purpose.

3.3 DEMOLITION

A. Disconnect, remove, cap, and identify designated utilities within demolition areas.

B. Remove foundation walls and footings to a minimum of two feet below finished grade within area of new construction.

C. Remove concrete slabs on grade.

D. Remove materials to be re-installed or retained in manner to prevent damage. Store and protect in accordance with requirements of Section 01600.

E. Backfill areas excavated, open pits and holes caused as a result of demolition, in accordance with Section 02223.

F. Rough grade and compact areas affected by demolition to maintain site grades and contours.

G. Remove demolished materials from site.

H. Do not burn or bury materials on site. Leave site in clean condition.

I. Remove temporary work.

3.4 SCHEDULES

A. Relics, antiques, and similar objects remain the property of Owner. Obtain direction regarding method of removal. Items may include:
1. _____.
2. _____.
3. _____.

B. Items to be removed, stored, and protected for re-installation:
1. _____.
2. _____.
3. _____.

C. Items to be removed and be retained by Owner; deliver to location designated by Architect/Engineer.
1. _____.
2. _____.
3. _____.

D. Items to be removed by and kept by the Owner:
1. _____.
2. _____.
3. _____.

END OF SECTION

SECTION 02220

EXCAVATION AND BACKFILL

PART 1 GENERAL

1.01 WORK INCLUDED

A. Excavation, backfill and related work for the construction of structures and other incidental work.

1.02 RELATED WORK

A. Section 01410 - Testing Laboratory Services: Compaction requirements of backfill.

1.03 REFERENCES

A. ASTM C33 - Specification for Concrete Aggregates.

B. ANSI/ASTM C136 - Sieve Analysis of Fine and Coarse Aggregates.

C. ANSI/ASTM D698 - Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 5.5 lb (2.49 kg) Rammer and 12 inch (305 mm) Drop.

D. ANSI/ASTM D1556 - Density of Soil in Place by the Sand-Cone Method.

E. ODOT Specifications - State of Ohio, Department of Transportation Construction and Material Specifications.

1.04 TESTS

A. Tests and analysis of fill materials will be performed in accordance with ANSI/ASTM D698 and under provisions of Section 01410.

1.05 PROTECTION

A. Protect trees, shrubs, lawns, rock outcropping and other features remaining as a portion of final landscaping.

B. Protect bench marks, existing structures, fences, sidewalks, paving and curbs from equipment and vehicular traffic.

C. Protect above and below grade utilities which are to remain.

D. Protect excavations by shoring, bracing, sheet piling, underpinning or other methods required to prevent cave-in or loose soil from falling into excavation.

E. Underpin adjacent structures which may be damaged by excavation work, including service utilities and pipe chases.

F. Notify Architect/Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

G. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

H. Grade excavation top perimeter to prevent surface water run-off into excavation.

I. No excavation or trenching work shall begin until all utility lines running across or adjacent to the property have been located by the affected utility company. The Contractor shall notify the Ohio Utility Protection Service (1-800-362-2674) and the utility owner at least forty-eight (48) hours prior to starting work.

1.06 DAMAGE TO STRUCTURES

A. The Contractor shall repair to the satisfaction of the Owner and the Architect/Engineer all damage to structures, piping, sewers, drains, cables, roadways, conduits, equipment and appurtenances, resulting from excavation and backfill operations.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots.

B. Common Backfill: Excavated material which has been approved by the Engineer to be used as backfill in designated locations.

C. Special Backfill: Granular material conforming to ODOT Specification 310.02.

D. Pipe Bedding: ASTM C33, No. 67.

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

A. All areas to be occupied by proposed structures and all areas to be regraded shall be cleared of all stumps, trees, roots, brush, hedges, boulders, sod, rubbish, heavy grass, weeds, etc. before excavation or grading is started.

B. Any area cleared beyond the limits shall be regraded and reseeded at the Contractor's expense.

3.02 TOPSOIL REMOVAL

A. All areas to be occupied by proposed structures and all areas to be regraded shall be stripped of its topsoil to its entire depth.

B. The topsoil shall be removed and stored on the project site to be reused on areas to be seeded.

C. Surplus material shall be removed from the site unless otherwise instructed by the Owner or Architect/Engineer.

3.03 PREPARATION

A. Identify required lines, levels, contours and datum.

B. Identify known underground utilities. Stake and flag locations.

C. Identify and flag surface and aerial utilities.

D. Notify utility company of any utilities which are to be removed or relocated.

E. Maintain and protect existing utilities remaining which pass through work area.

3.04 EXCAVATION

A. Excavate subsoil required for building foundations, construction operations and other work.

B. Excavation shall not interfere with normal 45 degree bearing splay of any foundation.

C. Hand trim excavation and leave free of loose matter.

D. Correct unauthorized excavation at no cost to Owner.

E. Fill over-excavated areas under structure bearing surfaces in accordance with direction by Architect/Engineer.

F. Stockpile excavated material in area designated on site and remove excess subsoil, not being reused, from site, unless otherwise instructed by the Owner or Architect/Engineer.

3.05 PIPE TRENCH

A. The maximum width of the trench at the top of the pipe shall be the outside diameter of the pipe plus 9 inches on each side of the pipe.

B. Place pipe on minimum 6 inch deep bed of pipe bedding.

C. Support pipe during placement and compaction of bedding fill.

D. Install pipe bedding at sides and over top of pipe. Provide top cover to minimum compacted thickness of 6 inches.

3.06 INSPECTION

A. Verify stockpiled fill to be reused is approved.

B. Verify foundation perimeter drainage installation has been inspected.

C. Verify foundation or basement walls are braced to support surcharge forces imposed by backfilling operations.

D. Verify areas to be backfilled are free of debris, snow, ice, or water, and ground surfaces are not frozen.

3.07 BACKFILLING

A. Backfill material shall be Common Backfill when approved by the Architect/Engineer or Special Backfill when required, unless otherwise noted.

B. Backfill around structures shall be placed in continuous layers not exceeding 8 inches loose depth compacted to 98% of maximum density per ASTM D698.

C. Backfill under structures or where other structures, pipelines or slabs are to be constructed shall be placed in continuous layers not exceeding 6 inches loose depth compacted to 100% of maximum density per ASTM D698.

D. Backfill under slabs on grade shall be Special Backfill placed in continuous layers not exceeding 6 inches loose depth compacted to 100% of maximum density per ASTM D698.

E. Backfill for pipe under paved areas shall be Special Backfill placed in continuous layers not exceeding 6 inches loose depth compacted to 100% of maximum density per ASTM D698.

F. Backfill for pipe not under paved areas shall be placed in continuous layers not exceeding 8 inches loose depth compacted to 92% of maximum density per ASTM D698.

G. Backfill areas to contours and elevations. Use unfrozen materials.

H. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.

I. Employ a placement method so not to disturb or damage foundation perimeter drainage, foundation dampproofing or utilities in trenches.

J. Maintain optimum moisture content of backfill materials to attain required compaction density.

K. Backfill against supported foundation walls. Backfill simultaneously on each side of unsupported foundation walls.

L. Slope grade away from building minimum 2 inches in 10 feet unless noted otherwise.

M. Make changes in grade gradual. Blend slopes into level areas.

N. Remove surplus backfill materials from site unless otherwise instructed by the Owner or Architect/Engineer.

O. Leave stockpile areas completely free of excess fill materials.

3.08 FIELD QUALITY CONTROL

A. Compaction testing will be performed in accordance with ANSI/ASTM D1556 and under provisions of Section 01410.

B. Compaction tests shall be performed on each layer.

C. Where the backfill material and method of compaction has proven to meet the test requirements, the number of tests

required may be reduced according to the Architect/Engineer.

D. Any variation in the material or method used for compaction will require tests on each layer.

E. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

PART 4 SPECIAL PROVISIONS

None

END OF SECTION

SECTION 02231

AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aggregate base course for paved areas.

1.2 RELATED SECTIONS

A. Section 02211 - Rough Grading: Preparation of site for base course.

B. Section 02223 - Backfilling: Compacted fill under base course.

C. Section 02225 - Trenching: Compacted fill under base course.

D. Section 02510 - Asphaltic Concrete Paving: Finish asphalt surface course.

E. Section 02520 - Portland Cement Concrete Paving: Finish concrete surface course.

1.3 REFERENCES

A. AASHTO M147-65 - Materials for Aggregate and Soil-Aggregate.

B. ASTM C136 - Sieve Analysis of Fine and Coarse Aggregates.

C. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.

D. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop. (Modified Proctor)

E. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

F. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Samples: Submit 10 lb. sample of each type of aggregate to testing laboratory.

PART 2 PRODUCTS

2.1 MATERIALS

A. Refer to ODOT designation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify subgrade has been inspected, gradients and elevations are correct, and are dry.

3.2 AGGREGATE PLACEMENT

A. Spread coarse aggregate over prepared base to a total compacted thickness as shown on details, install in layers not to exceed 8" each.

B. Level and contour surfaces to elevations and gradients indicated.

C. Compact placed aggregate materials to achieve compaction to 95 percent of its maximum dry density in accordance with ANSI/ASTM D1557.

D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

E. Use mechanical vibrating tamping in areas inaccessible to compaction equipment.

3.3 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation from True Elevation: Within 1/2 inch.

3.4 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

B. Gradation of Aggregate: In accordance with ASTM C136. Refer to ODOT designation.

C. Compaction testing will be performed in accordance with ANSI/ASTM D1557 and with Section 01400.

D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

E. Frequency of Tests: One test per lift for every 1000 S.F. of area.

END OF SECTION

SECTION 02510

ASPHALTIC CONCRETE PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Asphaltic concrete paving; wearing, binder or base course.

B. Pavement markings.

1.2 RELATED SECTIONS

A. Section 02211 - Rough Grading: Preparation of site for paving and base.

B. Section 02223 - Backfilling: Compacted subbase for paving.

C. Section 02231 - Aggregate Base Course.

D. Section 02607 - Manholes and Covers: Including frames.

E. Section 02853 - Parking Bumpers: Concrete bumpers.

1.3 REFERENCES

A. MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot Mix Types - The Asphalt Institute (AI).

B. MS-3 - Asphalt Plant Manual - The Asphalt Institute (AI).

C. MS-8 - Asphalt Paving Manual - The Asphalt Institute (AI).

D. MS-19 - Basic Asphalt Emulsion Manual, The Asphalt Institute (AI).

E. ASTM D946 - Penetration-Graded Asphalt Cement for Use in Pavement Construction.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with AI Manual MS-8 and State of Ohio (ODOT - Ohio Department of Transportation standards).

B. Mixing Plant: Conform to AI Manual MS-3 and ODOT specifications.

C. Obtain materials from same source throughout.

D. Maintain one copy of each document on site.

1.5 REGULATORY REQUIREMENTS

A. Conform to Local and County codes and ODOT specifications for paving work.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt when base surface temperature is less than 40 degrees F, or when surface is wet or frozen.

PART 2 PRODUCTS

2.1 MATERIALS

A. Asphalt Cement: ASTM D946 In accordance with ODOT standards.

2.2 ACCESSORIES

A. Primer: Homogeneous, medium curing, liquid asphalt in accordance with ODOT standards.

B. Pavement Markings: Alkyd traffic paint, white.

2.3 ASPHALT PAVING MIX

A. Use dry material to avoid foaming. Mix uniformly.

B. Binder Course: 4.5 to 6 percent of asphalt cement by weight in mixture in accordance with AI and ODOT standards.

C. Wearing Course: 5 to 7 percent of asphalt cement by weight in mixture in accordance with AI and ODOT standards.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify base conditions under provisions of Section 01039.

B. Verify that compacted subgrade granular base is dry and ready to support paving and imposed loads.

C. Verify gradients and elevations of base are correct.

3.2 SUBBASE

A. Section 02231 - Aggregate Base Course forms the base construction for work of this Section.

3.3 PREPARATION - PRIMER

A. Apply primer in accordance with ODOT standards.

3.4 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Place asphalt binder course within 24 hours of applying primer or tack coat.

B. Place binder course to 1-1/2 inch compacted thickness.

C. Place wearing course within two hours of placing and compacting binder course.

D. Place wearing course to 1-1/2 inch compacted thickness.

E. Compact pavement by rolling. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

F. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.5 PAVEMENT MARKINGS

A. One coat of alkyd traffic paint, white, 4" wide - conform to ODOT 640.

3.6 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation from True Elevation: Within 1/2 inch.

3.7 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400.

B. Take samples and perform tests in accordance with ODOT.

3.8 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury as outlined in ODOT.

END OF SECTION

SECTION 02700

EXTERIOR SITE UTILITIES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. General Comment - Drawings and General Conditions of the Contract, including Special Conditions, apply to this section.

B. The work under this section consists of labor, materials, transportation, tools, equipment, installation, tests and guarantees, etc. for the completion of such work as specified hereinafter, and as shown on the drawings.

C. This section shall include, but not necessarily be limited to the following:

1. Storm Drainage: Including installation of drainage systems consisting of manholes, catch basin, drain inlets, pipes, rip rap and all necessary and required accessory items and operations, connection to existing drainage facilities, alteration, reconstruction and/or relocation of existing structures as shown on the drawings. Connection of building storm sewer service to the on site storm lines shall be made by the Building Mechanical Contractor.

2. Sanitary Sewer: Including installation of manholes, drop connections, pipe, and all necessary and required accessory items and operations; connections to existing facilities; alteration and/or reconstruction of existing structures as shown on the drawings. Connection of building sanitary sewer service to the on site sanitary lines shall be made by the Building Mechanical Contractor.

3. Water Supply: Including installation of water distribution system consisting of valves and valve boxes, hydrants, pipe fittings, anchor and/or thrust blocks, manholes, and all necessary and required accessory items and operations; connections to existing facilities as shown on the drawings. Connection building water service lines to the water mains shall be done by the Building Mechanical Contractor.

4. Terminations and provisions for future connections are as indicated on the Underground Utility Drawings. Reference summary of work for further clarifications.

1.02 PERMIT AND CODES

A. The Contractor shall secure and pay for all permits and inspections required by any agency having jurisdiction over the installation of exterior utilities.

B. The Contractor shall carefully examine all of the requirements necessary for code compliance. In the event of a conflict between the specifications or drawings and the code, the most stringent requirement shall govern. In all cases the most stringent requirement shall govern where there are discrepancies between the references and standards of this specification. No changes in contract amounts will be allowed for changes necessary for code compliance.

C. Certificates of inspection shall be delivered free of charge to the Owner by the Contractor before the final payment, showing that all work and materials under this contract do fully meet the requirements and approval of the inspecting agency.

D. Roof drains, foundation drains, and other clean water connections to the sanitary sewer system are prohibited.

1.03 UTILITIES NOTIFICATION

A. Underground Utilities

At least two (2) working days prior to commencing construction operations in an area which may involve underground utility facilities, the Contractor shall notify the Engineer, the registered utility protection service (800-362-2764) and the owner of each underground utility facility shown on the plans.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sanitary sewer pipe and fittings shall be the size indicated on the drawings unless a particular type of pipe is approved equal by the Architect/Engineer.

1. Polyvinyl Chloride (PVC) pipe and fittings conforming to ASTM D-3034, pipe stiffness shall be

minimum SDR-35. Joints shall be bell and socket type using flexible elastomeric seals conforming to ASTM D-3212.

2. Concrete (CP) extra strength pipe and fittings conforming to ASTM C-14. Joints shall be bell and socket type using O-ring seals conforming to ASTM C-443.

3. Reinforced precast concrete manhole sections including concentric or eccentric cones and grade rings shall be 4,000 psi concrete and conform to ASTM C-478 and AASHTO M-199 and ODOT Item 604. Sections shall be complete with cast-in-place cast iron manhole steps equal to Neenah No. R-1980, 16" C to C or 16" wide polyurethane steps reinforced with 1/2" diameter steel bars. Manholes shall have Kor-n-seal boots.

B. Exterior underground water distribution piping and fittings shall be size and type indicated on the drawings and shall conform to the following:

1. Water lines four inches (4") and larger shall be ductile iron pipe conforming to AWWA C151/ANSI A21.51, or PVC AWWA C-900, DR-18, Class 150. All ductile iron pipe shall be cement lined and coated with coal tar pitch varnish conforming to ANSI A21.4 AWWA C-104. All pipe shall be suitable for a working pressure of 150 psi. All fittings shall be ductile iron.

   a. Ductile iron shall be thickness Class 52 conforming to the following:

      1. Pipe - AWWA C-150/ANSI A21.5

      2. Joints - AWWA C111-ANSI A21.11 (Push on Joints)

2. Ductile Iron Fittings: Fittings shall be of ductile cast iron, shall conform to ANSI A21.10 and shall be coated and lined as specified for the pipe. Fittings shall be of the mechanical joint type. The branch of the tees for fire hydrants shall be of the anchoring pipe as shown in the standard drawings. Provide required standard and tapped mechanical joint plugs. Mechanical joints and push-on joints shall be in accordance with ANSI A21.11, incorporating rubber gaskets.

3. Waterlines less than four inches (4") shall be Schedule 40 PVC pipe and fittings conforming to the latest requirements of ASTM D-1785 and ASTM D-2467 respectively.

4. Detectable Tracer Tape: This tape shall be installed for positive pipe locations by pipe/cable locators and a visible warning to excavators. The detection tape shall not be less than 2-inch wide; shall be inert, bonded layer plastic with metallized foil core. The tape shall be colored blue per the APWA Uniform Color Code with minimum 1 1/4" high lettering warning of buried water line repeated at least every 24 inches.

5. Gate Valves and Valve Boxes:

   a. All gate valves shall be compression resilient seated valves conforming to the latest standard specifications of the American Water Works Association (AWWA) C-509. Valves shall be as manufactured by American Flow Control, U.S. Pipe, Inc., AVK, Inc., Pratt, or approved equal.

   b. Gate valves shall be equipped with mechanical joints and non-rising systems. Valves shall be equipped with a 2" operating nut.

   c. All gate valves shall be designed for a working pressure of 200 lbs. per square inch unless otherwise noted on the plans. The Contractor shall make all valves tight under their working pressures after they have been placed and before the waterline is in operation. Any defective parts shall be replaced at the Contractor's expense.

   d. Valve boxes shall be provided for all gate valves. Valve boxes shall be of standard, adjustable sliding, heavy pattern, cast iron extension type, of such length as is required. Valve boxes shall be firmly supported and shall be kept centered and plumb over the wrench nut of the gate valve. The box cover shall be flush with the final grade. Where valve boxes are installed in locations subject to traffic, they shall be supported so that no load can be transmitted from the valve box to the valve. Covers shall be marked WATER.

C. Storm drainage pipe and fitting shall be the size indicated on the drawings. Unless a particular type of pipe is approved equal by the Engineer and/or the Owner, the following materials shall be used:

1. Reinforced Concrete (RCP) Class III pipe and fittings, for all pipe 12" and larger in diameter shall conform to ASTM C-76. Joints for reinforced concrete shall be bituminous joint filler meeting requirement of ODOT Item 706.10 applied per Item 603.06.

2. Reinforced precast concrete manhole and storm catch sections including concentric or eccentric cones and grade rings shall be 4,000 psi concrete and conform to ASTM C-478 or AASHTO M-199 and ODOT Item 604. Sections shall be complete with cast-in-place cast iron manhole steps equal to Neenah No. R-1980, 16" C to C or 16" side polyurethane steps reinforced with 1/2" diameter steel bar. Manholes shall have Kor-n-seal boots.

3. For storm pipe 10" and less in diameter use PVC SDR-35 pipe and fittings conforming to ASTM D3034.

D. Gas lines, when required to be installed by this Contractor, shall meet the requirements of the local utility supplying the gas.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING

A. All materials shall be packed, delivered, stored, and handled in a manner to prevent deterioration or contamination from foreign matter, and as recommended by the manufacturer, so that same shall be in perfect condition when ready to use. Any material judged by the Engineer to be unacceptable due to delivery, storage, and/or handling shall be removed from the site and replaced with acceptable material, all at the Contractor's expense.

B. Materials delivered to the job shall be stacked in a dry place, off the ground, on a prepared plank platform, and in a manner to promote circulation of air through and around the units.

3.02 LAYING OUT THE WORK

A. This Contractor is responsible for taking all lines to within five feet of the building wall, unless otherwise indicated on the drawings. Connections to the building are shown in their approximate locations; however, architectural and mechanical drawings should be consulted for exact location of connections. The Building Mechanical Contractors shall be responsible for all final connections.

B. This Contractor shall carefully check the project drawings and coordinate with other Contractors who interface with this work to establish a logical sequence of operations and to avoid conflicts or damage to other lines and existing work.

3.03 EXCAVATION

A. Perform all excavating and trenching to dimensions and elevations indicated on the drawings and specified for utility piping and related structures. The Contractor shall refer to Division 2, Section 02220 - Excavation and Backfill.

1. Trench walls below top of pipe shall be vertical and the trench width shall not exceed trench width detail as shown on the drawings. Above top of pipe the trench walls may be sloped.

2. Open no more trench in advance of pipe laying than is necessary to expedite the work.

3. Care shall be taken not to excavate below the depth indicated on the drawings. Where excessive or unauthorized excavation takes place, the over depth shall be backfilled at the proper grade with ODOT No. 67 stone compacted bedding material at the Contractor's expense.

4. Where unstable material is encountered in bottom of trench or other excavation, excavation shall be made to depth as directed by the Construction Manager and backfilled with ODOT No. 67 stone compacted bedding material.

5. Where sand, gravel, or clay is encountered, all pipe shall be laid on the prepared 4" minimum bed as shown on the plans evenly graded providing smooth packed bottom with cutouts for pipe hubs to insure uniform bearing.

6. Where stone or shale is encountered in the excavation, all pipe shall be laid on a 6" bed of ODOT No. 67 stone bedding.

B. Provide required timber sheeting, bracing, and shoring to protect sides of excavation. Do not brace sheeting against pipe. Provide staging and suitable ladders where required.

C. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of trenches to avoid overloading, and to prevent slides or cave-ins. Excavated material shall be piled on one side of the trenches in such a manner as to keep surface drainage of adjoining areas unobstructed.

D. Excavated material not suitable for backfill shall be stockpiled in areas designated by the Construction Manager and shall be contoured and graded for drainage.

E. When wet excavation is encountered, the trench shall be dewatered and kept free of water until the pipe has been laid and backfilled to a point at least one foot above top of pipe.

1. Provide adequate pumps, well points, hose, strainers, and other appurtenances required, including all power, labor, and maintenance.

F. When excavations are to be made in paved surfaces, the paved surfaces shall be line cut ahead of the excavation by means of pneumatic, saw cutting or other approved tools to provide a clean, uniform edge, with minimum disturbance of remaining pavements. The pavements so removed shall not be used for trench backfill, but shall be removed from the job site and disposed of legally by this Contractor.

3.04 BACKFILL

A. Trenches and excavation pits shall not be backfilled until all visual inspections covering the installation of storm sewer, sanitary sewer, and waterlines have been performed and approved.

B. All timber sheeting below a plane one foot above top of pipe shall remain in place in order not to disturb pipe grading. Before backfilling, remove all other sheeting, bracing, and shoring.

C. ODOT No. 67 stone bedding used for trench bottom shall be extended to the sides and carefully placed around and

over pipe in six inches (6") maximum layers. Each layer shall be thoroughly and carefully compacted until one foot (1') of cover exists over pipe. The cost of bedding material shall be included in the price of the pipe.

D. Remainder of trench shall be backfilled with excavating backfill material free of organic and frozen material and excessively large stones as approved by the testing laboratory to specified subgrade elevation. Backfilling shall be compacted to 98% Standard Proctor of dry density as per ASTM D-1557 under paved and building areas and 90% Standard Proctor for remaining areas.

1. In streets, drives, parking lots, and other areas to have or having improved hard surfaces, backfill shall be ODOT Item 310.02 stone material deposited from 1 foot over the pipe in six inch (6") layers and compacted to 98% Standard Proctor of dry density as determined by ASTM D-698. Where service or utility lines cross street, stone backfill shall be carried to five feet (5') beyond the curb, or where sidewalks exist, to the side of the sidewalk farthest away from the street.

E. Before backfilling around drainage structures, all forms, trash, and debris shall be removed and cleared away. Selected excavated material shall be placed symmetrically on all sides in six inch (6") maximum layers; each layer shall be moistened and compacted with mechanical or hand tampers to 98% Standard Proctor of dry density as determined by ASTM D-698. Where drainage structures are under or within five feet (5') of an improved hard surface, backfill shall be ODOT Item 310.02 stone material deposited in six inch (6") layers compacted 95% Modified Proctor of maximum density as determined by ASTM D-1557.

3.06 INSTALLATION

A. Sanitary and Storm Sewer Lines

1. Each length of pipe shall be laid with firm, full, and even bearing throughout its entire length, in a trench prepared and maintained in accordance with Section 3.03. Bedding shall comply with manufacturer's requirements and details as shown on drawings. Pipe shall be laid upgrade unless otherwise directed by the Engineer.

Bell and spigot pipe shall be laid with the bell upgrade. The pipe shall be joined so that there

will be a uniform space all around the pipe. Trimming of the pipe will not be allowed.

Every length of pipe shall be inspected and cleaned of all dirt and debris before being laid. Prior to the placing of a length of pipe, the end of the previously laid length shall be carefully and thoroughly wiped smooth and cleaned to obtain an even and close fitting joint.

No length of pipe shall be laid until the preceding lengths of pipe have been thoroughly embedded in place, so as to prevent movement or disturbance of the pipe.

2. Only full lengths of pipe are to be used in the installation, except that partial lengths of pipe may be used at the entrance to structures where necessary to obtain a proper connection to the structure.

3. All pipe entering structures (e.g., manholes, catch basins, etc.) shall be cut flush with the inside face of the structure, and the cut end of the pipe and surface of the structure shall be properly rounded and finished so that there will be no protrusion, ragged edges, or imperfections that will impede the flow of water or affect the hydraulic characteristics of the installation.

4. The Contractor shall protect the installation at all times during construction, and movement of concrete equipment, vehicles, and loads over and adjacent to any pipe shall be done at the Contractor's risk.

   At all times when pipe laying is not in progress, all open ends of all pipes shall be closed by approved temporary water-tight plugs. If water is in the trench when work is resumed, the plug shall not be removed until the trench has been pumped dry and all danger of water entering the pipe has passed.

5. The Contractor shall conduct his operations as to maintain at all times sewer flows through existing facilities to remain in place (including lateral home service) and through existing facilities to be replaced until new facilities are completed and placed in use. Additional pavement for any additional costs involved in maintaining these

flows by pumping or by any other means approved by the Engineer will not be allowed.

6. Where the plans provide for the proposed pipe to be connect to, or to cross either over or under an existing sewer, it shall be the responsibility of the Contractor to locate the existing pipe as to line grade before he starts to lay the proposed pipe.

   Also, all existing pipe that is not called out on the plans, but that is cut during excavation for the proposed pipe, shall be inspected by the Engineer to determine if the existing pipe is to be connected to the proposed pipe. At the time of said inspection, the Engineer shall determine the method of connection if the connection is required. The cost of the connections shall be included in the unit price bid for the pertinent pipe item.

7. Any adjustments of existing utilities will be by owners, except sanitary and storm sewer adjustments or appurtenances are included as part of this project.

8. Plugs for sanitary sewer connections to be of PVC material with PVC bolt, wing nut and rubber seal.

B. Water Distribution System

1. Provide all required valves, valve boxes, meter pits, etc., as shown on the plans. Cover for all valve boxes and pits shall be flush with grade and identified.

2. Pipe and accessories shall be handled in such a manner as to insure delivery on the work site in sound, undamaged condition. Particular care shall be taken not to injure the pipe coating. Rope or canvas slings shall be used in loading, unloading, and installing of the ductile iron or PVC water pipe. The use of chains or tongs will not be permitted. All surface areas of the ductile pipe that are damaged shall be recoated with hot bituminous material equal to that used to factory coat the pipe.

3. Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Pipe cutting shall be done by means of an approved type of mechanical cutter. Wheel type cutters shall be used when practical.

4. Protect open pipe ends whenever work is suspended during construction to prevent foreign bodies entering the lodging therein. Use wood blocks or other methods for protection.

   a. Clean joint contact surfaces immediately prior to jointing. Apply lubricants, primers, etc., to facilitate assembly as recommended by joint manufacturer.

5. All tee connections, bends, and dead ends shall be securely blocked and anchored in place with concrete thrust blocks.

6. The waterline will have a ten foot (10') minimum horizontal separation and/or an eighteen inch (18") vertical separation from the storm sewer and sanitary sewer at all times.

7. The waterline shall be installed with a four feet (4') minimum cover over the top of the pipe at all times. The waterline shall be constructed at the minimum depth whenever possible.

C. Utility Structures

1. Furnish and install utility structures, such as manholes, cleanouts, valve boxes, pits, etc., at location to the elevation and of dimensions as indicated on the drawings.

2. Provide poured concrete foundations or precast concrete bases for utility structures as indicated on the drawings.

3. Manholes and catch basins shall be constructed of precast concrete with cast iron frames, covers, and manhole steps, as indicated on drawings and specified herein.

4. Manhole steps shall be built into and thoroughly anchored to walls as indicted in the plans.

5. All piping entering or leaving drainage structures shall be adequately supported by poured in place concrete fill from pipe centerline to undisturbed ground. Kor-n-seal boots shall be used for all piping.

6. Set frames and covers in full bed of stiff mortar jointing compound at final elevation.

D. General Utility Notes

1. All work performed on this project is subject to the inspection and approval of the Engineer and/or Owner.

2. The use of a solvent or glue on fittings is not permissible.

3. Any pipes not connected on this project shall be fitted with appropriate plugs fastened in the approved manner.

4. Wherever existing power, telephone, gas, or other utilities require relocation, the work shall be done by others. The Contractor shall be responsible for repairing any damage to existing storm or sanitary sewers that are damaged during construction.

5. All fittings, couplings, etc. not specifically shown or called for on the plans, but required for a workmanlike job, shall be included in the cost of the pipe.

6. At all times during the progress of the work and until the release of the Contractor from his guarantee by the Owner, the Contractor shall maintain the backfilled trenches. Any settlement that occurs during such time shall be immediately filled. The Contractor shall also replace all pavement, drives, walks, pipe, sod, etc., which has been disturbed, to a condition equal to that which existed before construction was started.

3.06 TESTS

A. All concealed work must remain uncovered until all required tests and inspections are completed.

B. The Contractor shall contact the local governing agency and/or utility to determine which tests and inspections are required. The Contractor shall notify the appropriate inspector forty-eight (48) hours when the work is ready for tests or inspection.

C. The Contractor shall furnish to the Owner copies of all required tests and inspections.

D. Waterline testing shall be in conformance to AWWA C-600 and AWWA C-601 and as follows:

1. Hydrostatic Tests: After any section of pipe is laid between valves, the pipe shall be filled with water and subjected to hydrostatic pressure of 150 lbs. per square inch for a period of one hour. Allowable leakage will be fifty (50) gallons/inch/mile/twenty-four (24) hours with thirteen feet (13') lengths of pipe. Tests shall be performed by the Contractor and witnessed by the Engineer. The actual cost of the test shall be borne by the Contractor. All mains to be tested with hydrants in place and with hydrant connection valves open.

   a. Procedure: Each section of pipe line shall be slowly filled with water at the specific test pressure, measured at the point of lowest elevation shall be applied by means of a pump connected to the pipe, in a manner satisfactory to the Engineer. The pump, pipe connection, and all necessary apparatus including gauges and meters shall be furnished by the Contractor. When required, all material and labor necessary to make taps into the pipe shall be furnished by the Contractor at no cost to the Owner.

   b. Expelling Air Before Test: Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation and afterward tightly plugged.

   c. Connection to Existing Mains: When the pipe is to be connected to an existing valve or main, the Contractor shall make the connection only after the new water main pipe has been pressure tested and chlorinated. The Contractor may elect to connect the new water main to the existing pipe or valve prior to pressure testing; however, if such is done, the Contractor shall first verify to his satisfaction and shall be responsible for insuring that the existing pipe or valve is capable of meeting the pressure test requirements.

2. Air Test: Prior to tapping an existing main for a new main extension, the Contractor shall install the tapping saddle and apply a 90 pound air test to insure against leakage of the saddle during the tapping operation.

3. Disinfection of Complete Pipe Line: Before being placed in service and before certification of completion by the Engineer, all new water systems, or extensions to existing systems by valve section of such extension, or any replacement in the existing water system, or any exposed section of the existing system, shall be flushed and disinfected in accordance with the current State of Ohio EPA procedures. Water mains shall be thoroughly flushed prior to disinfection.

4. Chlorination: The Contractor will perform all necessary work to chlorinate the water mains and its appurtenances. A chlorine solution shall be injected into water mains of sufficient strength to create a 50 ppm chlorine solution in the main. The type of chlorine used, mixing rates, and application rate shall be approved by the Engineer. The strong chlorine solution shall remain in the water main at least twenty-four (24) hours prior to flushing. Immediately at the time of flushing the chlorinated water from the main, a water sample for testing the strong chlorine solution shall be taken. After the main has been thoroughly flushed, another sample shall be taken to test for residual chlorine. Sufficient notification shall be given to the Engineer by the Contractor as to the date and time such samples are to be taken. The Contractor shall rechlorinate the water main if tests conducted on the samples taken do not meet current standards. At the time of chlorination, all hydrant valves and intermediate main line valves shall be operated. All cost of chlorination, installation of corporations, and related materials and labor shall be at the Contractor's expense.

5. Chemical and Bacteriological Test: Following chlorination, all treated water shall be thoroughly flushed from the water main until the replacement water through its length shall, both chemically and bacteriologically, be proven equal in quality to the water in the source supply system.

E. Sanitary sewer testing shall be as follows:

1. The maximum rate of infiltration for the sanitary sewer is 200 gallons per inch diameter per mile, per twenty-four (24) hours. This test is to be conducted when the height of ground water is four feet (4') or more above the elevations of the crown of the pipe at the upstream end of the Section of

pipe to be tested. If ground water does not provide sufficient head, the Contractor shall flood the trench to obtain the specified external head. The measuring device shall be a V-notch weir or other measuring device approved by the Engineer. The Contractor shall include in his bid all costs necessary to perform the infiltration tests. If leakage exceeds the specified amount, the Contractor shall locate and remedy the defect at his own expense. The infiltration tests shall be conducted in the presence of a representative of the Engineer.

2. Deflection tests of PVC pipe shall run not less than 30 days after final full backfill has been placed in the presence of a representative of the Engineer. Where possible, electronic equipment shall be used to measure and record the deflection in flexible pipe. No pipe shall exceed a deflection of 5%. If such equipment is not available, the deflection test can be run by use of rigid balls or mandrels, having diameters equal to 95% of the inside diameter of the pipe which shall be pulled through the sewer line. If rigid balls or mandrels are used, tests shall be performed without mechanical pulling devices.

3.07 CUTTING AND PATCHING

1. Each trade division of the detail specifications shall include all cutting, patching, fitting, and excavation and backfill for that trade, unless therein specifically stated to the contrary, and as required for the proper accommodation of all work or other trade division.

2. Each trade shall do all fitting, cutting, and patching required for its work, to install it and make its several parts come properly; and to fit, to receive, or be received by the work of others, and make good after them, as the Owner may direct. Any cost due to the defective of ill-timed work shall be borne by those responsible therefore.

3. The Contractor shall not endanger any work by cutting, digging, or otherwise, and shall not cut or alter the work of any other Contractor, unless he has obtained the consent of the Engineer.

END OF SECTION

SECTION 02936

SEEDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Seeding, mulching and fertilizer.

B. Maintenance.

1.2 RELATED SECTIONS

A. Section 02205 - Soil Materials: Topsoil material.

B. Section 02223 - Backfilling: Rough grading of site.

C. Section 02225 - Trenching: Rough grading over cut.

D. Section 02923 - Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this Section.

E. Section 02950 - Trees, Plants, and Ground Cover.

1.3 REFERENCES

A. FS O-F-241 - Fertilizers, Mixed, Commercial.

1.4 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy, Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.5 MAINTENANCE DATA

A. Submit under provisions of Section 01700.

B. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

1.6 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

1.7 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. Provide certificate of compliance from authority having jurisdiction.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.9 COORDINATION

A. Coordinate work under provisions of Section 01039.

B. Coordinate with installation of underground sprinkler system piping and watering heads.

1.10 MAINTENANCE SERVICE

A. Maintain seeded areas immediately after placement. Perform two cuttings.

PART 2 PRODUCTS

2.1 SEED MIXTURE

A. Seed Mixture Blend:

1. 35 percent Kentucky Bluegrass (Poa pratensis)
2. 35 percent Creeping Red Fescue (Festuca rubra)
3. 10 percent Annual Ryerass (Lolium multiflorum)
4. 20 percent Perennial Ryegrass

2.2 ACCESSORIES

A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

B. Fertilizer: FS O-F-241, Type I, Grade A; recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, to the following proportions: Nitrogen 8 percent, phosphoric acid 32 percent, soluble potash 16 percent.

C. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this Section.

3.2 FERTILIZING

A. Apply fertilizer at a rate of 20 lbs./1000 SF.

B. Apply after smooth raking of topsoil and prior to roller compaction.

C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.

D. Mix thoroughly into upper 2 inches of topsoil.

3.3 SEEDING

A. Apply seed at a rate of 4 lbs per 1000 sq. ft. evenly in two intersecting directions. Rake in lightly.

B. Do not seed areas in excess of that which can be mulched on same day.

C. Planting Season: April 1 - June 1
August 1 - October 15

D. Do not sow immediately following rain, when ground is too dry, or during windy periods.

E. Roll seeded area with roller not exceeding 112 lbs.

F. Immediately following seeding, apply mulch to a thickness of 1/8 inch. Maintain clear of shrubs and trees.

G. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

3.4 HYDROSEEDING

A. Hydroseeding method is acceptable for distribution of seed and fertilizer. Provide mulch and method according to best trade practices.

3.5 MAINTENANCE

A. Mow grass two (2) times to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

B. Neatly trim edges and hand clip where necessary.

C. Immediately remove clippings after mowing and trimming.

D. Water to prevent grass and soil from drying out.

E. Control growth of weeds. Apply herbicide in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

F. Immediately reseed areas which show bare spots.

G. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 WORK INCLUDED

A. Reinforcing steel bars, welded steel wire fabric, fabricated steel bar or rod mats for cast-in-place concrete.

B. Support chairs, bolsters, bar supports and spacers for supporting reinforcement.

1.2 RELATED WORK, BUT NOT LIMITED TO

A. Section 03300 - Cast-In-Place Concrete.

1.3 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings.

B. ACI 315 - Details and Detailing of Concrete Reinforcement.

C. ACI 318 - Building Code Requirements for Reinforced Concrete.

D. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

E. ANSI/ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

F. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

G. CRSI - Concrete Reinforcing Steel Institute Manual of Practice.

H. CRSI 63 - Recommended Practice for Placing Reinforcing Bars.

I. CRSI 65 - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

1.4 QUALITY ASSURANCE

A. Perform concrete reinforcement work in accordance with CRSI Manual of Standard Practice, and Documents 63 and 65.

B. Conform to ACI 301 and ACI 315.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate sizes, spacings, locations and quantities of reinforcing steel, wire fabric, bending and cutting schedules.

PART 2 PRODUCTS

2.1 MATERIALS

A. Reinforcing Steel: ASTM A615, Grade 60 billet-steel, deformed bars.

B. Welded Steel Wire Fabric: ANSI/ASTM A497 deformed type or ANSI/ASTM A185 plain type.

1. Reinforcing fabric shall be in flat sheets. Coiled rolls may not be used.

2.2 FABRICATION

A. Fabricate in accordance with ACI 315.

B. Splices for reinforcing bars shall be according to ACI 318 with a minimum of 30 bar diameters, unless otherwise shown on the drawings.

C. Locate reinforcing splices not indicated on drawings at points of minimum stress. Stagger splices in adjacent bars.

PART 3 EXECUTION

3.1 INSTALLATION

A. Before placing concrete, clean reinforcement of foreign particles or coatings.

B. Place, support, and secure reinforcement against displacement. Do not deviate from alignment or required position.

C. Do not displace or damage vapor barrier.

D. Accommodate placement of all formed openings or cast in items.

E. Steel Reinforcement shall not be straightened or bent in a manner that will injure the material. No heating of bars will be permitted without written permission of the Architect/Engineer.

F. No cutting or welding of reinforcing bars will be permitted.

G. Chairs, inserts and other metal devices, where exposed after removal of forms, shall have exposed surfaces coated with plastic or other approved rust resistant coating.

H. Reinforcing for slabs on grade shall be supported. No "Pulling Up" of wire mesh during placement of concrete will be permitted.

I. The following minimum concrete cover shall be provided for reinforcement:

Inside Buildings	
Columns, Beams and Girders	1-1/2"
Slabs and Walls	3/4"
Contact with or over Water	
All members	2"
Contact with Earth	
Formed Walls and Columns	2"
Walls, Columns, Slabs and	
Footings placed against earth	3"

END OF SECTION

SECTION 03250

EXPANSION JOINTS AND WATERSTOPS

PART 1 GENERAL

1.1 WORK INCLUDED

A. Furnishing and installing all expansion joints and waterstops (Type I or Type II) as required.

1.2 RELATED WORK, BUT NOT LIMITED TO

A. Section 03300 - Cast-in-Place Concrete.

1.3 REFERENCES

A. ANSI/ASTM D1190 - Concrete Joint Sealer, Hot-Poured Elastic Type.

B. ANSI/ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete paving and Structural Construction.

1.4 CERTIFICATION

A. The manufacturer shall certify, in writing, that all waterstops meet or exceed the physical properties requirements set forth in the U.S. Corps of Engineers CRD-C572-74 specification and furnish a copy of certified independent laboratory test data showing compliance.

B. Waterstop manufacturer shall certify five years (minimum) continuous, successful experience in production of waterstops.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store waterstops under tarps to protect from oil, dirt, and sunlight.

PART 2 PRODUCTS

2.1 MATERIALS

A. Waterstops shall be of one of the following materials (as indicated on drawings or as scheduled):

1. Type I

   a. Prime virgin PVC, containing no scrapped, reclaimed material or pigment whatsoever, minimum 1750 PSI tensile strength, minus 51 degrees F to plus 175 degrees F working temperature range.

   b. Extruded Neoprene, continuous maximum lengths, 60 Shore A hardness, 2000 PSI minimum Tensile strength.

   c. Type I Waterstops for construction joints shall be 3/8" minimum thickness (non tapered) x 6" wide, with hog rings or grommets spaced at 12" on center, Greenstreak style number 732 or equal. Waterstops for expansion joints shall be 3/8" minimum thickness (non tapered) x 9" wide with a 1/2" I.D. hollow bulb in the center, and hog rings or grommets spaced at 12" on center, Greenstreak style number 735.

   d. Type I Waterstops shall be as manufactured by Williams Products, Inc., Greenstreak, W.R. Meadows, Inc. or equal.

2. Type II

   a. EVA joints foamed, closed-cell, cross-linked ethylene vinyl acetate low-density polyethylene co-polymer.

   b. Block outs for EVA joints shall be 1/2" x 1-1/4". Material for block out shall be foam or wood capable of retaining its shape under the weight of the wet concrete. EVA material shall be 5/8" x 1".

   c. Type II waterstops shall be as manufactured by Thermal-Chem or equal.

   d. Bonder used as water proofing adhesive (EVA joint) two-component epoxy. Thermal-Chem product #4 or equal.

3. Type III

   a. Type III waterstops for construction joints shall be non-bentonite, co-extruded, strip applied, hydrophilic rubber waterstop, Greenstreak's Hydrotite CJ-0725-3K or equal.

b. Type III waterstop shall have a delay coating to inhibit initial expansion of waterstop due to moisture present in fresh concrete.

c. Type III waterstop shall be designed and manufactured to provide a means directional expansion.

d. Volumetric expansion ratio of Type III waterstop shall be 5 to 1 minimum.

B. Expansion Joints

1. Joint Filler: ANSI/ASTM D1752, Type II; granulated cork particles impregnated and bound with resins; resiliency recovery of 95 percent if not compressed more than 50 percent of original thickness.

2. Joint filler shall be as manufactured by Sonneborn, W.R. Meadows, Inc. or equal.

3. Sealant: Polyurethane, multi-component, chemical curing, capable of continuous water immersion, non-sagging or self-leveling as applicable.

4. Sealant shall be compatible with filler.

PART 3 EXECUTION

3.1 INSTALLATION

A. Locate and place water stops and expansion joints where indicated on the drawings or as scheduled in this section.

B. Install waterstops continuous without displacing reinforcement. Seal joints watertight.

C. Waterstops shall be kept in correct position during placement of concrete using hog rings or grommets spaced at 12 inches on center along the length of the waterstop and wire tied to adjacent reinforcing steel.

D. Provide factory made waterstop fabrications for all changes of direction, intersections, and transitions leaving only straight butt joint splices for the field.

E. Field butt splices shall be heat fused welded using a Teflon coated thermostatically controlled waterstop splicing iron at approximately 380 degrees F. Follow approved manufacturer's recommendations. Lapping of waterstop, use of adhesives, or solvents shall not be allowed.

F. The joint filler shall be kept back approximately 1/2" from the surface and filled with sealant.

G. Install joint fillers and sealants in accordance with manufacturer's instructions.

H. Apply the EVA bonder and the EVA joint material in accordance with manufacturers instructions.

PART 4 SPECIAL PROVISIONS

None

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 WORK INCLUDED

A. Furnishing, forming, placing, finishing, curing and other related work of cast-in-place concrete for beams, columns, walls, slabs, foundations and other structures as required.

1.2 RELATED WORK, BUT NOT LIMITED TO

A. Section 03200 - Concrete Reinforcement.

1.3 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings.

B. ACI 305 - Hot Weather Concreting.

C. ACI 306 - Cold Weather Concreting.

D. ACI 308 - Standard Practice for Curing Concrete.

E. ACI 318 - Building Code Requirements for Reinforced Concrete.

F. ACI 347 - Recommended Practice for Concrete Formwork.

G. ASTM C33 - Concrete Aggregates.

H. ASTM C94 - Ready-Mixed Concrete.

I. ASTM C150 - Portland Cement.

J. ASTM C260 - Air-Entraining Admixtures for Concrete.

K. ASTM C494 - Chemical Admixtures for Concrete.

L. ASTM C618 - Fly ash and raw or calcinated natural pozzolan for use as a mineral admixture in Portland cement concrete.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301 and 318.

B. Obtain materials from same source throughout the Work.

C. Conform to ACI 305 when concreting during hot weather.

D. Conform to ACI 306 when concreting during cold weather.

1.5 TESTS

A. Testing and analysis of concrete shall be performed under provisions of Section 01410.

B. Tests of each proposed mix design along with the cement and aggregates used shall be performed to ensure conformance with requirements stated herein.

C. Three concrete test cylinders shall be taken for every 75 or less cu yds of each class of concrete placed each day.

D. One additional test cylinder shall be taken during cold weather (per ACI 306) and cured on site under same conditions as concrete it represents.

E. One slump test and one air entrainment test shall be taken for each truck.

1.6 PROJECT RECORD DOCUMENTS

A. Submit under Provisions of Section 01700.

B. Accurately record actual locations of all embedded utilities and components which are concealed from view.

1.7 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Submit product data for specified products including all proposed admixtures.

C. Submit proposed mix design and 28 day test results for each class of concrete for review prior to commencement of work.

D. Submit laboratory results of all tests performed.

1.8 FIELD SAMPLES

A. Provide under provisions of Section 01400.

B. Construct and erect a field sample for architectural concrete surfaces receiving special treatment or finish as a result of form work.

C. Sample panel to be of sufficient size to indicate special treatment or finish required.

D. Approval of finished sample panel will establish minimum standard of quality to be used for acceptance or rejection of completed concrete work of that type.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I, Portland type; or ASTM C595, Type IP, Portland Pozzolan Cement shall not exceed 25 percent by weight. Different cements shall not be used interchangeably in the same element or portion of work. No industrial slag will be allowed to be used in any concrete mix design.

B. Fine Aggregate: ASTM C33.

C. Coarse Aggregate: ASTM C33, Size 57.

D. Water: ASTM C94, Clean and not detrimental to concrete.

2.2 ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical Admixtures, where approved by the Architect/Engineer, shall conform to ASTM C494.

C. No Calcium Chloride shall be added to the mix.

2.3 ACCESSORIES

A. Bonding Agent: Two component modified epoxy resin as manufactured by Thermal Chem, Sika Corp., Sonneborn or equal.

B. Vapor Barrier: 6 mil thick clear polyethylene film with a water permeability of 0.10 perms or less in accordance with ASTM E-96, Procedure "A", type recommended for below grade application.

C. Non-shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 7000 psi in 28 days.

D. Joint Filler: Closed cell polyvinyl chloride foam resiliency recovery of 95% if not compressed more than 50% of original thickness.

E. Sealant: Cold applied two-part liquid urethane.

2.4 CONCRETE MIX

A. Mix concrete in accordance with ASTM C94.

B. All concrete, unless otherwise specified, shall have the following characteristics:

1. All Unexposed Concrete (Foundation Work):

Minimum Compressive Strength at 28 days:	3000 PSI
Maximum Water Cement Ratio:	0.45
Minimum Cement Content	517 LB/CY (5½ sacks)
Slump	Minimum: 2" Maximum: 4"

2. All Exposed Concrete (Floors, Walls, Columns, Walks, Drives)

Minimum Compressive Strength at 28 days:	4000 PSI
Maximum Water Cement Ratio	0.45
Minimum Cement Content	564 LB/CY (6 sacks)
Slump	Minimum: 2" Maximum: 4"
Air Entrainment (all concrete exposed to weather)	6± 1 percent

3. All Concrete Designated as "Fill Concrete"

Minimum Compressive Strength at 28 days:	1750 PSI
Maximum Water Cement Ratio:	0.7
Minimum Cement Content:	376 LB/CY (4 sacks)
Slump:	Minimum: 1" Maximum: 6"

NOTE: Maximum water cement ratios may be exceeded if standard deviation and concrete strength test results are submitted and approved by Architect/Engineer. Submit documentation as outlined in ACI 318 Section 5.3 for each proposed concrete mix design.

C. Add an air entraining agent to the mix for concrete exposed to the exterior or subject to freeze-thaw cycling.

D. Use set retarding admixtures during hot weather only when approved by Architect/Engineer.

E. Use set accelerating admixtures during cold weather only when approved by Architect/Engineer. Only non-chloride accelerators will be considered.

F. No admixture shall be used unless approved in writing by the Architect/Engineer.

G. Water shall not be added to the mix at the job site without specific approval by the Architect/Engineer.

H. Slump tests shall be taken prior to the addition of any approved water reducing or plasticizing agents.

2.5 FORMS

A. Conform to ACI 301.

B. Forms for exposed surfaces shall produce a smooth surface unless noted otherwise on the drawings.

PART 3 EXECUTION

3.1 CONCRETE FORMWORK

A. Construct and erect concrete formwork in accordance with ACI 301 and ACI 347.

B. Verify anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, held securely, and will not cause hardship in placing concrete.

C. Minimize form joints. Symmetrically align joints and make watertight to prevent leakage of mortar.

D. Arrange and assemble formwork to permit stripping so that concrete is not damaged during its removal.

E. Arrange forms to allow stripping without removal of principal shores, where required to remain in place.

F. Provide bracing to ensure stability of formwork. Strengthen formwork liable to be over stressed by construction loads.

G. Camber slabs and beams to achieve ACI 301 tolerances.

H. Provide temporary ports in formwork to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain. Close ports with tight fitting panels, flush with inside face of forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces.

I. Provide chamfer strips on external corners of beams, joists, columns and walls.

J. Construct formwork to maintain tolerances in accordance with ACI 301.

K. Apply form release agent on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices and embedded items.

L. Do not apply form release agent where concrete surfaces are scheduled to receive special finishes or applied coverings, which may be affected by agent. Soak contact surfaces of untreated forms with clean water. Keep surfaces wet prior to placing concrete.

3.2 FORM REMOVAL

A. Do not remove forms and shoring until concrete has sufficient strength to support its own weight and construction and design loads which may be imposed upon it.

B. Reshore structural members due to design requirements or construction conditions to permit successive construction.

C. Do not damage concrete surfaces during form removal.

3.3 INSERTS, EMBEDDED PARTS AND OPENINGS

A. Provide formed openings where required for work embedded in, or passing through, concrete.

B. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors and other inserts.

C. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.

3.4 JOINTS

A. Provide keyways in all construction joints. The width of the keyway shall be 1/3 of the wall or slab thickness (3½

inch minimum) by 1½ inch deep, unless otherwise shown on the drawings.

B. Approval by the Architect/Engineer is required for placing construction joints not shown on the drawings.

C. Provide control joints in concrete slabs on grade at a maximum spacing of 20 feet on center unless otherwise shown on the drawings.

D. Provide control joints in sidewalks spaced approximately 5 feet on center and expansion joints at approximately 20 feet on center, unless otherwise shown on the drawings. Expansion joints shall also occur adjacent to all construction items in place when walks are poured.

E. Control joints at interior slabs may be saw cut using a 3/16 inch thick blade, cutting 1/3 into the depth of the slab thickness. Saw cut control joints shall be made no sooner than 4 hours and no later than 24 hours after finishing is completed.

F. Control joints at exterior walks shall be finished using a 3/8" radius tool.

G. Provide diamond shaped or circular blockouts around all columns which are supported on footers below slabs-on-grade. Provide an expansion joint between the slab and the concrete fill around the column.

3.5 PREPARATION

A. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, held securely and will not cause hardship in placing concrete.

B. Prepare previously placed concrete by cleaning with a steel brush and removing all foreign matter and laitance.

1. Saturate surface with water.

2. Immediately before placing new concrete, place a bed of mortar over the entire surface.

C. Where called for on the drawings, apply a bonding agent in accordance with the manufacturer's instructions.

D. At locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

E. Install vapor barrier under interior slabs on grade. Lap joints minimum 6 inches and seal.

3.6 PLACING CONCRETE

A. Notify Architect/Engineer minimum 24 hours prior to commencement of concreting operations.

B. Place concrete in accordance with ACI 301.

C. Hot Weather Placement: ACI 301 and ACI 305.

D. Cold Weather Placement: ACI 301 and ACI 306.

E. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.

F. The method of placing the concrete shall be such to insure against separation of materials.

G. Place concrete continuously between predetermined construction and control joints in layers not exceeding 18 inches in depth. Do not break or interrupt successive pours such that cold joints occur.

H. Placement of concrete shall be completed within one hour after the introduction of mixing water.

I. All concrete shall be consolidated by vibrating. A spare vibrator shall be kept on the job during all concrete placing operations.

J. Sidewalks shall be four inches (4") thick minimum and placed on minimum four inches (4") of compacted sand fill unless noted otherwise on the drawings.

3.7 FINISHING

A. Rubbed Finishes

1. All exposed concrete surfaces of all structures shall receive a rubbed finish, unless otherwise specified.

2. Exposed concrete for exterior surfaces shall be defined as all exposed concrete to a point 6 inches below finished grade.

3. A smooth rubbed finish shall be produced on newly hardened concrete no later than the day following form removal. Surfaces shall be wetted and rubbed with carborundum brick or other abrasive until uniform color and texture are produced.

B. Floor Slab and Walkway Finishes

1. Interior floor slabs shall meet surface flatness tolerances as specified in ACI 301 for Class "A" finish.

2. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/8 inch per foot.

3. Floor slab finishes shall be as follows:

a. Exposed floor slabs shall have a smooth troweled finish unless otherwise specified.

b. Floor slabs, which are to have quarry tile, ceramic tile or terrazzo wearing surfaces with full bed setting system shall have a scratched or wood float finish.

c. Floor slabs which are to receive carpeting, resilient flooring or thin set tile shall have a smooth steel trowel finish.

d. Sidewalks, curbs, and ramps shall have a broom finish. The broom finish of sidewalks shall be transverse to the walk.

e. Edges of sidewalks and edges at control and expansion joints shall be neatly finished using a 3/8 inch radius tool.

f. Exterior platforms and loading docks, exterior steps, and exterior stoops shall have a non-slip finish using crushed ceramically bonded aluminum oxide.

C. Floor Slab Hardener

1. Interior exposed concrete floors shall be given 3 coats of a chemical hardener. Floor treatment shall be applied in strict accordance with manufacturer's recommendations. Hardener shall be "Lapidolith" by Sonneborn or equal.

3.8 CURING

A. Concrete curing shall be in accordance with ACI 301 and ACI 308.

B. Beginning immediately after placement, concrete shall be protected from premature drying, excessive hot or cold temperatures and mechanical injury.

C. For concrete surfaces not in contact with forms, one of the following procedures shall be applied immediately after completion of placement and finishing.

1. Ponding.

2. Application of absorptive mats or fabric kept continuously wet.

3. Application of waterproof sheet materials conforming to ASTM C171.

a. Seal all edges and joints.

4. Application of liquid membrane-forming curing compound conforming to ASTM C309.

a. Curing compound shall not be used on surfaces to which additional concrete or other material (hardeners, weatherproofing, paint, adhered floor coverings, etc.) is to be bonded.

D. For concrete surfaces in contact with forms the following procedures shall be followed:

1. Moisture loss from surfaces placed against forms exposed to the sun shall be minimized by keeping the forms wet.

2. After the concrete has hardened and while the forms are still in place, form ties shall be loosened and water applied to run down the inside of the form to keep the concrete wet.

3. Immediately following form removal, surfaces shall be kept wet by a water spray or water saturated fabric. Liquid membrane-forming curing compound conforming to ASTM C309 may be used with the previous restrictions still applying.

E. Curing procedures shall be continued for at least seven (7) days. One procedure may be replaced by another any time after the concrete is one day old.

3.9 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, finishes, tolerances or specified strength requirements.

B. Repair or replacement of defective concrete will be determined by the Architect/Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/ Engineer for each individual area.

D. If, in the opinion of the Architect/Engineer, the defects in the concrete can not be patched successfully or if the patch is unsatisfactory from the standpoint of appearance or structural integrity, the entire section of concrete shall be removed and replaced at the Contractor's expense.

3.10 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

C. Patch imperfections in accordance with ACI 301.

D. The area to be patched shall be cleaned and all defective concrete removed down to sound concrete. The defective area and an area at least 6 inches wide surrounding it shall be saturated with water.

E. A bonding agent shall be applied prior to placing the patching mortar.

F. The patching mortar shall be made of the same materials and proportions as used for the concrete, except the coarse aggregate shall be omitted.

G. On all exposed concrete, sufficient white Portland Cement shall be substituted for the regular cement to produce a color matching finish.

END OF SECTION

SECTION 04100

MORTAR

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Mortar and grout for masonry.

1.2 RELATED WORK

A. Section 03300 - Cast-in-Place Concrete: Non-Shrink Grout.

B. Section 04270 - Glass Unit Masonry.

C. Section 04300 - Unit Masonry System: Installation of mortar and grout.

D. Section 08112 - Standard Steel Frames: Grouting steel door frames.

1.3 REFERENCES

A. ASTM C91 - Masonry Cement.

B. ASTM C94 - Ready-Mixed Concrete.

C. ASTM C144 - Aggregate for Masonry Mortar.

D. ASTM C150 - Portland Cement.

E. ASTM C207 - Hydrated Lime for Masonry Purposes.

F. ASTM C270 - Mortar for Unit Masonry.

G. ASTM C404 - Aggregates for Masonry Grout.

H. ASTM C476 - Grout for Masonry.

I. ASTM C780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

J. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 01600.

B. Store and protect products under provisions of Section 01600.

C. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperatures to minimum 50 degrees F (10 degrees C) prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Masonry Cement: ASTM C91, Type M or S.

B. Mortar Aggregate: ASTM C144, standard masonry type.

C. Hydrated Lime: ASTM C207, Type S.

D. Grout Course Aggregate: Maximum 3/8 inch size.

E. Water: Clean and potable.

F. Bonding Agent: Standard.

G. Water Repellant Admixture (at Moisture Controlled Block): Equal to Dry-Block as manufactured by W. R. Grace. Co.

2.2 MORTAR COLOR

A. Mortar Color: Mineral oxide pigment; as manufactured by SGS, Glengery, or equal; color to match adjacent finished masonry.

B. Submit two ribbons of mortar color, illustrating color and color range.

2.3 MORTAR MIXES

A. Mortar for Load Bearing Walls and Partitions: ASTM C270, Type S using the Property Method.

B. Mortar for Non-load Bearing Walls and Partitions: ASTM C270, Type S using the Property Method.

C. Mortar for Reinforced Masonry: ASTM C270, Type S using the Property Method.

D. ASTM C270, Type N may be substituted for non-load bearing, interior walls and partitions with prior approval of Architect/Engineer.

E. ASTM C270, in above grade applications Type M may be used in lieu of Type S, with prior approval of Architect/Engineer.

F. Pointing Mortar: ASTM C270, Type N, using the Property Method with maximum 2 percent ammonium stearate or calcium stearate per cement weight.

G. Mortar for Glass Block: ASTM C270, Type recommended by glass block manufacturer using the Property Method.

H. Pointing Mortar for Glass Block: ASTM C270, Type recommended by glass block manufacturer, using the Property Method; with maximum 2 percent ammonium stearate or calcium stearate per cement weight with mason or silica sand aggregate.

2.4 MORTAR MIXING

A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270.

B. Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

C. Do not use anti-freeze compounds to lower the freezing point of mortar.

D. If water is lost by evaporation, retemper only within two hours of mixing.

E. Use mortar within two hours after mixing at temperatures of 80 degrees F (26 degrees C), or two-and-one-half hours at temperatures down to 50 degrees F (10 degrees C).

F. Add dry-block admixture in accordance with manufacturer's instructions for use with dry-block masonry units where specified in other sections.

2.5 GROUT MIXES

A. Bond Beams: Lintels: 3000 psi strength at 28 days; 8-11 inches slump; mixed in accordance with ASTM C476 Fine or Course grout.

B. Engineered Masonry: 3000 psi strength at 28 days; 8-11 inches slump; mixed in accordance with ASTM C476 Fine or Course grout. Achieve f'm = 1350 psi.

C. Epoxy Grout (when called for on plans)

1. Manufactured by:

a. Atlas Minerals and Chemicals, Inc.; Product: Rezklad Mortar.
b. Bonsal; Product: EPOX-E-Set AAR11-HT Mortar and Grout.
c. Laticrete International; Product: Latapoxy 105 NS Grout.

2.6 GROUT MIXING

A. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 Fine or Course grout, and manufacturers printed instructions.

B. Add admixtures in accordance with manufacturer's instructions. Provide uniformity of mix.

C. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.1 EXAMINATION

A. Request inspection of spaces to be grouted.

3.2 INSTALLATION

A. Install mortar and grout in accordance with MSJC specifications.

B. Work grout into masonry cores and cavities to eliminate voids.

C. Do not displace reinforcement while placing grout.

D. Remove grout spaces of excess mortar.

3.3 FIELD QUALITY CONTROL

A. Establish mortar mix in accordance with ASTM C270.

END OF SECTION

SECTION 04300

UNIT MASONRY SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete masonry and brick units.

1. Masonry Construction.
2. Brick Veneer Construction.
3. Cavity Wall Construction.

B. Reinforcement, anchorage, and accessories.

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control.

B. Section 01410 - Testing Laboratory Services.

C. Section 04100 - Mortar: Mortar and grout.

D. Section 07181 - Water Repellant Coatings.

E. Section 07212 - Rigid Insulation: Insulation for cavity spaces.

1.3 REFERENCES

A. ANSI/ASTM C55 - Concrete Building Brick.

B. ANSI/ASTM C126 - Facing Brick, (Solid Masonry Units made from Clay or Shale).

C. ANSI/ASTM C652 - Hollow Brick (Hollow Masonry Units Made from Clay or Shale).

D. NCMA: National Concrete Masonry Association: Specification for the Design and Construction of Load Bearing Concrete Masonry.

E. ACI 530 - Building Code Requirements for Masonry Structures and Specifications for Masonry Structures.

F. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

G. ASTM C62 - Building Brick (Solid Masonry Units Made From Clay or Shale).

C. Installation: Install in cores at block producer's plant in accordance with manufacturers specifications, allowing block to be handled or cut without dislodging insert.

D. Thermal Values:

1. 8" Block: R = 9.1 min.
2. 10" Block: R = 10.0 min.
3. 12" Block: R = 11.1 min.

2.4 BRICK UNITS

A. Face Brick: ANSI/ASTM C216, Grade SW, Type and color as selected by Architect/Engineer.

B. Building Brick: ASTM C62, solid units, grade as required by exposure conditions.

C. Brick Masonry Units: Nominal modular size of 3-5/8 x 2-1/4 x 7-5/8 inches.

2.5 REINFORCEMENT AND ANCHORAGE

A. Single Wythe Joint Reinforcement: Truss type; steel wire, hot dip galvanized to ASTM A641 after fabrication, 9 gauge side rods with 9 gauge cross ties (unless noted otherwise on drawings).

1. Manufacturers:

a. Dur-o-wal; Model: Truss.
b. AA Wire Products Co.; Model: Block-Trus.
c. Masonry Reinforcing Corp. of America; Model: Wire-Bond.
d. Hohmann and Barnard, Inc.; Model: Lox-All.
e. Substitutions: Under provisions of Section 01600.

2. Accessories: Pre-formed Tees and Corners; use at all corners and intersections.

B. Multiple Wythe Joint Reinforcement: Truss type; adjustable type, steel wire, hot dip galvanized to ASTM A641 after fabrication, side rods with 9 gauge cross ties and 3/16 inch eye and pintle.

1. Manufacturers:

a. Dur-o-wal; Model: Dur-o-eye.
b. AA Wire Products Co.; Model: Eye-block-trus.
c. Masonry Reinforcing Corp. of America; Model: Wire-Bond.

d. Hohmann and Barnard, Inc.; Model: Lox-All.
e. Substitutions: Under provisions of Section 01600.

2. Accessories: Pre-formed Tees and Corners; use at all corners and interjections.

C. Reinforcing Steel: type, specified in Section 03200.

D. Strap Anchors: Bent steel shape, as required by type of construction finish.

E. Corrugated Formed Sheet Metal Wall Ties: Galvanized steel finish.

2.6 FLASHINGS

A. Flexible Flashings: Rubberized asphalt, non-reinforced, homogeneous, waterproof, impermeable sheeting equal to Perm-a-Barrier as manufactured by W. R. Grace and Company.

2.7 ACCESSORIES

A. Joint Filler: Closed cell neoprene oversized 50 percent to joint width; self-expanding.

B. Building Paper: #15 asphalt saturated felt.

C. Weep Vents:

1. Polypropylene, honeycomb, width and color to match mortar joint, height to match veneer material.
2. Manufacturers:
a. Mortar Net USA, Ltd.; Product: Weep Vent.
b. Hohmann and Barnard; Product: Quadro-Vent.

D. Mortar Net:

1. Dovetail Pattern, 90% open mesh weave, high density polyethylene/nylon.
2. Manufacturers:
a. Mortar Net USA, Ltd.; Product: Mortar Net&trade.
b. Hohmann and Barnard; Product: Mortar Net.

E. Cleaning Solutions: Non-acidic, not harmful to masonry work or adjacent materials.

F. Acrylic Coating: Type recommended by burnished block manufacturer.

G. Rigid Insulation: Type "A" as specified in Section 07212.

PART 3 EXECUTION

B. The Painting Contractor shall field apply an additional coat of acrylic to each burnished face by airless spray.

C. Prior to the field coat, burnished masonry shall be cleaned with a non-acidic, detergent type cleaner. Each block face shall be cleaned equally (no spot cleaning). Allow wall to dry completely prior to installation of acrylic coating.

D. Apply an even coat of acrylic making sure the mortar joints are thoroughly covered.

E. Prior to delivery, the block manufacturer shall supply the name of the acrylic coating manufacturer which was used at the factory and written special instructions if different from those stated in this section.

3.17 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Section 01500.

B. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities (if applicable).

END OF SECTION

SECTION 05120

STRUCTURAL STEEL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Structural steel framing members, support members, and accessories.

B. Grouting under baseplates.

1.2 RELATED SECTIONS

A. Section 05210 - Steel Joists.

B. Section 05311 - Steel Roof Deck: Support framing for small openings in roof deck.

C. Section 05313 - Steel Floor Deck: Support framing for small openings in floor deck.

D. Section 05500 - Metal Fabrications: Non-framing fabrications affecting structural steel work.

E. Section 09900 - Painting: Finish painting.

1.3 REFERENCES

A. ASTM A36 - Structural Steel.

B. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.

C. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.

D. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.

E. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

F. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.

G. ASTM A325 - High Strength Bolts for Structural Steel Joints.

H. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

I. AWS A2.0 - Standard Welding Symbols.

J. AWS D1.1 - Structural Welding Code.

K. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

L. AISC - Specification for Architectural Exposed Structural Steel.

M. SSPC - Steel Structures Painting Council.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings:
1. Indicate profiles, sizes, spacing, and locations of structural members, openings, attachments, and fasteners.
2. Connections.
3. Loads.
4. Indicate welded connections with AWS A2.0 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Submit under provisions of Section 01400 certifying that products meet or exceed specified requirements.

D. Mill Test Reports: Submit under provisions of Section 01400 Manufacturer's Certificates, indicating structural strength, destructive and non-destructive test analysis.

E. Welders' Certificates: Submit under provisions of Section 01400 Manufacturer's Certificates, certifying welders employed on the Work, verifying AWS qualifications within the previous 12 months.

1.5 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

B. Perform Work in accordance with AISC - Specification for Architectural Exposed Structural Steel, where applicable.

1.6 QUALIFICATIONS

A. Fabricator: Company specializing in performing the work of this Section with minimum five years experience.

B. Erector: Company specializing in performing the work of this Section with minimum three years experience.

C. Design connections not detailed on the Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as shown on Drawings.

PART 2 PRODUCTS

2.1 MATERIALS

A. Domestic Steel:

1. **When a project is funded in whole or in part by State of Ohio Capital Funds, it is required that Domestic steel use requirements as specified in Section 153.001 of the revised code apply to this project. Copies of Section 153.001 of the revised code can be obtained from any of the Offices of the Department of Administrative Services.**

B. Structural Steel Members: ASTM A36.

C. Structural Tubing: ASTM A500, Grade B.

D. Pipe: ASTM A53, Grade B.

E. Bolts, Nuts, and Washers: ASTM A325.

F. Anchor Bolts: ASTM A307.

G. Welding Materials: AWS D1.1; type required for materials being welded.

H. Sliding Bearing Plates: Teflon coated.

I. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days.

J. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.

2.2 FINISH

A. Prepare structural component surfaces in accordance with SSPC SP-2.

B. Shop prime structural steel members. Do not prime surfaces that will be field welded.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.2 ERECTION

A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

B. Field weld components indicated on Drawings.

C. Do not field cut or alter structural members without approval of Architect/Engineer.

D. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

E. Grout under baseplates.

3.3 ERECTION TOLERANCES

A. Maximum Variation From Plumb: per AISC standards.

B. Maximum Offset From True Alignment: per AISC standards.

END OF SECTION

SECTION 05520

ALUMINUM RAILINGS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Aluminum pipe and tube handrails, and fittings.

1.02 RELATED WORK

A. Section 05510 - Metal Stairs: Handrailing at stairs.

1.03 REFERENCES

A. OSHA - Occupational Safety and Health Administration

1.04 REGULATORY REQUIREMENTS

A. All rails, posts, fittings, and attachments shall meet all standards and shall be designed to resist all loadings as set forth by the applicable building code and OSHA requirements.

1.05 SUBMITTALS

A. Submit shop drawings and product data indicating component details, materials, finishes, connection and joining methods, and the relationship to adjoining work.

PART 2 PRODUCTS

2.01 MATERIALS

A. All rails and posts shall be 1½ inch diameter (schedule 40 minimum) extruded aluminum pipe of alloy 6063-T6.

B. Posts shall have a solid metal core as required to resist the loadings specified in part 1.04 of this section.

C. Kickplates shall be of ¼ inch thick aluminum and 4 inches high.

D. Railings shall have a clear anodized finish.

E. All mechanical fasteners required shall be stainless steel.

2.02 FABRICATION

A. Verify dimensions on site prior to shop fabrication.

B. Unless otherwise shown on the drawings, the railing system shall consist of three horizontal rails with the top rail 3 ft.-6 in. above the floor and posts spaced at a maximum of 6 feet on center.

C. Fit and shop assemble sections in largest practical sizes, for delivery to site and installation. Shop connections shall be welded.

D. Supply components required for secure anchorage of handrails and railings.

E. Grind exposed welds smooth and flush with adjacent surfaces.

F. Make exposed joint butt tight, flush, and hairline.

G. Accurately form components required for anchorage of railings to each other and to building structure.

H. Aluminum surfaces in contact with concrete or a dissimilar metal shall be coated with a bitumastic paint.

PART 3 EXECUTION

3.01 PREPARATION

A. Supply items to be cast into concrete with setting templates and erection drawings to appropriate Sections.

3.02 INSTALLATION

A. Install in accordance with shop drawings and manufacturer's instructions.

B. Erect work square and level, free from distortion or defects detrimental to appearance or performance.

C. Anchor handrailings to structure.

D. All openings in the railing shall have a #1 weldless galvanized steel chain with snap hooks.

END OF SECTION

SECTION 05530

ALUMINUM GRATING AND CHECKERED FLOOR PLATES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Aluminum gratings and aluminum checkered floor plating.

1.02 RELATED WORK

A. Section 05510 - Metal Stairs.

B. Section 05520 - Aluminum Railings.

C. Section 09900 - Painting.

1.03 REFERENCES

A. ANSI/NAAMM A202.1 - Metal Bar Grating Manual.

B. ASTM B308 - Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded.

C. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bar, Rod, Wire, Shape and Tube.

1.04 SYSTEM DESCRIPTION

A. Load Design: ANSI/NAAMM A202.1.

B. Live Load: 100 lbs./sq. ft.

C. Grating or plate located in a roadway shall be designed for AASHO-H20 (32,000 pound axle) loading.

D. Maximum deflection Under Live Load: 1/240 of the span or 1/4 inch, whichever is least.

1.05 SUBMITTALS

A. Submit shop drawings and product data indicating details of grates, plates, supports, span and deflection table, openings, and perimeter construction details and tolerances.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aluminum Grating: ASTM B221, Aluminum alloy 6063-T6

B. Aluminum Checkered Plate: ASTM B221, Aluminum alloy 6061-T6

C. Aluminum Shapes: ASTM B308, Aluminum Alloy 6061-T6

D. Aluminum Finish: Standard mill finish

E. Fasteners: Stainless Steel

2.02 ALUMINUM GRATING

A. Grating shall be "I-Bar" Type with pressure-locked design.

B. Bearing bars shall be at least 1 1/2 inch in depth and spaced not more than 1 3/16 inch on center unless otherwise shown on the drawings. Top flange shall be grooved for anti-skid surface.

C. Cross bars shall be spaced at a maximum of 4 inches on center.

D. Provide banding around all openings and at grating edges.

E. Band shall have a depth equal to the bearing bars and a minimum thickness of 1/8 inch.

2.03 ALUMINUM CHECKERED PLATE

A. Aluminum checkered plate shall be raised pattern and at least 1/4 inch
thick unless otherwise shown on the drawings.

B. Provide stiffeners as required to support the specified loads.

2.04 FRAMES

A. Frames shall be aluminum and shop welded at the corners.

2.05 FABRICATION

A. Verify dimensions on site prior to fabrication.

B. Provide support framing for openings.

C. Individual plates or sections of grating shall not weigh more than 100 pounds.

D. Aluminum surfaces in contact with concrete or a dissimilar metal shall be coated with a bitumastic paint.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install grates and floor plates in accordance with manufacturer's instructions.

B. Secure grating and plates with mechanical fasteners to prevent movement.

3.02 TOLERANCES

A. Conform to ANSI/NAAMM A202.1.

B. Maximum Space Between Adjoining Sections: 1/4 inch.

C. The top of the grating or plate shall be set flush with the surface of the floor.

END OF SECTION

SECTION 06112

FRAMING AND SHEATHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Structural floor, wall, and roof framing.

B. Floor, wall, and roof sheathing.

C. Sill gaskets and flashings.

D. Preservative treatment of wood.

E. Fire retardant treatment of wood.

F. Miscellaneous framing and sheathing.

G. Telephone and electrical panel boards.

H. Concealed wood blocking for support of accessories, wall cabinets and wood trim.

1.2 RELATED SECTIONS

A. Section 06114 - Wood Blocking and Curbing.

B. Section 06180 - Engineered Wood Products.

C. Section 06193 - Plate Connected Wood Trusses.

1.3 REFERENCES

A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.

B. APA: American Plywood Association.

C. AWPA American Wood Preservers Association C1 - All Timber Products Preservative Treatment by Pressure Process.

D. AWPA American Wood Preservers Association C20 -Structural Lumber Fire Retardant Treatment by Pressure Process.

E. NFPA: National Forest Products Association.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with the following agencies:

1. Lumber Grading Agency: Certified by ALSC.
2. Plywood Grading Agency: Certified by APA.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01600.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

A. Lumber Grading Rules: NFPA; ALSC certified agencies.

B. Non-structural Light Framing: Spruce-Pine-Fir, No. 3 Grade or Better, 19 percent maximum moisture content.

C. Studding: Spruce-Pine-Fir, Standard Grade or Better, 19 percent maximum moisture content.

D. Structural Framing: Spruce-Pine-Fir, No. 2 Grade or Better, 19 percent maximum moisture content. Unless indicated otherwise on drawings.

2.2 SHEATHING MATERIALS

A. APA Rated Sheathing or APA Structural 1 Rated Sheathing, Exposure Durability Rating Exposure 1 or Better.

B. Exterior Exposure: All panels which have any edge or surface permanently exposed to the weather shall be classed exterior.

C. Identification: Each panel shall be identified with the appropriate trademark of the APA and shall meet the requirements of the latest edition of U.S. Product Standard PS1 or APA Performance Standards PRP-108.

2.3 UNDERLAY MATERIALS

A. APA Underlay, Exposure Rating 1 or Better.

2.4 SHEATHING AND UNDERLAY LOCATIONS

A. Roof Sheathing: Panel thickness as required for specified loads and spans, ½" minimum for 16" c/c support spacing, 5/8" minimum for 24" c/c support spacing, 48 x 96 in., square edges. Panel span rating as required by APA for support spacing indicated.

B. Floor Sheathing: Panel thickness as required for specified loads and spans, 3/4" minimum, 48 x 96 in., square edges. Provide tongue and groove edges or provide blocking where live loads are 50 psf or greater. Panel span rating as required by APA for support spacing indicated.

C. Wall Sheathing: Panel thickness and span rating as required by APA or as indicated on drawings, 48 x 96 in. sheets, square edges.

2.5 ACCESSORIES

A. Fasteners and Anchors:

1. Fasteners: Zinc electroplated steel for high humidity and treated wood locations, unfinished steel elsewhere.

2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.

3. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

B. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.

C. Sill Gasket on Top of Foundation Wall: 1/4 inch plate width glass fiber strip.

D. Sill Flashing Under Sill Gasket: galvanized steel.

E. Subfloor Glue: APA A.G.-01, waterproof of solvent base, air cure type, cartridge dispensed.

F. Building Paper: No. 15 asphalt felt.

G. Termite Shield: Galvanized sheet steel.

2.6 FACTORY WOOD TREATMENT

A. Fire retardant: AWPA Treatment C20, Interior Type, chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25 per ASTM E84.

B. Wood Preservative (Pressure Treatment): AWPA Treatment C1 using water borne CCA preservative with 0.4 percent retainage.

C. Wood Preservative (Surface Application): Clear AWP LP 2.

PART 3 EXECUTION

3.1 FRAMING

A. Set structural members level and plumb, in correct position.

B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Place horizontal members flat, crown side up.

D. Construct load bearing framing and curb members full length without splices.

E. Double members at openings over 24 inches wide. Space short studs over and under opening to stud spacing.

F. Construct double joist headers at floor and ceiling openings frame rigidly into joists under wall stud partitions that are parallel to floor joists.

G. Double joists or provide solid bridging between joists.

H. Bridge joists in excess of 8 feet span at mid-span. Fit solid blocking at ends of members.

I. Place full width continuous sill flashings under framed walls on cementitious foundations. Lap flashing joint 4 inches.

J. Place sill gasket directly on sill flashing. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

K. Coordinate installation of engineered wood products, and prefabricated wood trusses.

L. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

M. Coordinate curb installation with installation of decking and support of deck openings.

N. Install blocking as required for support of all accessories, cabinets, and wood trim.

3.2 SHEATHING

A. In all applications follow installation guidelines and minimum fastener schedules in APA unless indicated otherwise.

B. Secure roof sheathing perpendicular to framing members with ends staggered and sheet ends over firm bearing. Use sheathing clips between sheets between roof framing members.

C. Secure wall sheathing with long dimension parallel to wall studs.

D. Secure subfloor perpendicular to floor framing with end joints staggered and sheet ends over firm bearing. Attach with subfloor glue and drywall screws.

E. Install sheathing minimum two span continuous.

F. Install flooring underlay after dust and dirt generating activities have ceased and prior to application of finished flooring. Apply perpendicular to subflooring, stagger joints of underlay with subfloor joints.

G. Install telephone and electrical panel boards with plywood sheathing material where required.

3.3 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment in accordance with manufacturer's instructions.

B. Brush apply two coats of preservative treatment on wood in contact with cementitious materials, roofing and related metal flashings. Treat site-sawn cuts.

C. Allow preservative to dry prior to erecting members.

3.4 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Surface Flatness of Floor: 1/4 inch in 10 feet.

3.5 SCHEDULE

A. Telephone and Electrical Panel Boards: 3/4 inch thick, square edges, site brush applied preservative treated, verify size with Electrical Contractor.

END OF SECTION

SECTION 06114

WOOD BLOCKING AND CURBING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roof curbs and cants.

B. Blocking in wall and roof openings.

C. Wood furring and grounds.

D. Concealed wood blocking for support of accessories, wall cabinets and wood trim.

E. Telephone and electrical panel boards.

F. Preservative treatment of wood.

1.2 RELATED SECTIONS

A. Section 06112 - Framing and Sheathing.

1.3 REFERENCES

A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.

B. APA: American Plywood Association.

C. AWPA (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.

D. AWPA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process.

E. NFPA: National Forest Products Association.

F. WWPA: Western Wood Products Association.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with the following agencies:
1. Lumber Grading Agency: Certified by ALSC.
2. Plywood Grading Agency: Certified by APA.

PART 2 PRODUCTS

2.1 MATERIALS

A. Lumber Grading Rules: NFPA, ALSC, and WWPA.

B. Miscellaneous Framing: Stress Group D, 19 percent maximum moisture content, pressure preservative treatment.

C. Plywood: APA Rated Sheathing Structural I, Grade C- D Exposure Durability 1 unsanded.

2.2 ACCESSORIES

A. Fasteners and Anchors:

1. Fasteners: Hot-dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.

2. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

2.3 FACTORY WOOD TREATMENT

A. Fire retardant: AWPA Treatment C20, Interior Type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 per ASTM E84.

B. Wood Preservative Pressure Treatment: AWPA Treatment C1 using water borne, CCA preservative with 0.25 percent retainage.

PART 3 EXECUTION

3.1 FRAMING

A. Set members level and plumb, in correct position.

B. Place horizontal members flat, crown side up.

C. Construct curb members of single pieces.

D. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

E. Coordinate curb installation with installation of decking and support of deck openings.

F. Install blocking as required for support of all accessories, cabinets, and wood trim.

3.2 SHEATHING

A. Secure sheathing to framing members with ends over firm bearing and staggered.

B. Install telephone and electrical panel boards with plywood sheathing material where required.

3.3 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment in accordance with manufacturer's instructions.

B. Brush apply two coats of preservative treatment on site-sawn cuts in accordance with AWPA M4.

C. Allow preservative to dry prior to erecting members.

3.4 SCHEDULES

A. Roof Blocking: S/P/F species, 19 percent maximum moisture content, pressure preservative treatment.

B. Telephone and Electrical Panel Boards: 3/4 inch thick, square edges, site brush applied preservative treated, verify size with Electrical Contractor.

END OF SECTION

SECTION 06193

PLATE CONNECTED WOOD TRUSSES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated wood trusses for roof framing.

B. Bridging, bracing, and anchorage.

C. Fire retardant treatment of wood.

1.2 RELATED SECTIONS

A. Section 06112 - Framing and Sheathing.

B. Section 06114 - Wood Blocking and Curbing.

C. Section 06180 - Engineered Wood Products.

D. Section 06196 - Plywood Web Joists.

1.3 REFERENCES

A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.

B. ASTM A167 - Stainless and Heat Resisting Chromium - Nickel Steel Plate, Sheet, and Strip.

C. ASTM A446 - Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

D. AWPA (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.

E. AWPA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process.

F. NFPA: National Forest Products Association.

G. SPIB: Southern Pine Inspection Bureau.

H. TPI (Truss Plate Institute) BWT-76 - Bracing Wood Trusses.

I. TPI (Truss Plate Institute) HET-80 - Handling and Erecting Wood Trusses.

J. TPI (Truss Plate Institute) PCT-80 - Metal Plate Connected Parallel Chord Wood Trusses.

K. TPI (Truss Plate Institute) TPI-85 - Metal Plate Connected Wood Trusses.

L. TPI (Truss Plate Institute) QST-88 - Metal Plate Connected Wood Trusses.

M. WCLIB: West Coast Lumber Inspection Bureau.

N. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate sizes and spacing of trusses, loads and truss cambers, framed openings and related information. Submit design calculations sealed by Design Engineer.

C. Product Data: Provide truss configurations, bearing and anchor details, bridging and bracing.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with the following agencies:

1. Lumber Grading Agency: Certified by ALSC.
2. Plywood Grading Agency: Certified by APA.

B. Truss Design, Fabrication, and Installation: In accordance with Truss Plate Institute BWT-76, HET-80, PCT-80 including Supplement, TPI-85 including Supplement, QST-88.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

B. Design trusses under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Ohio.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for loads, seismic zoning, other governing load criteria, and fire retardant requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01600.

B. Handle and erect trusses in accordance with TPI HET-80.

1.9 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on drawings.

PART 2 PRODUCTS

2.1 MATERIALS

A. Lumber Grading Rules: NFPA.

B. Wood Members: Single top and bottom chord, species and grade as required to meet design requirements, 19 percent maximum and 7 percent minimum moisture content.

C. Steel Connectors: ASTM A446 steel, Grade B, hot dip galvanized; die stamped with integral teeth thickness as required for structural requirements.

D. Steel Connectors (Fire Retardant Lumber): Materials and configuration as recommended for fire retardant lumber in latest TPI literature.

E. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

2.2 ACCESSORIES

A. Wood Blocking, Plating, Support Members, and Framing for Openings: In accordance with Section 06114.

B. Fasteners: Type to suit application.

2.3 FABRICATION

A. Fabricate trusses to achieve structural requirements specified.

B. Brace wood trusses in accordance with TPI BWT-76.

2.4 WOOD TREATMENT

A. Fire retardant: AWPA Treatment C20, Exterior Type, chemically treated and pressure impregnated; capable of

providing a maximum flame spread/smoke development rating of 25 per ASTM E84.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that supports and openings are ready to receive trusses.

3.2 PREPARATION

A. Coordinate placement of bearing and support items.

3.3 ERECTION

A. Install trusses in accordance with manufacturer's instructions.

B. Set members level and plumb, in correct position.

C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in true alignment until completion of erection and installation of permanent bracing.

D. Do not field cut or alter structural members without approval of Architect/Engineer.

E. Place headers and supports to frame openings required.

F. Frame openings between trusses with lumber in accordance with Section 06114.

G. Coordinate placement of decking with work of this section.

3.4 TOLERANCES

A. Framing Members: ½ inch maximum, from true position.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Finish carpentry items.

B. Wood door frames, glazed frames.

C. Wood casings and moldings.

D. Hardware and attachment accessories.

1.2 RELATED SECTIONS

A. Section 06114 - Wood Blocking and Curbing: Grounds and support framing.

B. Section 06410 - Custom Casework: Shop fabricated custom cabinet work.

C. Section 08211 - Flush Wood Doors.

D. Section 09900 - Painting: Painting and finishing of finish carpentry items.

E. Section 12302 - Wood Casework: Shop fabricated cabinet work.

1.3 REFERENCES

A. AHA A135.4 - Basic Hardboard; American Hardboard Association.

B. ANSI A208.1 - Wood Particle Board.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. AWI P-200 - Architectural Woodwork Quality Standards; Architectural Woodwork Institute.

E. BHMA A156.9 - American National Standard for Cabinet Hardware.

F. HPVA HP-1 - Voluntary Standard for Hardwood and Decorative Plywood; Hardwood Plywood Manufacturer's Association.

G. NEMA LD 3 - High Pressure Decorative Laminates; National Electric Manufacturer's Association.

H. NIST PS 20 - American Softwood Lumber Standard.

1.4 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data:
1. Provide data on fire retardant treatment materials and application instructions.
2. Provide instructions for attachment hardware, finish hardware, and miscellaneous accessories.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, and finishes, to a minimum scale of 1-1/2 inch to 1 ft.

D. Samples:
1. Submit two samples of finish plywood, 10 x 10 inch in size illustrating wood grain and specified finish.
2. Submit two samples of wood trim 6 inches long.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with AWI Architectural Woodwork Quality Standards, Premium.

B. Fabricator: Company specializing in fabricating the products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.

B. Protect work from moisture damage.

1.7 PROJECT CONDITIONS

A. Section 01039 - Coordination and Meetings.

B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

C. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

A. Softwood Lumber: PS 20; Graded in accordance with AWI Premium; White Pine species, maximum moisture content of 6 percent; with flat grain of quality suitable for transparent finish.

B. Hardwood Lumber:

1. Transparent Finish: Graded in accordance with AWI Premium; Red Oak species, maximum moisture content of 6 percent; with plain sawn grain of quality suitable for transparent finish.

2. Opaque Finish: Graded in accordance with AWI Premium; Poplar species, maximum moisture content of 6 percent; with plain sawn grain of quality suitable for opaque finish.

2.2 SHEET MATERIALS

A. Softwood Plywood: PS 1 Grade C-D; Graded in accordance with AWI Premium; veneer core.

B. Hardwood Plywood: Graded in accordance with AWI Premium; veneer core, type of glue recommended for application; Red Oak face species, plain slice cut, book matched grain.

C. Prefinished Paneling: Red Oak face species, plain saw grain, V-cut vertical joint scoring; 1/4 inch thick, finished as satin.

D. Wood Particleboard: ANSI A208.1 Type 1; AWI standard, composed of wood chips, sawdust, or flakes of medium density, made with high waterproof resin binders or water resistant adhesive; of grade to suit application; sanded faces.

E. Hardboard: Pressed wood fiber with resin binder, tempered grade, 1/4 inch thick unless noted otherwise on drawings, smooth one or two sides to suit application.

2.3 PLASTIC LAMINATE MATERIALS

A. Plastic Laminate: AWI, 0.050 inch General Purpose quality; color and pattern, and surface texture as selected by Architect/Engineer; manufactured by Nevamar, Formica, or WilsonArt.

B. Laminate Backing Sheet: NEMA LD 3 BK20 backing grade, undecorated plastic laminate.

2.4 ADHESIVE

A. Adhesive: Type recommended by laminate manufacturer to suit application.

2.5 FASTENERS

A. Fasteners: Of size and type to suit application; brass finish in exposed locations.

B. Concealed Joint Fasteners: Threaded steel.

2.6 ACCESSORIES

A. Lumber for Shimming and Blocking: Softwood lumber of White Pine species.

B. Glass: Type as specified in Section 08800.

C. Primer: Alkyd primer sealer type.

D. Wood Filler: Oil base, tinted to match surface finish color.

2.7 HARDWARE

A. Hinges: Self-closing style, plated finish; 3000 series manufactured by Grass America, Inc. or equal approved by Architect/Engineer.

B. Pulls: 3-1/2" wire style, powder coat finish; MC-402 manufactured by EPCO or equal approved by Architect/Engineer.

C. Shelf Brackets: Plated finish; #80/180 manufactured by Knape & Vogt or equal approved by Architect/Engineer.

D. Shelf Standards and Rests: Support style, plated finish; #255BR manufactured by Knape & Vogt or equal approved by Architect/Engineer.

E. Drawer Slides: 100 pound telescoping style, plated finish; #1429 manufactured by Knape & Vogt or equal approved by Architect/Engineer.

F. Grommets: 1-3/4" diameter style, plastic with slotted snap-in cap.

2.8 FABRICATION

A. Fabricate to AWI Premium standards.

B. Shop assemble work for delivery to site, permitting passage through building openings.

C. Fit exposed sheet material edges with 3/4 inch matching hardwood edging. Use one piece for full length only.

D. Cap exposed plastic laminate finish edges with material of same finish and pattern.

E. Shop prepare and identify components for book match grain matching during site erection.

F. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

G. Ease all exposed edges of trim lumber.

H. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 2 feet from sink cut-outs.

I. Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.

2.9 SHOP FINISHING

A. Sand work smooth and set exposed nails and screws.

B. Apply wood filler in exposed nail and screw indentations.

C. On items to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.

D. Finish work in accordance with AWI - Section 1500 System per Section 09900.

E. Stain, seal, and urethane exposed to view surfaces. Brush apply only.

F. Seal internal surfaces and semi-concealed surfaces. Brush apply only.

G. Seal surfaces in contact with cementitious materials.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01039 - Coordination and Meetings: Verification of existing conditions before starting work.

B. Verify adequacy of backing and support framing.

C. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

A. Install work in accordance with AWI Premium quality standard.

B. Set and secure materials and components in place, plumb and level.

C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

D. Install components and trim with nails, screws, or bolts with blind fasteners at 6 inch on center, wall adhesive by gun application.

E. Install prefinished paneling with nails, screws, and wall adhesive by the bead method at 12 inches on center.

F. Install hardware in accordance with manufacturer's instructions.

3.3 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.4 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.5 SCHEDULE

A. All wood trim shall be hardwood lumber, Oak species with transparent finish unless noted otherwise on drawings.

END OF SECTION

SECTION 07181

WATER REPELLENT PENETRANT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Water repellent coating applied to exterior masonry and concrete surfaces.

1.2 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete: Concrete surfaces.

B. Section 03451 - Architectural Precast Concrete: Concrete surfaces.

C. Section 04300 - Unit Masonry System: Masonry surfaces.

D. Section 07900 - Joint Sealers.

1.3 REFERENCES

A. FS SS-W-110 - Water Repellent, Colorless Silicone, Resin Base.

1.4 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide details of product description, tests performed, limitations to coating, and chemical properties including percentage of solids.

1.5 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Procedures for submittals.

B. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.

C. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

1.7 MOCKUP

A. Section 01400 - Quality Control: Requirements for mockup.

B. Prepare surface 36 x 36 inch in size.

C. Locate where directed.

D. Mockup may remain as part of the Work upon approval of the Architect/Engineer.

1.8 DELIVERY, STORAGE, AND PROTECTION

A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.

B. Protect coating liquid from freezing.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 - Material and Equipment: Environmental conditions affecting products on site.

B. Do not apply coating when ambient or surface temperature is lower than 50 degrees F or higher than 100 degrees F.

C. Do not apply coating when wind velocity is higher than 10 mph.

1.10 EXTRA MATERIALS

A. Section 01700 - Contract Closeout.

B. Provide two gallons of coating of each color used.

PART 2 PRODUCTS

2.1 CLEAR COATINGS

A. Manufacturers

1. Huls America, Inc.; Product: Chem-Trete BSM-40.

B. MATERIALS

1. Coating: Isobutyl trimethoxy silane in ethanol solution; colorless; containing 40 percent minimum active ingredient.

2.2 PIGMENTED COATINGS

A. Acceptable Manufacturers:

1. United Coatings; Product: Aquathon.
2. Hydrozo Coatings; Product: Colorseal/Clear 16.
3. Section 01600 - Material and Equipment: Product options and substitutions. Substitutions: Permitted.

B. Materials

1. Pigmented Coating: FS SS-W-110, silicone resin Methyl Methacrylate Acrylate copolymer with inorganic oxide toning pigments; standard color as selected by Architect; containing 20 percent minimum solids by volume.

C. Performance Requirements

1. Resistance to Accelerated Weathering: Color retention and ultraviolet resistance of the treated specimen shall meet the following requirements after 3,000 hours of testing in accordance with ASTM D 822 and G 23 in an Atlas Carbon Arc Weather-Ometer. (Cycling set at 18 minutes of water spray with ultraviolet radiation and 102 minutes of ultraviolet radiation only). Test specimens shall be concrete masonry unit face shells.

   a. Color Retention: Within five (5) N.B.S. (National Bureau of Standards) units when tested in accordance with ASTM D 2244; or shall show no appreciable change when tested in accordance with ASTM D 1729. Inspection is compared to unweathered specimen.

   b. Ultraviolet Resistance: No chalking or flaking when tested in accordance with ASTM D 659 and D 772.

2. Resistance to Salt Spray: Color retention and degree of efflorescence of the treated specimen shall meet the following requirements after 500 hours of testing in accordance with ASTM B 117 in a Harshaw Salt Spray Cabinet. Test specimens shall be treated cement asbestos board or equal.

a. Color Retention: Within five (5) N.B.S. (National Bureau of Standards) units when tested in accordance with ASTM D 2244; or shall show no appreciable change when tested in accordance with ASTM D 1729. Inspection is compared to unweathered specimen.

b. Degree of Efflorescence: Specimen shall exhibit no efflorescence when tested in accordance with ASTM D 2831.

3. Resistance to Sulfide Staining: No discoloration after 15 minutes immersion in saturated hydrogen sulfide gas solution when tested in accordance with ASTM D 1712. Compare with control specimen not exposed to hydrogen sulfide gas solution. Test specimen shall be treated cement asbestos board or equal.

4. Resistance to Chemical Reagents: Specimen shall exhibit none or slight color change and no softening or deterioration after seven (7) days immersion in the following chemicals: ammonium hydroxide - 10 percent; sodium hydroxide - 10 percent; mineral spirits - KB value 38. Inspection is compared to specimen not exposed to chemical reagents. Test specimen shall be treated asbestos cement board or equal.

5. Independent Verification of Minimum 10 Year Exposure to Southwest Climate: Stain shall have been in use in the Southwest desert region 10 years or more and show no signs of fading, peeling or flaking. Supply project locations exceeding 10 years service.

6. Moisture Vapor Transmission: Must allow moisture vapor from building interior to pass through substrate with a perm rating of greater than 5.00 when tested in accordance with ASTM E 398.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01039 - Coordination and Meetings: Verification of existing conditions before starting work.

B. Verify joint sealants are installed and cured.

C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of coating.

3.2 PREPARATION

A. Delay work until masonry mortar and concrete substrates are cured a minimum of 60 days.

B. Remove loose particles and foreign matter.

C. Remove oil or foreign substance with a chemical solvent which will not affect coating.

D. Scrub and rinse surfaces with water and let dry.

3.3 APPLICATION

A. Apply coating in accordance with manufacturer's instructions.

B. Apply at a rate recommended by coating manufacturing using airless spray method.

C. Apply pigmented coatings in two continuous, uniform coats; clear coatings in one continuous uniform coat.

D. If unevenness in color, lines of work termination or scaffold lines, etc., exist, the Architect may have all such surfaces resprayed at the contractor's expense. Respraying, if required, shall be carried to a natural break-off point.

E. Brush or roller-apply coating only at locations where overspray would affect adjacent materials and where not practical for spray application.

3.4 PROTECTION TO FINISHED AND ADJACENT WORK

A. Section 01700 - Contract Closeout: Protecting installed work.

B. Protect adjacent surfaces not scheduled to receive coating.

C. Protect landscaping, property, and vehicles.

D. If applied to unscheduled surfaces, remove immediately by a method instructed by coating manufacturer.

3.5 SCHEDULES

A. Exterior Masonry: Two coat application, pigmented.

1. Architect reserves the option to choose up to three different complementing colors from the manufacturer's standard pallet.

2. Architect shall furnish a complete schedule upon receipt of color chart and final selection/approval by Owner.

B. Field Stone at Entry Area: One coat application, clear.

END OF SECTION

SECTION 07212

BOARD INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Board insulation at cavity wall construction, perimeter foundation wall, underside of floor slabs, and exterior wall behind gypsum board wall finish.

1.2 RELATED SECTIONS

A. Section 07213 - Batt and Blanket Insulation.

B. Section 07531 - Elastomeric Sheet Roofing - Fully Adhered: Roof Insulation.

1.3 REFERENCES

A. ANSI/ASTM D2842 - Water Absorption of Rigid Cellular Plastics.

B. ASTM C240 - Testing Cellular Glass Insulating Block.

C. ASTM C578 - Preformed Cellular Polystyrene Thermal Insulation.

D. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.

E. FS HH-I-530 - Insulation Board, Thermal, Unfaced, Polyurethane or Polyisocyanurate.

F. FS HH-I-551 - Insulation Block and Boards, Thermal (Cellular Glass).

G. FS HH-I-1972/GEN - Insulation Board, Thermal, Faced, Polyurethane or Polyisocyanurate.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.1 INSULATION MATERIALS

A. Extruded Polystyrene Insulation (Type A): ASTM C578, Type IV extruded cellular type, conforming to the following:

Thermal Resistance	R of 5.0 per inch
Thickness	Thickness indicated or required to achieve designated "R" valves
Board Size	24 or 48 x 96 inch
Compressive Strength	Minimum 25 psi
Water Absorption	In accordance with ASTM D2842 0.3 percent by volume maximum
Edges	Square edges

B. Polyisocyanurate Insulation (Type B): FS HH-I-1972 Style 1 Class 2; closed cell type, conforming to the following:

Thermal Resistance	Aged R of 7.2 per inch at 75 degrees mean temperature.
Thickness	Thickness indicated or required to achieve designated "R" values
Board Size	48 x 96 inch
Compressive Strength	Minimum 25 psi
Water Absorption	In accordance with ASTM D2842 less than 1.5 percent by volume maximum
Edges	Square edges.
Facing	Factory applied skin of treated kraft paper or fiberglass mats on both faces.

2.2 ADHESIVES

A. Adhesive: Type recommended by insulation manufacturer for application.

2.3 ACCESSORIES

A. Insulation Fasteners: Impaling clip of galvanized steel with washer retainer, to be mechanically fastened to surface to receive board insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation.

B. Verify substrate surface is flat, free of irregularities or substances that may impede adhesive bond.

3.2 INSTALLATION - FOUNDATION PERIMETER

A. Apply Type "A" boards to foundation wall perimeter, vertically (or as detailed on drawings). Place boards in a method to maximize contact bedding. Butt edges and ends tight to adjacent board and to protrusions. Install per manufacturer's recommendations.

B. Extend boards over control joints, unbonded to foundation.

3.3 INSTALLATION - CAVITY WALLS

A. Secure impale fasteners to substrate at a frequency of 6 per insulation board. Follow manufacturer's recommendations.

B. Install Type "A" boards horizontally between wall reinforcement. Stagger end joints.

3.4 INSTALLATION - EXTERIOR WALLS

A. Install Type "A" boards on wall surface, vertically between furring strips.

B. Place boards in a method to maximize contact bedding. Stagger end joints. Butt edges and ends tight to adjacent board and to protrusions.

C. Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

3.5 INSTALLATION - UNDER CONCRETE SLABS

A. Where detailed, place Type "A" insulation under slabs on grade after base for slab has been compacted.

B. Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.6 PROTECTION OF FINISHED WORK

A. Do not permit Work to be damaged prior to covering insulation.

END OF SECTION

SECTION 07213

BATT AND BLANKET INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Batt insulation and vapor retarder in exterior wall construction.

B. Acoustical batt insulation.

1.2 RELATED SECTIONS

A. Section 07212 - Board Insulation.

1.3 REFERENCES

A. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

B. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

C. NFPA 255 - Test of Surface Burning Characteristics of Building Materials.

D. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

PART 2 PRODUCTS

2.1 MATERIALS

A. Batt Insulation: ASTM C665 Type II - preformed glass fiber batt; conforming to the following:

1. Thermal Resistance: 3-1/2" R of 13
   6" R of 19
   12" R of 38
2. Batt Size: Width of Framing Opening.
3. Facing: Faced on one side with asphalt treated Kraft paper.

B. Vapor Barrier: 4 mil thick, black polyethylene film for above-grade application.

2.2 ACOUSTICAL BATT INSULATION

A. ASTM C665; preformed glass fiber, friction fit type, unfaced, to be 1-1/2" less than wall thickness or as

indicated on the drawings; ceiling insulation minimum 4" thick.

2.3 ACCESSORIES

A. Nails or staples: Steel wire; galvanized; type and size to suit application.

B. Wire Mesh: Galvanized steel, hexagonal wire mesh.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate, and adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

A. Install batt insulation in accordance with manufacturer's instructions.

B. Install without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.

E. Install with factory applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.

F. Staple or nail facing flanges in place at maximum 6 inches oc. Retain in place with wire mesh secured to framing members as required.

G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

3.3 SCHEDULE

A. Acoustical Batt Insulation: In all new interior partition walls except where indicated otherwise on drawings; above ceilings minimum 2' each side of acoustically insulated walls which do not extend to underside of structure above.

END OF SECTION

SECTION 07465

PREFORMED METAL SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preformed metal siding system for walls with insulation, liners, related flashings and accessory components.

1.2 RELATED SECTIONS

A. Section 06112 -Framing and Sheathing: Stud wall framing system.

B. Section 07610 - Preformed Metal Roofing.

C. Section 07620 - Sheet Metal Flashing and Trim.

1.3 REFERENCES

A. ASTM A167 - Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet, and Strip.

B. ASTM A446/A446M - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

C. ASTM A525/A525M - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements.

D. ASTM A606 - Steel Sheet and Strip, Hot-Rolled and Cold-Rolled, High-Strength, Low-Alloy, with Improved Corrosion Resistance.

E. ASTM A755/A755M - Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil Coating Process For Exterior Exposed Building Products.

F. ASTM A792/A792M - Steel Sheet, Aluminum-Zinc Alloy Coated by the Hot-Dip Process, Structural (Physical) Quality.

1.4 DESIGN REQUIREMENTS

A. Components: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with OBBC code.

B. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement

within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.

C. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

D. Products: Provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials in Section 07213.

1.5 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.

C. Samples: Submit sample of siding and siding finish, 24 x 24 inch in size illustrating finish color, sheen, and texture.

1.6 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing the work of this section with minimum five years documented experience, and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.

B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

C. Store prefinished material off ground protected from weather, to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

D. Prevent contact with materials which may cause discoloration or staining.

1.8 COORDINATION

A. Coordinate work under provisions of Section 01039.

B. Coordinate the Work for installation of vapor retarder and air barrier seals.

C. Coordinate the Work with installation of related and adjacent components or materials.

PART 2 PRODUCTS

2.1 EXTERIOR WALL PANELS

A. Manufacturers

1. McElroy Metal, Inc.; Model: Multi-Rib.
2. VicWest Steel
3. MBCI
4. Section 01600 - Materials and Equipment: Product options and substitutions. Substitutions: Permitted.

B. Exterior Sheet Materials

1. Precoated Galvanized Steel: ASTM A755/A755M; ASTM A446/A446M, Grade D, Coating Designation G90; shop precoated with polyvinylidene fluoride (PVF) coating. Exposed Exterior Surfaces: Color as selected from manufacturer's standard range (24 ga. minimum thickness).

2.2 INTERIOR PANEL AND OTHER SHEET MATERIALS

A. Manufacturers

1. MBCI; Model: Artisian 1.
2. McElroy Metal, Inc.
3. VicWest Steel
4. Section 01600 - Materials and Equipment: Product options and substitutions. Substitutions: Permitted.

B. Galvanized Steel: ASTM A446/A446M, Grade D, Coating Designation G90. Precoated Surfaces: Color as selected from manufacturer's standard range (26 ga. minimum thickness).

2.3 INSULATION

A. Insulation: Glass fiber type specified in Section 07213; thermal.

2.4 ACCESSORIES

A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant; color as selected.

B. Sealants: Manufacturer's standard type suitable for use with installation of system; non-staining, non-shrinking and non-sagging; ultra-violet and ozone resistant; color as selected.

C. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, stainless steel; fastener cap same color as exterior panel. Exposed fasteners same finish as panel system.

D. Field Touch-up Paint: As recommended by panel manufacturer.

E. Bituminous Paint: Asphalt base.

F. Building Paper: Cellulose fiber building paper, water repellent breather type. ASTM D226, 15 pound (73 kg/sq m) unperforated asphalt felt.

2.5 COMPONENTS

A. Exterior Sheet: Minimum 26 gage thick precoated steel stock; profile as indicated; interlocking edges, fitted with continuous gaskets.

B. Liner: Minimum 26 gage thick steel stock; interlocking edges, fitted with continuous gaskets.

C. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered brake formed to required angles. Mitered internal corners to be back braced to maintain continuity of profile.

D. Expansion Joints: Same material, thickness and finish as exterior sheets; manufacturer's standard brake formed infill type, of profile to suit system as required.

E. Trim, Closure Pieces, Caps, Flashings, Facias: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

F. Anchors: Galvanized steel or Aluminum.

2.6 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest practicable lengths.

C. Fabricate corners in one continuous piece with minimum 18 inch returns.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that building framing members are ready to receive panel system.

3.2 INSTALLATION - METAL PANELS

A. Install metal siding system on walls and soffits in accordance with manufacturer's instructions.

B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.

C. Fasten siding to structural supports; aligned, level, and plumb.

D. Locate joints over supports. Lap panel ends minimum 2 inches.

E. Provide expansion or control joints where indicated or required.

F. Use concealed fasteners unless otherwise approved by Architect/Engineer.

G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.3 TOLERANCES

A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.

B. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

3.4 CLEANING

A. Clean work under provisions of Section 01700.

B. Remove site cuttings from finish surfaces.

C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

3.5 GROUNDING

A. Ground Metal Wall System in compliance with all OBBC and NEC requirements.

PART 4 SPECIAL PROVISIONS

4.1 ACOUSTICAL METAL LINER PANEL

A. Wall and ceiling metal liner panels in the SBR Blower Building shall be perforated acoustical metal liner panels meeting the requirements of paragraph 2.2.

END OF SECTION

SECTION 07610

PREFORMED METAL ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Steel roofing and associated flashings and fascias.

B. Counterflashings.

C. Fasteners.

D. Accessories.

E. Grounding.

1.2 RELATED SECTIONS

A. Section 07620 - Sheet Metal Flashing & Trim.

B. Section 07631 - Gutters and Downspouts.

1.3 REFERENCES

A. ASTM A792-86 Sheet Steel, Aluminum Zinc Alloy Coated by the Hot Dipped Process.

B. ASTM A361 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process for Roofing and Siding.

C. NAAMM - Metal Finish Handbook.

D. NRCA (National Roofing Contractors Association) - Roofing Manual.

E. SMACNA - Architectural Sheet Metal Manual.

1.4 SUBMITTALS

A. Submit shop drawings under provisions of Section 01300.

B. Indicate on shop drawings, material profile, jointing pattern, jointing details, fastening methods, and installation details.

C. Submit samples under provisions of Section 01300.

D. Submit sample of metal roofing illustrating typical standing seam material, and finish.

3.2 PREPARATION

A. Field measure site conditions prior to fabricating work.

B. Install starter and edge strips, and cleats before starting installation.

C. Install reglets true to lines and levels. Seal top of reglets with sealant.

3.3 INSTALLATION

A. Conform to drawing details as applicable, and as included in SMACNA manual.

B. Insert flashings into reglets to form tight fit. Secure in place with plastic wedges at maximum 12 inches on center. Seal flashings into reglets with sealant.

C. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Architect/Engineer.

D. Apply plastic cement compound between metal flashings and felt flashings.

E. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

F. Seal metal joints watertight.

END OF SECTION

SECTION 07631

GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Prefinished aluminum gutters and downspouts.

1.2 RELATED SECTIONS

A. Section 07620 - Sheet Metal Flashing and Trim.

1.3 REFERENCES

A. ASTM B209 - Aluminum and Aluminum Alloy Sheet and Plate.

B. SMACNA - Architectural Sheet Metal Manual.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Indicate general construction, configurations, jointing methods, fastening methods, locations, and installation details.

C. Product Data: Provide data on prefabricated components.

D. Samples: Submit two samples, 8 inches long illustrating component design, finish, color, and configuration.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Material and Equipment: Transport, handle, store, and protect.

B. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.

C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.1 MATERIALS

A. Prefinished Aluminum Sheet: ASTM B209, .040 inch thick; plain finish shop precoated with PVDF polyvinylidene fluoride coating of color as selected by Architect.

2.2 COMPONENTS

A. Gutters: SMACNA rectangular style profile; 6".

B. Downspouts: SMACNA rectangular profile; 4" x 5".

C. Anchors and Supports: Profiled to suit gutters and downspouts.
   1. Anchoring Devices: In accordance with SMACNA requirements. Type recommended by fabricator.
   2. Gutter Supports: Straps at maximum 3'-0" O.C.
   3. Downspout Supports: Aluminum brackets; straps will not be permitted.

D. Fasteners: Same material and finish as gutters and downspouts, with soft neoprene washers.

2.3 ACCESSORIES

A. Downspouts Boots: PVC with molded boot fittings.

B. Splash Blocks: Pre-cast concrete splash blocks; minimum 3,000 PSI at 28 days, with minimum five percent (5%) air entrainment.

C. Gutter Splice: .060 self-sealing EPDM.

2.4 FABRICATION

A. Form gutters and downspouts of profiles and sizes to SMACNA requirements.

B. Field measure site conditions prior to fabricating work.

C. Fabricate with required connection pieces.

D. Form sections square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

E. Fabricate gutter and downspout accessories; seal watertight.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01039 - Coordination and Meetings: Verification of existing conditions before starting work.

B. Verify that surfaces are ready to receive work.

C. Beginning of installation means acceptance of conditions.

3.2 INSTALLATION

A. Install gutters, downspouts, and accessories in accordance with manufacturer's printed instructions.

B. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories. Apply EPDM membrane at all seams and connections minimum 3" each side of joint.

C. Slope gutters 1/8" per foot minimum.

D. Apply bituminous protective backing on surfaces in contact with dissimilar materials.

E. Seal metal joints watertight.

F. Connect downspouts to storm system where indicated. Seal connection watertight.

G. Set splash blocks under downspouts, unless shown to connect to storm drainage system.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sealants and joint backing.

B. Precompressed foam sealers.

1.2 RELATED SECTIONS

A. Section 07181 - Water Repellant Coating.

1.3 REFERENCES

A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

B. ASTM C1193 - Standard Guide for Use of Joint Sealants.

C. ASTM D1056 - Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.

D. ASTM D1565 - Standard Specification for Flexible Cellular Materials--Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).

E. ASTM D1667 - Standard Specification for Flexible Cellular Materials--Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).

F. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for concrete Pavements.

1.4 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

1.5 SUBMITTALS FOR INFORMATION

A. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years experience.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.8 COORDINATION

A. Section 01039 - Coordination and Meetings: Coordination requirements.

B. Coordinate the work with all sections referencing this section.

1.9 WARRANTY

A. Correct defective work within a five year period after Date of Substantial Completion.

B. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 SEALANTS

A. Type A - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Use NT, G, A M, and O multi-component.

1. Manufacturers
   a. White Caulk - Sonneborn: Ultra
   b. Other than white caulk
      1. Sonneborn: Sonolastic NP2
      2. Pecora: Dynatrol II
      3. Bostik: Chem-Calk 500
   c. Sealants submitted for approval, other than what is specified, shall meet warranty requirements and pass 2,000 hours of accelerated weathering without surface cracking per ASTM C793.

2. Colors as selected by Architect/Engineer from standard colors, or custom-color as needed to match adjacent substrate.

3. All sealants shall comply with applicable ASTM standards.

4. Applications: Use for:
   a. Soft joints in masonry.
   b. Joints between concrete and other materials.
   c. Joints between metal frames and other materials.
   d. Other exterior joints for which no other sealant is indicated.

B. Type B - Exterior metal lap joint sealant: Premium grade, high-performance, one part silyl-terminated, non-sag elastomeric sealant.

1. Manufacturers
   a. Dow Corning: 795
   b. GE: Silpruf Sealant
   c. Pecora: 895

2. Applications that come in contact with urethane must be compatible.

3. Color shall be as selected by Architect/Engineer from manufacturers standard color ranges.

4. Applications: Use for:
   a. Concealed sealant bead in sheet metal work.
   b. Concealed sealant bead in siding overlaps.
   c. Metal to glass.
   d. Glass to glass.

C. Type C - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.

1. Manufacturers:
   a. Sonneborn: Sonolac
   b. Pecora: AC-20
   c. Bostik: Chem-Calk 600.

2. Standard colors matching finished surfaces as selected by Architect/Engineer.

3. Applications: Use for:
   a. Interior caulking for all dissimilar applications that are non-moving in nature.
   b. Joints between door and window frames and wall surfaces.

c. Other interior joints for which no other type of sealant is indicated.

D. Type D - Bathtub/Tile Sealant: Silicone; ASTM C920, Type S, Grade NS, Class 25, Use NT, M, A, and T (when primed); single component, mildew resistant.

1. Manufacturers:
   a. Dow Corning: Dow 786.
   b. GE: Sanitary Sealant.
   c. Pecora: 896

2. Applications: Use for:
   a. Joints between plumbing fixtures and floor and wall surfaces.
   b. Joints between kitchen and bath countertops and wall surfaces.

E. Type E - Exterior or interior expansion or control joints in horizontal wearing surfaces: Bitumen-modified Polyurethane, self-leveling or troweled; ASTM C920, Type M, Grade P, Class 25, Use T and M.

1. Manufacturers:
   a. Sonneborn: Sonolastic SL2/NP2.
   b. Pecora: Dynatred/NR 201 or 200.
   c. Bostik: Chem-Calk 550.

2. Standard colors matching finished surfaces as selected by Architect/Engineer.

3. Applications: Use for:
   a. Expansion joints in floors, up to ½" wide.

2.2 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber; D1565, open cell PVC or D1667, closed cell PVC; oversized 30 to 50 percent larger than joint width; compatible and approved by sealant manufacturer.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant. Use of power tools shall not be permitted.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfiguration.

3.3 INSTALLATION

A. Perform installation in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
1. Width/depth ratio of 2:1.
2. Neck dimension no greater than ½ of the joint width.
3. Surface bond area on each side not less than 75 percent of joint width.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints concave, channel shaped, or as detailed.

H. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

I. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal all joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.4 CLEANING

A. Section 01700 - Contract Closeout: Cleaning installed work.

B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF FINISHED WORK

A. Section 01700 - Contract Closeout: Protecting installed work.

B. Protect sealants until cured.

END OF SECTION

SECTION 08110

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Non-rated and fire rated steel doors and frames.

1.02 RELATED WORK

A. Section 08700 - Hardware.

B. Section 08800 - Glazing.

C. Section 09900 - Painting: Field painting of doors and frames.

1.03 REFERENCES

A. ASTM E152 - Methods of Fire Tests of Door Assemblies.

B. DHI - Door Hardware Institute: The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.

C. NFPA 80 - Fire Doors and Windows.

D. SDI-100 - Standard Steel Doors and Frames.

E. SDI-105 - Recommended Erection Instructions for Steel Frames.

F. ANSI A224.1 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

1.04 QUALITY ASSURANCE

A. Conform to requirements of SDI-100.

B. Fire rated door and frame construction to conform to ASTM E152.

C. Installed frame and door assembly to conform to NFPA 80 for fire rated class indicated on Drawings.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated frames and doors.

1.06 SUBMITTALS

A. Submit shop drawings and product data indicating frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.

B. Indicate door elevations, internal reinforcement, closure method, and cut outs for glazing and louvers.

1.07 DELIVERY, STORAGE AND PROTECTION

A. Protect doors and frames with resilient packaging.

PART 2 PRODUCTS

2.01 DOORS AND FRAMES

A. Doors and frames shall be as manufactured by the Ceco Corporation, Steelcraft, or equal.

B. Exterior Doors: SDI-100 Full Flush, Composite Construction, 1-3/4 Inch, 18 Gage, insulated door and glazing.

C. Interior Doors: SDI-100 Full Flush, Composite Construction, 1-3/4 Inch, 18 Gage.

D. Exterior Frames: 16 gage thick material.

E. Interior Frames: 16 gage thick material.

2.02 DOOR CORE

A. Non-insulated Door: Core shall be Impregnated Kraft honeycomb or manufacturer's standard.

B. Insulated Door: Core shall be polystyrene insulation producing a heat transmission coefficient (U) factor for the door of 0.09.

2.03 ACCESSORIES

A. Louvers: Roll formed steel material, prime painted, inverted 'V" blade, sightproof.

B. Rubber Silencers Resilient Rubber.

C. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamperproof screws.

2.04 FABRICATION

A. Fabricate frames as welded unit type.

B. Fabricate frames and doors with hardware reinforcement plates welded in place.

C. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.

D. Prepare frame for silencers. Provide three single rubber silencers for single doors on strike side, and two single silencers on frame head at double doors without mullions.

E. Attach fire rated label to each frame and door unit.

F. Close top edge of exterior door flush with inverted steel channel closure. Seal joints watertight.

G. Fabricate frames for masonry wall coursing with 4 inch head member.

2.05 FINISH

A. Primer: Baked on rust inhibiting prime paint in accordance with ANSI A 224.1.

B. Finish: Enamel of color selected by Owner to be field applied.

C. Coat inside of frame profile with bituminous coating when in contact with masonry.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install frames in accordance with SDI-105.

B. Install doors in accordance with DHI.

C. Coordinate with wall construction for anchor placement.

D. Coordinate installation of glass and glazing.

E. Install door louvers

F. Adjust hardware for smooth and balanced door movement.

END OF SECTION

SECTION 08332

OVERHEAD COILING ALUMINUM DOORS

PART 1 GENERAL

1.1 SCOPE

A. This section includes the furnishing and installing of aluminum coiling doors complete and ready for service as shown on the Drawings and described in this Section.

B. Each coiling doors shall be furnished complete with a curtain, hood, guides, gears, motor operator, weatherstripping, safety strip, and all other accessories required for satisfactory operation.

C. The erector of the doors shall be approved by the manufacturer.

1.2 SUBMITTALS

A. Submittals shall be in accordance with the requirements of Section 01300 and shall include:

1. Submittals for Review:

a. Shop drawings

b. Manufacturer's certification

c. Manufacturer's literature

d. Samples

1. Samples of finished and frame corner construction shall be submitted to the Engineer for approval.

2. Samples shall be clearly identified as to location and type of finish.

2. Operation and maintenance information.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. General: The dimensions of the coiling doors shall be as shown on the Drawings and as called for in the door

schedule. The doors, frames, and operators shall be products of Kinnear Coiling Doors, Overhead Door Corporation, or equal.

2.2 DOORS

A. The door curtain shall be of interlocking slats formed without sharp bends. Slats shall be extruded aluminum 6063 alloy.

B. Slats to be of sufficient section to provide curtain strength adequate to safely resist a wind load of 20 lbs. per square foot. The slats shall have a minimum thickness of 0.055 inches.

C. Ends of slats shall be provided with end locks with integral slat lugs as windlocks which engage bars and lock the curtain in the guides. Bottom bar to be two aluminum angles.

D. The curtain to be coiled on a pie or barrel of size sufficient to carry the door load, with a deflection not to exceed 0.03 inches per foot of opening width. The door shall be evenly counterbalanced to helical springs contained in pipe. All springs shall be anchored to the same tension rod and held in position by the same adjusting wheel accessible from the outside.

E. The coil brackets shall be of high grade iron or precision formed plate designed to house the ends of the coils and support the counterbalance assembly.

F. The coil shall be housed in a minimum 24 gauge aluminum hood.

G. The gears shall be high grade gray iron, cast teeth machine molded from machine cut patterns.

H. The guides shall be built of structural aluminum angles to form a slot of sufficient depth to retain curtain in guides against heavy wind pressure. Guides shall be provide with windlock bars.

I. Guides and hood shall be weatherstripped to prevent air pressure.

J. The door and hood shall be anodized.

2.3 OPERATORS

A. Provide manual or electric operator per Door Schedule in Part 4.

PART 3 EXECUTION

3.1 INSTALLATION OF FRAMES

A. Set frame to maintain scheduled dimensions, hold head level, and set jambs plumb and square.

B. Secure anchorages and provide connections to adjacent construction.

3.2 INSTALLATION OF DOORS

A. Comply with manufacturer's instructions for installation of door hardware, operators, and other components.

B. Adjust so doors operate smoothly and fit properly when closed.

C. Adjust and lubricate locks and operators.

D. Clean surfaces and remove protective tape and excess caulking sealants.

PART 4 SPECIAL PROVISIONS

4.1 DOOR SCHEDULE

A.

Door No.	Size	Operator Type
1	10'-0" x 10'-0"	Manual Chain Wheel Operator

END OF SECTION

SECTION 08520

ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Extruded aluminum windows with fixed and/or operating sash.

B. Site glazed.

C. Operating hardware and insect screens.

1.2 RELATED SECTIONS

A. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.

B. Section 08410 - Aluminum Entrances and Storefronts: Operable sash within glazing system.

C. Section 08800 - Glazing.

1.3 REFERENCES

A. AA (Aluminum Association) - Designation System for Aluminum Finishes.

B. AAMA 101 - Aluminum and Poly (Vinyl Chloride) (PVC) Prime Windows and Glass Doors.

C. AAMA 603.8 - Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.

D. AAMA 605.2 - Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.

E. AAMA 606.1 - Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.

F. AAMA 607.1 - Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.

G. AAMA 1502.7 - Test Method for Condensation Resistance of Windows, Doors, and Glazed Wall Sections.

H. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

I. ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.

J. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

K. ASTM E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

L. ASTM E1105 - Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.

M. FS RR-W-365 - Wire Fabric (Insect Screening).

1.4 SYSTEM DESCRIPTION

A. Windows: Tubular aluminum sections, factory fabricated, factory finished, vision glass, related flashings, anchorage and attachment devices.

B. Configuration: Fixed non-operable and outward projecting bottom sash.

C. Glazing: Exterior.

D. Forced Entry Resistance: Conform to ASTM F568 for type as applicable.

1.5 PERFORMANCE REQUIREMENTS

A. System Design: Design and size components to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall as calculated in accordance with applicable code.

B. Deflection: Limit member deflection to flexure limit of glass of the longer dimension with full recovery of glazing materials.

C. Assembly: To accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.

D. Air Infiltration: Limit air infiltration through assembly to 0.06 cfm/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E283.

E. Vapor Seal: Limit vapor seal with interior atmospheric pressure of 1 inch (25 mm) sp, 72 degrees F (22 degrees C), 40 percent RH without seal failure.

F. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

G. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.

1.6 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide component dimensions, anchorage and fasteners, glass, and internal drainage details.

C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work; and installation requirements.

1.7 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Procedures for submittals.

B. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.8 QUALITY ASSURANCE

A. Manufacturer and Installer: Company specializing in manufacturing commercial aluminum windows with minimum three years documented experience.

1.9 PRE-INSTALLATION MEETING

A. Section 01039 - Coordination and Meetings: Pre-installation meeting.

B. Convene minimum of one week before starting work of this section.

1.10 DELIVERY, STORAGE, AND PROTECTION

A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.

B. Protect factory finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 - Material and Equipment: Environmental conditions affecting products on site.

B. Do not install sealants when ambient temperature is less than 40 degrees F.

C. Maintain this minimum temperature during and after installation of sealants.

1.12 WARRANTY

A. Section 01700 - Contract Closeout.

B. Correct defective Work within a one year period after Date of Substantial Completion.

C. Warranty: Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. DeSCo; Product: 2500 Series.

2.2 MATERIALS

A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper.

B. Steel Sections: Profiled to suit mullion sections.

C. Fasteners: Stainless steel.

2.3 COMPONENTS

A. Frames: 3 inch wide x 2-1/2 inch deep profile, thick section; thermally broken with interior portion of frame insulated from exterior portion; applied glass stops of snap-on or screw fastened type.

B. Insect Screen Frame: Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.

C. Insect Screens: 14/18 mesh, aluminum strands.

D. Operable Sash Weather Stripping: Wool pile or Nylon pile; permanently resilient, profiled to effect weather seal.

E. Fasteners: Stainless steel.

2.4 GLASS AND GLAZING MATERIALS

A. Glass and Glazing Materials: As specified in Section 08800 of Types described below:
1. Glass in Exterior Lights: 5/8" insulated, tinted.

2.5 SEALANT MATERIALS

A. Sealant and Backing Materials: As specified in Section 07900.

2.6 HARDWARE

A. Sash lock: Lever handle with cam lock.

B. Projecting Sash Arms: Cadmium or Zinc plated steel, friction pivot joints with nylon bearings, removable pivot clips for cleaning.

2.7 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Arrange fasteners and attachments to ensure concealment from view.

E. Prepare components with internal reinforcement for operating hardware.

F. Permit internal drainage weep holes and channels to migrate moisture to exterior. Provide internal drainage of glazing spaces to exterior through weep holes.

G. Assemble insect screen frame, miter and reinforced frame corners. Fit mesh taut into frame and secure. Fit frame with four spring loaded steel pin retainers.

H. Double weatherstrip operable units.

2.8 FINISHES

A. Exposed Aluminum Surfaces: Anodized to dark bronze color, to 0.0007 inch thickness.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01039 - Coordination and Meetings: Verification of existing conditions before starting work.

B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.

3.2 INSTALLATION

A. Install window frames, glass and glazing and hardware in accordance with manufacturers printed instructions.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

D. Install sill and sill end angles.

E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

F. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.

G. Install operating hardware.

H. Install glass in accordance with Section 08800, to exterior wet/dry method of glazing.

I. Install perimeter sealant, backing materials, and installation criteria in accordance with Section 07900.

3.3 ERECTION TOLERANCES

A. Section 01400 - Quality Control: Tolerances.

B. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.4 ADJUSTING

A. Section 01700 - Contract Closeout: Adjusting installed work.

B. Adjust hardware for smooth operation and secure weathertight closure.

3.5 CLEANING

A. Section 01700 - Contract Closeout: Cleaning installed work.

B. Remove protective material from factory finished aluminum surfaces.

C. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

D. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

SECTION 08710

DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hardware for wood and hollow steel doors.

B. Cylinders for aluminum doors.

C. Thresholds.

D. Weatherstripping, seals and door gaskets.

1.2 RELATED SECTIONS

A. Section 06200 - Finish Carpentry: Wood Door Frames.

B. Section 08111 - Standard Steel Doors.

C. Section 08112 - Standard Steel Frames.

D. Section 08211 - Flush Wood Doors.

E. Section 08212 - Stile and Rail Wood Doors.

F. Section 08410 - Aluminum Entrances and Storefronts.

1.3 REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

B. AWI - Architectural Woodwork Institute - Quality Standards.

C. BHMA (Builders Hardware Manufacturers Association) - A156 series.

D. DHI (Door and Hardware Institute) - A115 series.

E. DHI (Door and Hardware Institute) - WDHS.3 - Architectural Hardware for Wood Flush Doors.

F. NFPA 80 - Fire Doors and Windows.

G. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.

H. NFPA 252 - Fire Tests of Door Assemblies.

I. UL 10B - Fire Tests of Door Assemblies.

J. UL 305 - Panic Hardware.

1.4 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Shop Drawings:

1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, and any electrical characteristics and connection requirements.

2. Submit manufacturer's parts lists and templates.

1.5 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Procedures for submittals.

B. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 01700 - Contract Closeout: Procedures for submittals.

B. Project Record Documents: Record actual locations of installed cylinders and their key code.

C. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

A. Perform work in accordance with the following requirements:
1. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
2. AWI
3. BHMA A156 Series

4. DHI - A115 Series
5. DHI - WDHS.3
6. NFPA 80
7. NFPA 101
8. NFPA 252
9. UL 10B
10. UL 305

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

C. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with three years experience approved by manufacturer.

D. Hardware Supplier Personnel: Employ a qualified person to assist in the work of this section.

1.8 REGULATORY REQUIREMENTS

A. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.

B. Conform to applicable code for requirements applicable to fire rated doors and frames.

1.9 DELIVERY, STORAGE, AND PROTECTION

A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.

B. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.10 PROJECT CONDITIONS

A. Section 01039 - Coordination and Meetings.

B. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.

C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

D. Coordinate Owner's keying requirements during the course of the Work.

1.11 WARRANTY

A. Section 01700 - Contract Closeout.

B. Provide five year manufacturer warranty.

1.12 MAINTENANCE MATERIALS

A. Section 01700 - Contract Closeout.

B. Provide special wrenches and tools applicable to each different or special hardware component.

C. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Hinges: McKinney, Stanley, Hager.

B. Latch Sets: Sargent, Schlage, Corbin/Russwin.

C. Push/Pulls: Rockwood, Burns, Baldwin.

D. Cylinder Locks: Sargent, Schlage, Corbin/Russwin.

E. Exit Devices: Sargent, Precision, Corbin/Russwin, Von Duprin.

F. Closers: Sargent, Norton, LCN.

G. Weatherstripping: Durable, National Guard.

H. Thresholds: Durable, National Guard.

I. Stops: Rockwood, Ives, Baldwin, Glynn-Johnson.

J. Bi-Fold Hardware: L.E. Johnson, Stanley.

K. Track Hardware: L.E. Johnson, Stanley.

L. Dead Bolt: Adams Rite.

2.2 FINISHES

A. Finishes: Identified in schedule at end of section.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01039 - Coordination and Meetings: Verification of existing conditions before starting work.

B. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.

C. Verify that electric power is available to power operated devices and is of the correct characteristics.

3.2 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions.

B. Use templates provided by hardware item manufacturer.

C. Mounting heights for hardware from finished floor to center line of hardware item:
1. Locksets: 39 9/16 inch
2. Push/Pulls: 45/42 inch respectively
3. Dead Locks: 60 inch (48 inch for handicap)
4. Exit Devices: 45 inch

3.3 ADJUSTING

A. Section 01700 - Contract Closeout.

B. Adjust hardware for smooth operation.

3.4 PROTECTION OF FINISHED WORK

A. Section 01700 - Contract Closeout: Protecting Installed Work.

B. Do not permit adjacent work to damage hardware or finish.

3.5 FINISHED HARDWARE SCHEDULES

A. Hardware Set No. 1 - Interior and Exterior Doors

1-1/2 pr.	4-1/2" Butts FBB 199	US32D	Stanley
1	Lockset ML2265-LSM	US32D	Corbin
1	Closer J110-4	SBL	Corbin
3	Silencer 33		Russwin
1	Threshold 655	Aluminum	Zero
1 set	Weatherstrip 160A		National Guard

1	Door Bottom 112N	Aluminum	National Guard

3.6 KEYING: All locks keyed to existing master key system. Keying to be determined at site meeting with Architect/Owner and supplier. Furnish two keys per lock.

END OF SECTION

SECTION 08800

GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Glass, plastic and glazing for Sections referencing this Section for products and installation.

1.2 RELATED SECTIONS

A. Section 08111 - Standard Steel Doors.

B. Section 08112 - Standard Steel Frames.

C. Section 08211 - Flush Wood Doors.

D. Section 08410 - Aluminum Entrances and Storefronts.

E. Section 08520 - Aluminum Windows.

1.3 REFERENCES

A. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.

B. ASTM C1036 - Flat Glass.

C. ASTM C1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.

D. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

E. ASTM E546 - Test Method For Frost Point of Sealed Insulating Glass Units.

F. ASTM E576 - Test Method For Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.

G. ASTM E773 - Test Method for Seal Durability of Sealed Insulating Glass Units.

H. ASTM E774 - Sealed Insulating Glass Units.

I. FGMA - Glazing Manual.

J. FGMA - Sealant Manual.

K. FS TT-G-410 - Glazing Compound, Sash Metal for Back Bedding and Face Glazing (Not for Channel or Stop Glazing)

L. Laminators Safety Glass Association - Standards Manual.

M. SIGMA - Sealed Insulated Glass Manufacturers Association.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Samples: Upon request, submit samples, 12 x 12 inch in size, illustrating glass units, coloration and design.

E. Manufacturer's Installation Instructions: Indicate special precautions required.

F. Manufacturer's Certificate: Certify that sealed insulated glass meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with FGMA Glazing Manual FGMA Sealant Manual, SIGMA and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

1.6 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop Drawings.

1.7 COORDINATION

A. Coordinate the Work with glazing frames, wall openings, and perimeter air and vapor seal to adjacent Work.

1.8 WARRANTY

A. Section 01700 - Contract Closeout: Provide ten year warranty to include coverage for sealed glass units from

seal failure, interpane dusting or misting, and replacement of same.

B. Insulating Glass: Shall be warranted for five years against visual obstruction resulting from film formation or moisture collection between the internal glass surfaces, excluding glass breakage.

PART 2 PRODUCTS

2.1 FLAT GLASS MATERIALS

A. Manufacturers

1. LOF Glass Co.

2. Saint Gobain.

3. PPG Industries, Inc.

4. Substitutions: Under provisions of Section 01600.

B. Float Glass (Type A): Clear, 1/4-inch thick.

C. Safety Glass (Type B): Clear, fully tempered conforming to ANSI Z97.1; 1/4-inch thick.

D. Tinted Glass (Type C): Float or safety type, annealed, light reducing in gray color; 1/4-inch thick.

E. Wire Glass (Type D): Clear polished both sides square mesh of woven stainless steel wire of 1/2-inch grid size; 1/4-inch thick.

F. Low E Glass (Type E): Float type, tempered, annealed, clear or tinted (as indicated), coating on surface, visible light transmittance of 81 percent, solar light transmittance of 68 percent; 1/4-inch thick.

G. Mirror Glass (Type F): Clear float type with copper and silver coating, organic overcoating, beveled edges, 1/4-inch thick, sizes as noted on drawings.

2.2 SEALED INSULATING GLASS MATERIALS

A. Manufacturers

1. LOF Co.

2. PPG Industries.

3. Saint Gobain.

4. Substitutions: Under provisions of Section 01600.

B. Insulated Glass Units (Type SG-A): ASTM E774 and E773; double pane with silicone sealant edge seal; outer pane of 1/4-inch tinted glass, inner pane of 1/4-inch clear glass, purge interpane space with dry hermetic air; total unit thickness of 1 inch minimum.

C. Insulated Glass Units - Low E (Type SG-B): ASTM E774 and E773; double pane with silicone sealant edge seal; outer pane of 1/4-inch tinted glass, inner pane of Low E coating on clear color glass cover plate, visible light transmittance of 51 percent, solar light transmittance of 4 percent, shading coefficient of .69, interpane space argon filled, total unit thickness of 1 inch minimum.

2.3 GLAZING COMPOUNDS

A. Glazing compounds, sealants and tapes shall be as recommended by the glazing manufacturer for the type of glass and application.

2.4 GLAZING ACCESSORIES

A. Setting Blocks: ASTM C864 Option I, Neoprene or EPDM, 80 to 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: ASTM C864 Option I, Neoprene, 50 to 60 Shore A durometer hardness, minimum 3-inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealant in accordance with manufacturer's instructions.

3.3 INSTALLATION - EXTERIOR DRY METHOD (PREFORMED GLAZING)

A. Cut glazing tape or spline to length; install on glazing pane. Seal corners by butting and sealing junctions with sealant.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

D. Install removable stops without displacing glazing tape or spline. Exert pressure for full continuous contact.

3.4 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

D. Place glazing tape on free perimeter of glazing in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

3.5 INSTALLATION - MIRRORS

A. Set mirrors with clips. Anchor rigidly to wall construction.

B. Place plumb and level.

3.6 CLEANING

A. Clean work under provisions of Section 01700.

B. Remove glazing materials from finish surfaces.

C. Remove labels after work is complete.

D. Clean glass and mirrors.

3.7 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01500.

B. After installation, mark pane with an 'X' by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

END OF SECTION

SECTION 09910

PAINTING

PART 1 GENERAL

1.01 WORK INCLUDED

A. All labor, material, and equipment required to prepare all surfaces and complete all painting and finishing of all exterior and interior surfaces as required by the drawings and as specified herein.

B. Surface finish schedule.

C. Color selection schedule.

1.02 RELATED WORK

A. Section 07175 - Water repellant coating.

1.03 REFERENCES

A. SSPC - Steel Structures Painting Council Specifications.

1.04 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with three years experience.

B. Applicator: Company specializing in commercial painting and finishing approved by product manufacturer.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/fuel/smoke rating requirements for finishes.

1.06 SUBMITTALS

A. Provide product data and manufacturer's application instructions on all finishing products.

B. Submit two samples illustrating range of colors and textures available for each surface finishing product scheduled, for selection.

1.07 FIELD SAMPLES

A. Provide field sample panel, 12 inches long by 12 inches wide, illustrating special coating color, texture, and finish.

B. Locate where directed.

C. Accepted sample may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labelled containers; inspect to verify acceptance.

B. Container labelling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.

C. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.

D. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 50 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

B. Do not apply coatings to surfaces that will be exposed to rain or snow before the coating is dry, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.

C. Minimum Application Temperature 50 degrees F unless required otherwise by manufacturer's instructions.

D. Do not apply coatings to surface if surface temperature is not at least 5 degrees F greater than the dew point.

1.10 EXTRA STOCK

A. Provide a one gallon container of each color and surface texture to Owner.

B. Label each container with color, texture and room locations, in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Paints and finishes shall be as manufactured by the Sherwin-Williams Company, Koppers Company, Inc., Tnemec Company, Inc. or equal.

B. Coatings listed in the painting schedule are of the Sherwin-Williams and have been set up as a standard of quality.

2.02 MATERIALS

A. Primer and Thinner: As recommended by the manufacturer of the finish coat.

B. Primer shall be compatible with finish coat.

C. Amount of thinner used shall not exceed manufacturer's recommendations.

D. Coatings used on submerged surfaces in potable water shall be approved by the Environmental Protection Agency and NSF Standards 60 and 61.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify that surfaces and substrate conditions are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

3.02 PREPARATION

A. All surface preparation shall be done in strict accordance with the manufacturer's recommendations.

B. All surfaces, of whatever material, shall be thoroughly cleaned of dirt, oil, grease, rust and other foreign substances and shall be clean and dry at the time of application.

PART 4 SPECIAL PROVISIONS

4.01 PAINTING SCHEDULE

A. Metals

1. Interior, Non-submerged: Epoxy

Primer	Recoatable Epoxy Primer	B67R5
1st Coat	Sher-Tile High Solids Epoxy	B67W200 Series
2nd Coat	Sher-Tile High Solids Epoxy	B67W200 Series

2. Exterior, Non-submerged: Alkyd

Primer	Kem Bond HS	B50NZ3
1st Coat	Industrial Enamel HS	B54WZ400 Series
2nd Coat	Industrial Enamel HS	B54WZ400 Series

3. Submerged in Sewage: Coal Tar Epoxy

Primer (Shop)	Epoxide 33	Ceramic Buff
1st Coat	Coal Tar Epoxy C-200	B69B50
2nd Coat	Coal Tar Epoxy C-200	B69B50

4. Submerge In Potable Water: Epoxy

Primer (Shop)	Epoxide 33	Ceramic Buff
1st Coat	Hi-Solids Catalyzed Epoxy	B62H200
2nd Coat	Hi-Solids Catalyzed Epoxy	B62L200

B. Concrete

1. Exterior, Below Grade Habitable Spaces: Bituminous Membrane Waterproofing

2. Submerged in Sewage: Coal Tar Epoxy

1st Coat	Coal Tar Epoxy C-200	B69B50
2nd Coat	Coal Tar Epoxy C-200	B69B50

3. Submerged in Potable Water: Epoxy (NSF Approved)

1st Coat	Hi-Solids Cathalyzed Epoxy	B62H200

2nd Coat	Hi-Solids Catalyzed Epoxy	B62L200

4. Interior Non-submerged: Epoxy

1st Coat	Sher-Tile High Solids Epoxy	B67W200 Series
2nd Coat	Sher-Tile High Solids Epoxy	B67W200 Series

5. Interior Floors: Gray Epoxy

1st Coat	Rustoleum Water Based Epoxy	6000 System
2nd Coat	Rustoleum Water Based Epoxy	6000 System

C. Masonry

1. Exterior Below Grade: Coal Tar Epoxy

1st Coat	Coal Tar Epoxy C-200	B69B50
2nd Coat	Coal Tar Epoxy C-200	B69B50

2. Exterior: Acrylic

Filler (Block)	Heavy Duty Block Filler	B42W46
Primer (Masonry)	Lexon Exterior Masonry Primer	A24W300
Finish	Lexon Exterior Masonry Coating	A24W301

3. Interior: Epoxy

Filler (Block)	Epoxy Ester Masonry Filler/Sealer	B61W2
1st Coat	Sher-Tile High Solids Epoxy	B67W200 Series
2nd Coat	Sher-Tile High Solids Epoxy	B67W200 Series

D. Plaster and Drywall

1. Interior: Epoxy with Egg Shell Finish

Primer	ProMar 200 with Latex Wall Primer	B28W200
1st Coat	Sher-Tile High Solids Epoxy	B67W200 Series

2nd Coat	Sher-Tile High Solids Epoxy	B67W200 Series

E. Wood

1. Interior: Alkyd

Primer	Wall and Wood Primer	B49W2
1st Coat	Industrial Enamel HS	B54WZ400 Series
2nd Coat	Industrial Enamel HS	B54WZ400 Series

2. Exterior: Alkyd

Primer	A-100 Exterior Alkyd Wood Primer	Y24W20
1st Coat	Industrial Enamel HS	B54WZ400 Series
2nd Coat	Industrial Enamel HS	B54WZ400 Series

4.02 COLOR SCHEDULE

A. Piping and Conduit Exposed to View:

Water (Potable)	Light Blue
Water (Non-Potable)	Light Blue with 6" Black Bands Spaced 30" Apart
Water (Effluent)	Aqua
Raw Sewage	Gray
Drain	Aluminum
Primary Sludge	Dark Brown
Digested Sludge	Black with 6" Red Bands Spaced 30" Apart
Waste Activated Sludge	Black
Chlorine	Yellow
Chemical	Dark Blue
Compressed Air	Green
Gas	Red
Electrical Conduit	Color To Match Nearest Adjacent Surface

B. All Other Colors Shall Be Selected By The Owner From Standard Color Charts.

END OF SECTION

SECTION 11311

SUBMERSIBLE SEWAGE GRINDER PUMPS

PART 1 GENERAL

1.1 SCOPE

A. Provide pumps, motors, and appurtenances where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.2 SUBMITTALS

A. Submit Product Data

1. Material list of items proposed to be provided under this Section.

2. Manufacturer's specifications and other data needed to prove compliance with specified requirements.

3. Factory certified pump performance curves.

4. Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this section with the work of adjacent trades.

5. Manufacturer's recommended installation procedures.

B. Contract Closeout Submittals

1. Provide three copies of the pump operation and maintenance manuals.

1.3 QUALITY ASSURANCE

A. All work shall be performed by mechanics and craftsmen experienced in this type of work and the finished work shall reflect craftsmanship of the highest quality.

PART 2 PRODUCTS

2.1 RECESSED IMPELLER EXPLOSION PROOF SUBMERSIBLE SEWAGE GRINDER PUMPS

A. Contractor shall furnish all labor, materials equipment and incidentals required to provide two (2) explosion

proof submersible centrifugal sewage grinder pumps for NEC class 1, division 1, group C, D hazardous locations.

2.2 OPERATION CONDITIONS

A. Each pump shall be rated 3 H.P., 480 volts, 3 phase, 60 hertz, 1,750 R.P.M. The unit shall produce 100 U.S. GPM at 25 feet TDH.

2.3 CONSTRUCTION

A. Each pump shall be of the sealed submersible type, Model HPGFH300M4-4 as manufactured by Hydromatic Pumps, Inc. The pump volute, motor and seal housing shall be high quality gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined and Buna N Rubber O-ring sealed on a beveled edge. Gaskets shall not be acceptable. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.

2.4 ELECTRICAL POWER CORD

A. Electrical power cord shall be water resistant 600V, 60°C., UL and/or CSA approved and applied dependent on amp draw for size.

B. The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire, at staggered intervals, and each strand shall be individually separated. This area of the cord cap shall then be fitted with an epoxy compound potting which will prevent water contamination to gain entry even in the event of wicking or capillary attraction.

C. The power cord leads shall then be connected to the motor leads with extra heavy connectors having brass inserts with a screwed wire to wire connection.

2.5 MOTOR

A. The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have Class F insulation, (155°C. or 311°F.), and a dielectric oil filled motor, NEMA B design (3 phase), NEMA L design (single phase).

B. The pump and motor shall be specifically designed so that they may be operated partially dry or completely submerged in the liquid being pumped.

C. Stators shall be securely held in place with a removable end ring and threaded fasteners so they may be easily removed in the field, and must be capable of being repaired or rewound by a local motor service station. No special tools shall be required for pump and motor disassembly.

D. Pump shall be equipped with heat sensors. The heat sensor(s) (one on single phase, two on three phase) shall be a low resistance, bimetal disc that is temperature sensitive. It (they) shall be mounted directly in the stator and sized to open at 120°C. or 130°C. and automatically reset at 30-35°C. differential. The sensor shall be connected in series with the motor starter coil so that the starter is tripped if a heat sensor opens. The motor starter shall be equipped with overload heaters so all normal overloads are protected by external heater block.

2.6 BEARINGS AND SHAFT

A. An upper radial bearing and a lower thrust bearing shall be required. These shall be permanently lubricated by the dielectric oil which fills the motor housing.

B. The shaft shall be machined from a solid 416 stainless steel and be a design which is of large diameter with minimum overhand to reduce shaft deflection and prolong bearing life.

2.7 SEALS AND SENSORS

A. The rotor and stator in the motor housing shall be separated and protected from the pumped liquid by an oil filled seal housing incorporating two type 21 carbon ceramic mechanical seals mounted in tandem. This seal housing shall be equipped with 2 moisture sensing probes installed between the seals, and the sensing of moisture in the seal chamber shall be automatic, continuous, and not require the pump be stopped or removed from the wet well.

2.8 IMPELLERS

A. Impeller shall be brass multi-vane, semi-open, non-overloading design. They can either be factory or field trimmed to meet specific performance conditions. Impellers shall be hydraulically and statically balanced at the factory, and machined for threading on to the pump shaft. Wear or field trimming shall not deter the factory balance.

2.9 GRINDER CUTTERS

A. The combination centrifugal pump impeller and grinder unit shall be attached to the common motor and pump shaft made of 416 stainless steel. The grinder unit shall be on the suction side of the pump impeller and discharge directly into the impeller inlet leaving no exposed shaft to permit packing of ground solids. _The grinder shall consist of two stages. The cutting action of the second stage shall be perpendicular to the plane of the first cut for better control of the particle size. The grinder shall be capable of grinding all materials found in normal domestic sewage, including plastics, rubber, sanitary napkins, disposable diapers, and wooden articles into a finely ground slurry with particle dimensions no greater than 1/4 inch. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance.

B. The upper (axial) cutter and stationary cutter ring shall be reversible to provide new cutting edges to double life. The stationary cutter ring shall be a slip fit into the suction opening of the volute and held in place by three (3) 300 series stainless steel screws and a retaining ring. The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The upper (axial) cutter shall cut off the extrusions, as they emerge from the slots of the cutter ring to eliminate any roping effect which may occur in single stage cutting action. The upper (axial) cutter shall fit over the hub of the impeller and the lower (radial) cutter shall be slip fit and secured by means of peg and hole and rotate simultaneously with the rotation of the shaft and impeller. The grinding mechanism shall be locked to the shaft by a 300 series stainless steel countersunk washer in conjunction with a 300 series stainless steel flat head cap screw threaded into the end of the shaft.

2.10 PAINTING

A. The pump shall be painted after assembly, and testing, with a dark green water reducible air dry enamel. The paint shall be applied in one coat covering all exterior surfaces.

2.11 TESTING

A. Commercial testing shall be required and include the following:

1. The pump shall be visually inspected to confirm that it is built in accordance with the specification as to HP, voltage, phase and hertz.

2. The motor and seal housing chambers shall be hi-potted to test for moisture content and/or insulation defects.

3. Pump shall be allowed to run dry to check for proper rotation.

4. Discharge piping shall be attached, the pump submerged in water and amp readings shall be taken in each leg to check for an imbalanced stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator will be replaced.

2.12 WARRANTY

A. The pump unit or any part there of shall be warranted against defects in material or workmanship within one year from date of installation or 18 months from date of manufacture, whichever comes first, and shall be replaced at no charge with a new or re manufactured part, F.O.B. factory or authorized warranty service station. The warranty shall not assume responsibility for removal, reinstallation or freight, nor shall it assume responsibility of incidental damages resulting from the failure of the pump to perform. The warranty shall not apply to damage resulting from accident, alteration, design, misuse or abuse.

2.13 CONTROL PANEL

A. Contractor shall furnish all labor, materials, equipment and incidentals required to provide one simplex motor control system in a single panel as specified herein.

B. The motor control panel shall be assembled and tested by a shop meeting U.L. Standard 508 for industrial controls. The motor and control panel shall be assembled and tested by the same manufacturer supplying the pump so as to insure suitability and assurance of experience in matching controls to motors and to insure single source responsibility for the equipment.

2.14 CONTROL PANEL CONSTRUCTION

A. The controls for the pump shall be contained in a non-corrosive enclosure meeting NEMA 4X and U.L. 94 V-O requirements.

B. The enclosure shall be thermal formed from an engineered thermoplastic material. The enclosure shall be steel gray in color and chemically induced. Painting of the enclosure shall not be acceptable. The enclosure shall have provisions for padlocking. A nameplate shall be permanently affixed to the panel and include the model number, voltage, phase, hertz, ampere rating and horsepower rating. A warning label against electric shock shall be permanently affixed to the outer door. All fasteners shall be 300 series stainless steel or type 6063T5 aluminum, or thermoplastic. The outer door shall be attached to the enclosure using captured, quarter turn thermoplastic screws and non-corrosive lift off hinge. The hinge shall permit the outer door to be separated from the main enclosure, when opened, by a simple upward motion. A hinge arrangement which requires unbolting for removal of the outer door is not acceptable.

C. A steel back panel with electroplated bright zinc and clear chromate finish shall be provided. A painted steel back panel will not be acceptable. The back panel shall be mounted on stainless steel bolts using stainless steel nuts and lock washers to maintain enclosure integrity and shall be used as the means for mounting the components in the enclosure.

D. A run light and hand-off-auto switch shall be provided. Run light and hand-off-auto switch shall be mounted on an electroplated bright zinc with clear chromate finish steel bracket. The run light and hand-off-auto switch shall be properly labeled as to function. The hand-off-auto switch shall be rocker type with an electrical life of 50,000 operations. The run light shall match the hand-off-auto switch in appearance and have a red LED type lamp.

E. The incoming power shall be 480 volts, 3 phase, 60 hertz service. Terminal blocks with box type lugs shall be supplied to terminate all wiring for floats and heat and seal sensors for the pump, if required. The pump leads shall be terminated at the overload relay or at box type terminal blocks. The terminal blocks for the float connections shall be on the pump controller, as described in paragraphs M and N.

F. A circuit breaker shall be used to protect from line faults and to disconnect the pump from the incoming power. Circuit breaker shall be thermal magnetic and sized to meet NEC requirements for motor controls.

G. The magnetic starter shall include a contactor with a minimum mechanical life of 3,000,000 operations and a minimum contact life of 1,000,000 operations. A definite purpose contactor shall not be acceptable. The magnetic starter shall include an overload relay which is ambient temperature compensated and bimetallic. The overload relay shall have test and reset buttons. The overload relay shall be capable of being set in either manual or automatic reset mode. In the manual mode, reset shall be accomplished only by the operator. At 6 times full load amps the overload relay shall trip within 10 seconds or Class 10 rated overload relays shall be required.

H. Control voltage shall be 120 VAC accomplished by the means of a transformer. A control fuse and on/off switch shall protect and isolate the control voltage from the line.

I. Wire ties shall be used to maintain panel wiring in neat bundles for maintenance and to prevent interference with operating devices. All wiring shall be color coded to facilitate maintenance and repair of the control panel. Where a color is repeated, number coding shall be added. A schematic shall be permanently attached to the inside surface of the front door.

J. All ground connections shall be made with ring tongue terminals and star washers to assure proper ground.

K. A simplex pump controller shall be provided for control logic. Pump controller shall be solid state utilizing a printed circuit board to avoid conventional wiring. The printed circuit board of the pump controller shall be made of U.L. listed materials.

L. The pump controller shall indicate float circuit operations utilizing red or amber LED indicator lights. LED indicator lights shall provide adequate information so that they can be used for diagnosis in troubleshooting problems located in the float circuits. Each LED shall be permanently labeled on the pump controller as to function.

M. Pump controller shall have provisions for connecting float level controls and heat sensor monitors, where applicable, to box type lug connectors.

d. Contractor will instruct and demonstrate to the Engineer or authorized representative, the operation and servicing of equipment provided.

END OF SECTION

SECTION 11336

SECONDARY CLARIFIERS

PART 1 GENERAL

1.1 SCOPE

A. Under this item the Equipment Manufacturer shall furnish and deliver two (2) secondary clarifier units in precast concrete rectangular tanks.

B. The secondary clarifiers shall be as manufactured by Mack Industries of Valley City, Ohio or approved equal.

1.2 RELATED SECTIONS

A. Section 03300 - Cast In Place Concrete

B. Section 05120 - Structural and Miscellaneous Steel

C. Section 09910 - Painting

D. Section 15100 - Processing Piping and Valves

1.3 SUBMITTALS

A. Submit the following product data:

1. Material list of items proposed to be provided under this Section.

2. Manufacturer's specifications and other data needed to prove compliance with specified requirements.

3. Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this section with the work of adjacent trades.

4. Manufacturer's recommended installation procedures.

5. The collector equipment manufacturer shall provide the following drawings:

a. Overall system process and instrumentation diagram.

b. General Equipment Layout

8. Manufacturer's specifications and other data needed to prove compliance with specified requirements.

9. Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this section with the work of adjacent trades.

10. The dewatering equipment manufacturer shall provide the following drawings:

    a. Overall dewatering system process and instrumentation diagram

    b. General Equipment Layout

B. Operation and Maintenance (O&M) Manuals. O&M manuals shall be submitted to the Engineer/Architect in accordance with Sections 01300 and 01700 of these specifications. The initial review copy of the O&M manual and three revised copies shall be submitted prior to delivery of the equipment. The O&M manuals shall include:

1. Storage instructions
2. Installation instructions and details
3. Start-up instructions
4. Shutdown instructions
5. Operation, maintenance, repair, and cleaning instructions
6. Detailed parts list for all equipment items including part numbers

1.4 WORKMANSHIP AND DESIGN

A. All components of the sludge dewatering equipment shall be engineered for long, continuous, and uninterrupted service. Provisions shall be made for easy lubrication, adjustment, or replacement of all parts. Corresponding parts of multiple units shall be interchangeable.

1.5 QUALITY ASSURANCE

A. Consideration will be given only to products of manufacturers who can demonstrate that their equipment fully complies with all requirements of the specifications and contract documents.

B. The equipment shall be supplied by a firm which has been regularly engaged in the design, fabrication, assembly, testing, start-up and service of full scale belt filter presses, of the same model and size as proposed, operating with similar sludges for a period of not less

than five (5) years prior to the bid date of this contract. The bidder shall submit data to substantiate the manufacturers experience in accordance with the contract documents.

C. Perform all work in compliance with all federal, state, and local codes and regulatory agencies.

D. All work shall be performed by mechanics and craftsmen experienced in this type of work and the finished work shall reflect the craftsmanship of the highest quality.

1.6 JOB CONDITIONS

A. Coordination. Coordinate all work with other trades to prevent delays, errors, and/or omissions.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General. The delivery, storage, and handling of the equipment shall be in accordance with Section 01600 and the manufacturer's instruction.

1. Delivery. All units shall be shipped assembled as much as practical. All units shall be labeled with all labeling intact and legible with item name, model number, size, and manufacturer's name.

2. Storage. All units, accessories, and components shall be stored in the manufacture's original package, under cover and protected from damage.

3. Handling. Handle all units and components in accordance with the manufacturer's instructions. Use lifting rings and canvas harnesses for lifting to prevent scratching or abrading finished surfaces.

1.8 PRODUCT INTEGRITY

A. All major components shall be designed and manufactured by a single source for optimum compatibility. The entire product shall be warranted against failure due to faulty materials, workmanship and corrosion for a period of one (1) year. There shall be factory authorized service locally to assure that the equipment can be properly maintained and serviced as needed.

1.9 PERFORMANCE TESTING

A. The equipment manufacturer shall conduct a performance test to demonstrate that the installed equipment can meet

the specified performance requirements. One press shall be selected for the testing. The test shall occur as soon as possible after successful equipment start-up and process and system stabilization has been accomplished.

B. The test period shall consist of two five hour steady state test runs on two consecutive days with sludge feed, sludge cake and effluent (combined filtrate and washwater) samples taken at the start of each run and every hour thereafter resulting in a total of twelve samples of each type. The sludge feed and effluent samples shall be analyzed for total suspended solids content; the cake samples shall be analyzed for total solids content. The resulting solids contents shall be averaged and the average value of each type shall be used to judge satisfactory performance. Polymer solution strength and flow rate shall be recorded. Sludge feed rate shall be recorded.

C. The press manufacturer's representative shall operate the equipment during the test. The owner shall furnish personnel to assist in the operation and to take samples. The owner shall also furnish sludge, water, chemicals, utilities, sludge cake disposal, routine test equipment and laboratory services for analyzing the samples. The belt press manufacturer shall recommend the most suitable polymer which shall be provided by the owner. The contractor shall provide any special instrumentation for measuring sludge feed or polymer feed rates.

D. The equipment shall have passed the performance test if the specified cake solids, solids capture and polymer cost requirements are met with the press operating at the specified hydraulic and solids loading rates.

E. Should the installed equipment fail to meet the specified performance requirements, the manufacturer shall within 30 days make changes in the equipment or method of operation as necessary and the equipment shall be retested. If after a second 30 day period, the equipment still does not meet the performance criteria, the equipment shall have failed the performance test and the owner shall require its removal and replacement with the specified equipment at no additional cost to the owner.

1.10 PERFORMANCE REQUIREMENTS

A. Each belt filter press shall be capable of operating satisfactorily under the following performance conditions:

B. Type of sludge: Aerobically digested waste activated sludge.

C. Sludge feed concentration: 1 to 5% dry solids.

D. Hydraulic throughput, solids throughput, cake solids concentration, solids capture (combined filtrate and washwater) and polymer cost requirements:

Feed Solids	Hydraulic Throughput GPM	Solids Throughput lbs DS/hr	Minimum % Cake Solids	Solids Capture
1-5%	20-30	180-240	12	83-85%

1.11 BASIS OF DESIGN

A. The plans have been prepared based on OR-TEC HP 1500 Series belt filter press and appurtenances. If equipment is proposed which requires an arrangement differing from that shown on the plans or if the details of design and construction are different from those specified, the contractor and equipment manufacturer shall prepare and submit for review the necessary design calculations along with the necessary structural, electrical, instrumentation, mechanical and architectural drawing revisions. All work associated with accommodating alternate equipment shall be at no additional cost to the owner.

PART 2 PRODUCTS AND EQUIPMENT

2.1 ACCEPTABLE MANUFACTURERS

A. All materials and components used in the manufacture of the belt press shall conform to and/or exceed specifications and quality standards.

B. All suppliers and manufacturers will be subject to compliance with the quality and utility requirements of OR-TEC, Inc. in the production of the MARK II 1000 Stainless Steel Belt Press.

2.2 OPERATIVE CONDITIONS:

A. Waste Activated Sludge

Item	Requirements
Solids Throughput	180 - 240 lbs. dry solids / hr
Sludge Feed Concentration	1% - 5% Dry Solids
Polymer Dosage	8-12# polymer per dry ton solids
Capture	83% - 85%
Final Cake	12% Minimum

2.3 EQUIPMENT SPECIFICATIONS

A. Model: Mark Ii 1000 Belt Press - 1.0 Meter

Construction	304 Stainless Steel
Length	8'-1"
Width	6'- 0" including gear drive
Height	3' - 1"
Weight	1,450 lbs.
Belt Wash	13 gallons/min. @ 80 psi
Belt Length	185"
Belt Width	38.5"

2.4 PRODUCT DESCRIPTION

A. Belt Press

1. The belt press frame shall be constructed of stainless steel. The belt tracks by means of cone rollers. Sludge is introduced on to an upwardly sloping belt with dams on three sides comprising a sludge feed box.

2. The sludge feed box shall be sealed with polypropylene skirting to prevent leakage of the sludge from the feed box. The sludge first travels on a sloping belt where de-watering occurs by gravity. This gravity de-watering is aided by a series of roll over ploughs and a dispersion roller. Next, the sludge travels through a pressing zone where the water is further removed by pressure. A doctor blade removes sludge from the belt by its scraping action against it. The belt continues on through a washing station where it is thoroughly cleaned prior to its returning to the de-watering zone.

3. All non-drive roller bearings are encased in bearing housings which are fastened to the main frame. The bearing housings are made from

thermoplastic composite with embedded steel coils to provide strength. Stainless steel set screws locate the bearings on each end of the stainless steel shafts. The two (2) coned roller bearings are fitted as above with the exception of the housing which is adjustable. Drive roller bearings are fitted to a vertical support which in turn are secured to the roller frame. They are also self-aligning.

4. The belt is driven through a series of neoprene covered rolls by an adjustable variable speed drive. Speed is adjusted by means of a variable controller.

5. The belt wash station shall be equipped with a stainless steel spray bar containing stainless steel spray jets. The spray bar is fitted with an in-line stainless steel cleaning brushes and a clean out valve.

6. Wash water and pressate collection trays collect the wash water and pressate and deliver them to a drain. Collection trays are fabricated from stainless steel. The filtrate can be diverted for reuse.

7. The belt alignment will be controlled electromechanically. Sensors shall be located on both sides of the belt. When the sensor detects lateral movement, a signal shall be sent to an actuator that will position the tracking roller, correcting and maintaining the belt travel.

8. The inline sludge mixer shall be an Or-Tec STMX inline free flow type.

9. The belt press shall be easily convertible into a thickener without requiring the removal of any rollers.

B. Flocculation Tank

1. A flocculation tank will be fitted to the inlet of the belt press. Sludge enters at the bottom of the tank and discharges near the top onto the belt press.

2. The flocculator will be fitted with four (4) 4" reverse truss propellers. The propellers are aluminum and shaft is stainless steel.

3. The flocculator is driven by a variable speed 1/4 hp gear motor.

2.5 MATERIALS

A. Belt Press

1. Support Frame will be constructed from 2.5" x 2.5" stainless steel, with accurately located positions for the roller bearings

2. All trays, covers and guards are stainless steel.

3. The rollers will be supported by 2.5" x 2.5" stainless steel.

4. The drive roller one (1), the horizontally adjustable roller one (1) the first pressure roller one (1), top return roller one (1) and the bottom return roller one (1) will be 6" diameter stub-end shaft rollers. The rollers will be constructed from 3/8" wall steel tubing with stainless steel end walls and 2" stainless steel stub shafts. The rollers will be covered with 1/8" neoprene rubber to 70 shore hardness. The bearing housing will be corrosion resistant thermoplastic, fitted with two (2) self aligning sealed bearings. Bearing type: AMI or equal.

5. The second pressure roller one (1) will be 5" diameter stub-end shaft rollers. The rollers will be constructed from 3/8" wall steel tubing with stainless steel end walls and 2" stainless steel stub shafts. The rollers will be covered with 1/8" neoprene rubber to 70 shore hardness. The bearing housing will be corrosion resistant thermoplastic, fitted with two (2) self aligning sealed bearings. Bearing type: AMI or equal.

6. Coned or tracking rollers two (2) will be constructed from 3/8" wall steel tubing with stainless steel end walls and 2" stainless steel stub shafts. The rollers will be covered with 1/8" neoprene rubber to 70 shore hardness. The cones end-caps will be manufactured from machined PVC and fixed in place with 1/4" machined keyways. The top cone roller is adjustable. The adjuster is positioned on the frame and fixed with stainless steel bolts. The bearing housing will be corrosion resistant thermoplastic, fitted with two (2) self aligning sealed bearings. Bearing type: AMI or equal.

7. The horizontal adjustable roller is adjustable by means of take up bearings. These bearings are moved by tightening/loosening a 7/8" stainless steel threaded rod. The bearing housing will be corrosion resistant thermoplastic, fitted with two (2) self aligning sealed bearings. Bearing type: AMI or equal.

8. The dewatering belt will be woven polyester with stainless steel joiners connected with stainless steel lacing.

9. Doctor blade will be machined U.H.M.W. bolted to a stainless steel frame. Balanced adjustable weights at both ends of the frame will be supported by adjustable steel brackets located on the machine frame.

10. Drive motor. Type: Helical worm right angle geardrive. Standard speed will be 5-25 rpm. It will have a 3/4 hp motor. Gearbox shall be shaft mounted on the drive roller. Speed selection shall be 4 - 20 rpm, adjustable by a panel mounted VFD. Castings shall be machined, dipped in zinc enriched primer (one coat, min. DFT 1 mil.), assembled, degreased, spray painted with second coat of stainless steel impregnated water based paint (min. DFT 1.5 mil.). Primer and paint shall be by Haptic or approved equal.

11. The belt washing system is a self-cleaning, hand operated, 1-1/2" manifold system. It is manufactured from 304 stainless steel.

12. Gravity drainage area of the dewatering cloth is sealed with polypropylene skirting.

13. Adjusters and fasteners are all stainless steel.

14. Machined nylon plows positioned every 6" across the drainage zone will provide roll over of the sludge. There will be two (2) rows of plows. One (1) P.V.C. roller, 2", will gently squeeze the sludge during and after the plowing process. This squeezing of the sludge helps release additional water. The plows and rollers will be fitted to a stainless steel frame. This frame will be secured to the machine frame and be easily removable.

15. The inline sludge mixer shall be an Or-Tec STMX inline free flow type. This non-clogging unit with

no moving parts shall be fitted immediately following the sludge forward feed pump. The inlet/outlet shall be 3" flanged. The unit will require no power.

B. Flocculation Tank

1. Flocculator mount to be stainless steel, minimum 1/4" thick.

2. A 2" NPT drain line shall be provided on tank bottom.

3. Tank material shall be stainless steel. Tank over flow chute shall allow sludge to flow on belt.

C. Inlet Chute

1. Inlet chute is fabricated from stainless steel.

2. Inlet chute receives flocculated sludge from the flocculation tank and fans out across nearly the entire width of the belt. The chute is equipped with vanes or diverters.

D. Flocculator

1. Flocculator will be vertically mounted. It will have four (4) alternating left and right propellers. The stainless steel mixing shaft will be coupled to a helical worm inline geardrive. The 2 hp motor shall be controlled by a panel mounted variable speed controller. Speed range is 0-250 rpm.

E. Sludge Pump

1. Type: Seepex 10-6L BN/114. Duty: 400 - 2,400 gph Positive displacement progressive cavity with a minimum of one stage. The pump will be compact and close-coupled in design (or bare shaft design directly connected to the specified drive). The gearbox will be sized for a minimum service factor or 1.5 and designed to absorb a maximum thrust load of no less than two times pump thrust load.

2. The pump design will allow the suction port to rotate in 90 degree increments perpendicular to the pump centerline. The pump casting will be cast iron with clean out ports on each side. The castings will be free of sand holes, blow holes and

other such defects. A drain plug is located in the suction casting.

3. Suction and discharge flanges shall be raised face 150 lb. Flanges meeting ANSI B16.5 standards and casing shall be tapped to accept appropriate gages. The bearings will be sized to provide a minimum service life of 50,000 hours when operating at the rated capacity and head. The bearing housings are sealed with a double bearing seal on both sides of the cartridge housing. The housing is so designed that it can be removed without dismantling the pump or suction piping.

4. The rotor shall be AISI D-6 tool steel machined and hardened to 62-64 Hrc and treated for corrosion protection (316SS may be substituted for tool steel). To prolong service life, a non-porous fissure free coating is applied which diffuses deep into the base metal. Chrome plating is not acceptable due to hydrogen embrittlement of hardened metals.

5. The stator shall be vulcanized in a metal tube and have a shore hardness of 70. It shall be Buna N and will extend beyond the stator sleeves, forming a collar to prevent the material from contact with the metal stator sleeve.

6. Universal joints are the type that use an oversized hardened bolt and companion bushing assembly. These parts are hardened to 70 and 74 HRc respectively. The joint is so designed that only replacement of the bolts and bushing is required, not of the drive shaft or coupling rod. U-joints are packed with a high quality synthetic grease and are protected by an elastomeric sleeve secured by two stainless steel bands. This positive seal prevents the ingress of liquid into the joint area. The U-joint is further equipped with a stainless steel cover to provide a guarantee of 10,000 operating hours. Each joint is designed to transmit the maximum torque at the maximum speed and at the maximum pressure rating of the pump.

7. The pump shaft is manufactured of solid chrome steel bar stock that is coated with a metalized surface exceeding 75 Hrc (Chrome plating is insufficient. Hollow drive shafts are not acceptable due to the settling of material in the area which affects rod movement, thus increasing wear on bearings and joints.)

8. The shaft also incorporates a plug-in arrangement that expedites disassembly and eases maintenance. This design allows quick replacement of the rotating assembly through the gland area without disturbing the suction piping or pump drive. Disassembly shall be front pull out design, allowing the rotor, both U-joints and the shaft to be removed as one unit.

9. The stuffing box is removable if modification is desired. It will be of sufficient size and design to incorporate packing or mechanical seals as specified.

10. Construction materials for the casing can be cast iron. The shaft can be chrome alloy steel and the rotor tool steel, 62-64 Hrc.

11. Maximum operating speed of the pump shall be 240 rpm. Minimum motor size shall be 5 hp, 4 pole design. The unit is operated by a variable frequency drive within a range of 60 Hz. Motor shall have class F insulation and will be protected from high temperature damage by PTC thermistors in each motor phase winding. Service factor: 1.15.

12. The pump shall be close coupled to an adjustable gear reducer with a speed range of 56 - 558 RPM and a 5 hp, TEFC 1750 RPM, 3 phase, 60 hz, 230/460 V. Paint specifications as above.

F. Polymer Dosing System

1. OR-TEC BLEND 500P shall be a complete package that is capable of automatically pumping, metering, activating and feeding the emulsion polymer as a solution. The system will be manufactured with corrosion resistant material.

2. The system will include one emulsion polymer metering pump that is capable of pumping 1.83 gallons of emulsion per hour.

3. Dilution water will be controlled by a valve and regulated by a rotometer.

4. An activation, blending, mixing and retention system will be incorporated into the body of the unit. The point of injection of the emulsion polymer will be fitted with a Cormaic injector. This prevents contamination of the polymer feed

line and also ensures precise metering of the chemical at a controlled head. The retention/mixing vessel provides sufficient retention with gentle mixing of the activated solution. The electrical requirement for the system is 120 vac.

G. Auger

1. Auger shall a total of length be 24'.

2. Auger housing shall be a trough type. It shall be 18'3" in diameter and 3/16" thick. It shall be constructed from stainless steel.

3. The sludge inlet on the auger shall be a 40" wide stainless steel hopper.

4. The sludge discharge of the auger shall be a 6" tube extending down 4" from the end of the auger with a 150 lb ANSI flange welded on the end of the tube extension. The tube and flange shall be constructed from stainless steel.

5. The auger flight shall be 9" segmental flight with full pitch. The flight shall be constructed from 10 gauge stainless steel. The flight shall have a 2-3/8" center tube.

6. UHMW hanger bearings shall support the flight at along the length of the flight. The non-drive bearing shall be a 4-bolt 2" bearing. Type: Dodge or equal.

7. Two "A" frame supports shall be provided to support the auger. The supports shall be constructed from ¼" stainless steel.

8. Auger drive shall be an Lenze, SEW or equal constant speed gear reducer with a speed of 60 rpm and a 1 hp, TEFC, 750 rpm 3/60/230 - 460 motor.

9. An adjustable amp overload switch shall be provided to stop the entire dewatering system during overload conditions and indicate an alarm condition at the control panel.

H. Wash Water Pump

1. Type: Jacuzzi centrifugal pump.

2. The pump shall be capable of delivering 13 gpm at 80 PSI. It shall be driven by a 2.0 hp motor at a maximum of 2,900 rpm.

3. Pump is painted with Sherwin Williams, JACBLUE#F75LT2 (GIT212F75). Surface preparation is by de-greasing. No primer is used. Finish is by spray painting one coat.

4. Inlet is 1 1/4" female NPT. Outlet is 1" female NPT.

I. Control Panel

1. The control panel shall be a NEMA 12 enclosure and shall contain all electrical controls, wires, starters, terminals, relays, overloads, VFDs, fuses and labels required for operation of the belt press and ancillary equipment described herein.

2. The front of the control panel door shall include a main disconnect breaker switch (power on/off). In the off position all power to the control panel shall be off.

3. The front of the control panel door shall also include the following switching. All switch functions shall be clearly indicated by suitably engraved labels;

   a. System on pushbutton/off pushbutton
   b. System green/on and red/fault lights
   c. Belt Press on/off switch
   d. Belt Press green/running light
   e. Belt Press speed controller for VFD
   f. Flocculator on/off switch
   g. Flocculator green/running light
   h. Flocculator speed controller for VFD
   i. Sludge Pump on/off switch
   j. Sludge Pump green/running light
   k. Sludge Pump speed controller for VFD
   l. Wash water pump on/off switch
   m. Wash water pump green/running light
   n. Conveyor on/off switch
   o. Conveyor green/running light
   p. Polymer system on/off switch
   q. Polymer system green/running light
   r. E-stop pushbutton
   s. Hours running meter

4. The control panel emergency circuit shall immediately shut down all equipment and a red fault light will come on under the following conditions:

   a. Pressing E-stop pushbutton on control panel
   b. Pulling emergency pull cable surrounding belt press
   c. Belt press limit switches being activated by belt tracking to a misaligned position
   d. The unexpected de-energizing or overloading of any circuit within the control panel

J. Belt Tracking

1. Dewatering belt shall be automatically tracked by an Or-Tec ATS.

2. Sensors positioning shall be maintained by stainless steel counter weights. The sensors shall contain mercury tilt switches.

3. Belt shall be moved by means of an electromechanical linear actuator.

4. System shall be controlled by proprietary Or-Tec software control device and housed in the control panel. Frequency and length of actuator stroke shall be adjustable using control panel mounted ATS controller.

K. Skid

1. All the above will be mounted, piped and wired on a integral stainless steel skid.

L. Sludge Pump/Dry Cake Pump Thermistor

1. A temperature sensor in a stainless steel protection sleeve shall be installed in the stator of the pump. This device shall continuously monitor the temperature in the stator and switch off the pump in the event of a rise in the stator temperature. This shall prevent the pump from dry-running.

M. Sludge Flowmeter

1. Sludge Flowmeter. Type: Magnetic Meter. Duty: 0 - 100 gpm. ISCO Unimag Model (UP03FTNCR) with remote converter (4404-UMC41) or approved equal.

2. Display: LCD Current Flow/Total Flow mounted on skid beside control panel.

3. Pipe size shall be 2"

4. Installed, mounted, piped and wired on skid between sludge pump and flocculation tank.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install the belt filter press and appurtenances in accordance with the manufacturer's instructions and as shown on the drawings.

1. Anchor bolts shall be spaced to accommodate the base plates as recommended by the manufacturer. Required grout and leveling shims shall be provided by the Contractor.

2. All piping shall be sized to fit the actual installation required. The Contractor shall be responsible for verifying the actual job site conditions and dimensions prior to fabricating pipe and flanges.

3. All flange piping and valves shall be initially installed and aligned with flange bolts in a loose condition prior to tightening flange bolts.

4. Field Demonstration

a. Final calibration, lubrication, and adjustments shall be made by qualified factory representatives prior to initial start-up.

b. The Contractor will be responsible for arranging and coordinating attendance of required personnel and initial start-up and instructions. Required personnel shall include, but not be limited to:

1) Contractor
2) Engineer
3) Owner's Representative
4) Manufacturer's Authorized Representative
5) Contractor's Electrician

c. Contractor will instruct and demonstrate to the Engineer or authorized representative, the operation and servicing of equipment provided.

3.2 TESTING AND INSPECTION

A. General: Notify Owner and Engineer in writing when the installation is complete and ready for testing and start up.

B. Inspect components for proper installation, wiring and piping.

C. After sludge is available, operate all components and check for proper operation. Make necessary adjustments.

3.3 MANUFACTURER'S SERVICES

A. A manufacturer's representative for the equipment specified herein shall be present at the job site for a minimum of one (1) day, travel time excluded, for inspection of installation, certification of field testing, and adjustment. A second visit for a minimum of 1-1/2 days, travel time excluded, will be provided for polymer selection, training and reviewing the Operations Manual with appropriate personnel. Additional field service will be provided at a reasonable fee or at no charge, depending on the circumstances of the visit.

END OF SECTION

SECTION 11375

AERATION MIXING SYSTEM

PART 1 GENERAL

1.1 SCOPE OF WORK

A. This section includes the design, manufacture, installation and start-up of a flexible membrane, fine pore aeration system including in-basin aeration components and rotary positive displacement blowers as shown on the Drawings and as specified herein.

B. The aeration system manufacturer shall provide single source responsibility for the complete aeration system including aeration and blower components.

C. Aeration equipment shall include all in-basin aeration components including lateral piping, diffuser assemblies and restraint components.

D. Blower equipment shall include complete blower assemblies with motor, blower, base, v-belt drive, belt guard, inlet filter, silencers, and all accessories as specified herein.

1.2 DEFINITIONS

A. Lagoon: Earthen reactor with sloped sidewalls within which aeration occurs.

B. Diffuser Unit: Fabricated unit including diffuser support frame and flexible membrane, which releases air to the water.

C. Diffuser Assembly: Fabricated assembly including multiple diffuser units, hub assembly and ballast components.

D. Air Lateral Piping: Air distribution piping from header stub and diffuser assembly.

E. Header Stub: Air distribution piping between the header piping and lateral piping. Header stub shall extend to the water surface and terminate with a vertical face, full diameter, flanged connection.

F. Isolation/Balancing Valve: Manual butterfly valve located between the header and lateral piping. Valve provides control of air release to the lateral for system

balancing as well as isolation capability for maintenance operations.

G. Air Header Piping: Air distribution piping from the blower building to the header stubs.

H. Blower Manifold Piping: Air distribution piping between the blower discharge and air header piping.

I. Standard Cubic Feet per Minute (scfm): Air at 68°F, 14.7 psia and 36% relative humidity.

J. Maximum Pressure: Pressure in blower manifold piping at the specified airflow rate.

K. Oxygen Transfer Efficiency: Percent of oxygen in the air stream that is dissolved to the wastewater under specified conditions of temperature, barometric pressure, airflow rate, and dissolved oxygen concentration.

L. Standard Oxygen Transfer Efficiency: Percent of oxygen in the air stream that is dissolved to clean water under conditions of 68°F, 14.7 psia, and zero dissolved oxygen.

M. Air Distribution Uniformity: Variation in air distribution between diffuser assemblies.

1.3 SYSTEM DESCRIPTION

A. Design Requirements

1. Design in-basin air piping and diffusers to diffuse air throughout the system in accordance with the specifications.

2. Design each diffuser assembly to provide uniform air release over the specified airflow range.

3. Design the aeration system to provide the minimum specified oxygen transfer efficiency at the specified airflow and operating pressure.

4. Design the blowers to provide the specified airflow at the specified operating discharge pressure.

1.4 SUBMITTALS

A. General

1. A detailed engineering submittal package shall be provided in sufficient detail and scope to confirm compliance with the requirements of this section.

Submittals shall be complete for all required components. Partial submittals will not be accepted.

B. Shop Drawings

1. Detailed layout drawings for in-basin aeration components. Layout drawings shall include

a. Layout and configuration of aeration system.

b. Detail drawings of diffuser assemblies showing components, method of construction, and attachment mechanism to air lateral piping.

c. Detail drawings of lateral piping showing inlet, outlet, and terminal end connections.

d. Detail drawings of header stub components.

e. Detail drawings of lateral restraint components.

2. Detailed layout drawings for blower components. Layout drawings shall include

a. Layout and configuration of blower components.

b. Detail drawings of discharge assembly piping.

C. Product Data

1. Detailed listing of materials and materials of construction.

2. Product literature.

D. System Design and Performance Data

1. Aeration System

a. Certified Oxygen Transfer Performance Curve

1) Certified curve shall be an oxygen transfer efficiency in percent versus air fluxrate defined as scfm per active diffuser surface area in tap water at 14.7 PSIA, 20°C and zero dissolved oxygen at the specified submergence.

2) The certified curve shall be based on aeration test results from a full-scale

a. Air flow balancing.

b. Diffuser assembly maintenance and membrane replacement.

c. Lateral restraint system.

3. Information on the blower system shall include but not be limited to

a. Blower and motor lubrication schedule.

b. V-Belt drive components.

c. Inlet filter element.

d. Pressure relief valve.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Aeration Equipment

1. Environmental Dynamics, Inc., Columbia, Missouri.

2. Pre-approved equal.

a. Information on alternate manufacturers shall be submitted to the Design Engineer no less than 2 weeks prior to the bid date. Only pre-approved, named manufacturers are acceptable.

B. Blower Equipment

1. Dresser Industries, Inc., Roots Division.

2. Pre-approved equal.

a. Information on alternate manufacturers shall be submitted to the Design Engineer no less than 2 weeks prior to the bid date. Only pre-approved, named manufacturers are acceptable.

2.2 MATERIALS

A. Welded Stainless Steel Components

1. Sheets and plates of Type 304L stainless steel with 2D finish conforming to AISI 304L and ASTM A240.

2. Limit carbon content to 0.30% maximum.

B. Non-welded Stainless Steel Components

1. Sheets and plates of Type 304 stainless steel conforming to AISI 304 and ASTM A240.

C. Fasteners and Anchorage Components

1. 18-8 series stainless steel.

D. PVC Pipe and Fittings (Schedule 40 and 80)

1. Base material shall be ASTM D-1784.

2. Pipe shall be manufactured in accordance with ASTM D-1785 and ASTM D-2665.

E. PE Pipe and Fittings

1. Base material shall be PE 3408, ASTM D-3350, PE 345434C.

2. Pipe shall be manufactured in accordance with ASTM F-714.

2.3 AERATION EQUIPMENT

A. System Performance

1. The aeration-mixing system shall be designed to meet the following

a. AOR = 67.7 pounds oxygen per hour
b. SOR = 150.18 pounds oxygen per hour
c. SOTE = 13.2 %
d. SCFM = 1,100 scfm maximum
e. Discharge Pressure = 8.0 psig
f. Diffuser Unit DWP = 16 inches H20 maximum
g. Diffuser Submergence = 8.25 feet maximum

2. The diffusers shall not exceed the following

a. Air Fluxrate = 3.15 scfm/ft2 of active diffuser surface area at the design airflow.

b. Active Surface Area = 410 ft2 minimum

1) Active surface area shall be defined as the net perforated area of the media or membrane and shall reflect only that portion of the membrane which can be

demonstrated to produce uniform air discharge under the full operating range proposed for the diffuser.

c. The diffuser system shall have sufficient turn-up capacity to handle the air requirement for mixing equal to 1,600 scfm without impacting the integrity and functional performance of the system.

B. Flexible Membrane, Fine Pore Diffusers

1. Diffusers units shall have nominal dimensions of 3.5 inches in diameter and 20 inches long.

2. EDI FlexAir 44S Magnum diffuser assembly with four diffuser units per assembly shall be employed over the flat floor area of the reactor.

3. EDI FlexAir 42S Magnum diffuser assembly with two diffuser units per assembly shall be employed over the side slope areas.

4. The diffuser membrane shall be fully supported over full length and circumference with a 3 inch PVC membrane support frame.

   a. Use of a non-fully supported diffuser membrane is not acceptable.

5. The diffuser support frame shall be approximately 20 inches long and have a full diameter mounting connection.

   a. Use of non-full diameter mechanical connections including threaded connections is not acceptable.

6. The diffuser membrane shall be held in place by two 304 stainless clamps.

   a. Retainer clamps shall be crimp type. Worm gear type clamps are not acceptable.

7. Installation of the diffuser membrane shall be accomplished with the removal and installation of the membrane clamps.

   a. Disassembly of diffuser assembly to remove and install membranes is not acceptable.

8. Individual diffuser units shall be provided with a removable end cap.

   a. End cap shall be full diameter and completely removable to facilitate flushing of a diffuser assembly should cleaning be required.

   b. End cap shall be retained in-place with a mechanical connection.

      1) Attachment of end cap by means of friction fit or other non-mechanical means shall not be acceptable.

9. The diffuser unit shall be fully capable of operating under continuous or intermittent conditions and shall be designed with check valve capabilities to prevent entry of mixed liquor into the diffuser unit or air piping on air shutdown or interruption of air supply. A minimum of three (3) check valve features shall be provided, not limited to the following

   a. Membrane shall be elastic and allow openings to close when the air supply is interrupted.

   b. Membrane shall contract and close around full diameter support frame.

   c. Membrane shall employ a non-perforated section that is aligned and seals against the support frame, air distribution orifices.

   d. Use of independent or internal check valve components is not acceptable.

10. Diffuser assemblies shall be configured such that the assembly does not contact the basin floor and shall allow individual assemblies to be retrieved and raised to the lagoon surface for inspection or maintenance.

   a. Assembly retrieval shall be possible without lowering the liquid level of the basin, without taking the basin out of service, and without disturbing or impairing operation of the process or other diffuser units.

   b. Assembly shall be retrievable by a single retrieval harness. The requirement for multiple harnesses shall not be acceptable.

a. Lateral piping shall be heavy-walled, high density, polyethylene.

b. Lateral piping shall be sized to allow a normal airflow variation of 0 to 200% of the designed airflow.

c. Inlet connection shall be a full diameter flange fitting.

d. Four (4) inch laterals shall be provided.

1) SDR-17 minimum shall be used for the lateral piping.

2) All fittings, flange adapters and the initial 20 feet of the lateral run shall be SDR-11 minimum.

3) Lateral piping shall be butt fusion welded in the field by the Contractor to assure maximum strength and structural integrity.

4) Fusion welds between pipe sections with different wall thickness shall be completed at the factory. Field fusion welding of these sections shall not be allowed.

5) Lateral piping shall be shipped to the job site in up to 40' lengths.

6) Lateral sections with a diffuser assembly spacing less than 20 feet will be shipped with outlet tees factory installed. Installation of these sections requires butt fusion welding adjoining sections.

7) Laterals sections with a diffuser assembly spacing greater than 20 feet will be shipped in straight lengths. Outlet tees shall be side fusion welded to a 2 foot section of lateral pipe and are shipped loose. Installation requires butt fusion welding outlet tee lateral sections into the lateral piping at the required locations as shown on the contract drawings.

e. Each diffuser assembly shall receive air from the floating polyethylene lateral from a 1-1/4 inch flexible EPDM airline.

1) This EPDM airline shall be approximately 8.25 feet long per the contract drawings.

2) Airline shall be reinforced with a minimum of four (4) spirals of polyester cord.

3) Minimum working pressure for the airline shall be 150 psig.

f. An outlet tee shall be provided on the lateral section to transition to the diffuser assembly airline.

1) Outlet tee shall be HDPE construction and shall be an equivalent diameter as the airline.

2) Outlet tee shall be side fusion welded to the lateral pipe section. A weld contact area equal to 4 square inches minimum is required.

3) All side fusion welding shall be completed in the factory. Field side fusion welding is not acceptable.

4) The use of mechanical fittings in lieu of a fusion-welded outlet is not acceptable.

5) A quick disconnect feature shall be provided allowing the diffuser assembly to be easily installed or removed from the lateral.

3. Floating laterals shall be restrained in place by means of an end tether.

a. Lateral piping shall terminate with a full diameter blind flange.

b. Tether cable shall attach to the lateral by the flange bolts. Direct attachment of the cable to the HDPE lateral is not acceptable.

c. Tether cable shall be stainless steel.

d. Tether cable shall be anchored to a deadman located on the bank.

e. (Tether cable shall be attached to a self-compensating take-up winch which is anchored to a deadman located on the bank. Self-compensating winch shall allow the slack in the cable to be taken-up and include an adjustable release tension to accommodate lateral contraction or varying water level.)

4. Cross cable restraints shall be provided to minimize lateral movement and structural loads on the piping.

a. Cross cable shall be stainless steel.

b. Cable connection to the lateral shall be below the lateral centerline and shall provide a minimum 18" clearance below the waterline.

5. Systems that are not fully restrained and allow random movement of laterals are not acceptable.

E. Spare Parts

1. The Contractor shall furnish the following spare parts and store as directed

a. Ten (10) - EDI FlexAir 44S Magnum aeration-mixing units completely factory assembled.

b. Ten (10) - Membranes and stainless steel membrane clamps.

2.4 BLOWER EQUIPMENT

A. System Performance

1. The blower system shall perform as an integrated component with the aeration system and provide the required volume and pressure capacity as required for the aeration system.

2. The blower unit shall not exceed the following

a. Operating Speed = 80% of maximum rated speed maximum

b. Differential Pressure = 80% of maximum rated differential pressure

3. Minimum of three (3) 50% blower units are required. Two units shall deliver the design air requirement and one unit shall serve as an online spare.

4. A pressure relief valve shall be provided on each individual blower unit.

   a. The pressure relief valve shall operate at a minimum of 0.5 psig above the design discharge operating pressure.

   b. Each blower shall be capable of operating under a full relief condition with 100% of the discharge vented through the relief valve without operating in the motor service factor.

B. Blower Unit

1. Positive displacement blowers to be designed for oil-free discharge air with vertical inlet and outlet ports.

2. Cast iron headplates and case; high strength cast or ductile iron involute contoured impellers, stress relieved. Impellers accurately, statically and dynamically balanced by metal removal at lobe base and not by counterweights or by metal removal at outer profile of lobe.

3. Accurately cut steel timing gears, secured directly to rotor shafts for a non-slip synchronization of rotors.

C. Motor

1. Each motor shall provide power to the blower without operating in the motor service factor at the design operating speed and full pressure relief valve discharge.

2. Motor is to be ODP enclosure, 10 horsepower, 460 volt, 3 phase and 60 Hz.

3. Motor shaft speed shall be less than 1,800 rpm.

4. Service factor is 1.15 for the nameplate horsepower.

5. Minimum operating efficiency equal 90 percent.

D. Sliding Motor Base

1. Each sliding motor base shall have a NEMA frame matching the motor.

2. Each motor base to be equipped with two adjusting screws to maintain sheave alignment and allow for uniform belt tension.

E. V-Belt Drive

1. Each V-belt drive set shall be capable of transmitting the larger of

2. Motor horsepower including 1.15 motor service factor, or

3. Blower torque for each sheave set with a 1.4 service factor.

4. Blowers shall have sheaves, belts and bushings to deliver 100% of the design airflow as specified.

5. V-belts shall be "3VX or 5VX" style.

   a. Two belts per blower are required with each belt capable of handling the horsepower draw of the blower at the design maximum airflow and full pressure relief valve pressure.

   b. Blowers designed to operate at multiple set points shall have properly sized belt sets.

   c. All belt pairs shall be "matched sets".

6. Sheaves to be two-groove "3V or 5V" style.

   a. Sheaves shall be sized to deliver the required airflow at the specified differential pressure.

   b. Blowers designed to deliver multiple airflow conditions shall have corresponding motor/blower sheave combinations.

   c. Motor sheaves to be appropriately sized to prevent failure of motor bearings or shaft.

   d. Blower sheaves are to be sized to prevent bearing failure from excessive "overhung loads".

e. Bushings: "Full-grip" style bushings are "wedge-lock" fit to the shaft with a key and set screw. Bushing is mounted independent of sheave to allow alternate sheaves to be installed without having to realign sheaves.

F. Belt Guard

1. Each belt guard is comprised of a safety guard and backing plate conforming to OSHA standards.

2. The safety guard shall be constructed from 13 gauge expanded metal grating (1/2" openings) and the backing plate shall be fabricated from 1/8" steel plate.

3. Belt guard shall be designed to allow adjustment of motor base and allow greasing of blower and motor bearings without having to remove safety guard.

G. Blower Base

1. Each blower base is to be fabricated from heavy-duty steel channel and angle iron with legs.

2. All joints shall be connected by continuous welds and to be chipped and brushed before painting.

3. Blower bases to be primed and painted with standard gray machine enamel.

H. Inlet Filter/Silencer

1. Inlet filter/silencer shall be of heavy-duty construction and shrouded for weather protection.

2. Noise attenuation to be a minimum of 8 dB at 125 hertz and greater.

3. Furnish Universal model CCS silencers with a 4inch, threaded connection.

4. Inlet filter to be 99.5% efficient on 2 micron particles and 97% efficient on 1 micron particles.

5. Filter elements are to be reusable dry pleated paper type.

6. Maximum pressure drop of a clean filter at 100% rated flow is 3 inches water column.

I. Filter Restriction Gauge

1. Each filter restriction gauge to measure up to 20 inches of water column vacuum.

2. Indicator shall recall the point of highest vacuum to determine filter element condition and have a reset option for use when filter is cleaned or new.

3. Mount filter restriction gauge on hood or in nozzle of inlet filter/silencer shroud with 1/8" MPT.

J. Inlet and Discharge Silencers

1. One inlet silencer and one discharge silencer to be supplied for each blower unit.

2. Each silencer must have a minimum noise attenuation of 30 decibels between 125 hertz and 500 hertz.

3. Airflow velocity through silencer inlet shall be between 3500 ft/min and 5500 ft/min for maximum attenuation of noise at the design airflow.

4. Silencers shall be heavy-duty, all welded constructed using carbon steel plates.

5. Critical grade inlet silencer shall be provided for applications operating at a blower timing gear, pitch line velocity greater than 3,300 ft/.

6. Critical grade discharge silencer shall be provided for applications operating at a blower timing gear, pitch line velocity greater than 2,700 ft/.

7. Silencer supports shall be provided to mount silencers to blower base.

K. Flex Connectors

1. Each blower flex connector utilizes nitrile blend rubber sleeve reinforced with 4-ply polyester yarn belts.

2. Sleeve shall be pressure rated at 20 psig for continuous temperatures of 250°F.

3. Stainless steel hose clamps shall secure sleeve to threaded nipples. Companion flanges shall be provided for flanged piping systems.

L. Pressure Relief Valve (PRV)

1. PRV shall be cast iron construction.

2. PRV shall be capable of relieving the full design maximum airflow without operating in the service factor of the motor, blower or drive assembly.

3. Weighted style shall be used.

M. Check Valve

1. Check valves shall be the split flapper-type with a body of steel or lightweight cast iron.

2. Internal flappers are to be aluminum with EPDM seals suitable for continuous operation at temperatures up to 350 F.

3. Flappers to be loaded with 304 stainless steel springs.

N. Shut-off Valve

1. Shut-off valve shall be provided to seal off each blower from the main air header.

2. Valves are to be rated for temperatures from -40°F to 300°F and pressures up to 20 psig.

3. Valve shall be wafer style.

O. Inlet Thermometer

1. Thermometer shall have a -40° F to 110° F temperature range.

2. The thermometer shall have a 1/4" male pipe thread connection to fit into a 2-1/2" long brass well. Contractor to provide a 1/2" FPT connection for well.

P. Discharge Thermometer

1. Thermometers for discharge side of blower shall have a 30 °F to 300 °F temperature range.

2. The thermometer shall have a 1/4" male pipe thread connection and fits into a 2-1/2" long brass well. Contractor to provide a 1/2" FPT connection for well.

Q. High Temperature Shut-Down Switch

1. Switch shall have an operating range of 140° to 290°F.

2. The maximum temperature capability shall be 340 °F.

3. Sensor is to be capillary type with remote 3-3/4" brass bulb.

4. Contractor to provide 1/2" FPT in discharge piping near blower for thermostat well.

R. Pressure Gauge

1. Pressure gauge shall be provided for each blower and mounted vertically in the blower piping downstream of the discharge silencer to provide stable pressure readings.

2. Gauge shall be liquid filled with a 4-1/2 " diameter face.

3. Scale range is 0-15 psig with scale divisions by 0.1 psig and accuracy of ± 2%.

4. Each pressure gauge shall be equipped with a snubber to prevent wear of the movement and reduce shock on the gauge.

5. Gauge cocks shall be provided to isolate each gauge from the air supply system.

S. Vibration Pads

1. Vibration pads shall be installed between blower base and concrete blower pad.

2. Vibration pads shall be sized to handle vibrations and loading of blower base assembly.

3. The pads shall be constructed of granulated cork and sisal fiber impregnated with vinyl resin.

T. Skid Mounting

1. Blower package to be factory assembled with the following components mounted to the blower base

   a. Silencers to be firmly mounted above and below the blower with silencer supports attached to the blower base.

b. Silencer supports are to be designed to allow vertical adjustment of piping height.

2. Components after discharge silencer shall be assembled into a "header assembly" and shipped unattached to blower assembly for protection during transit.

3. Some instruments may be packed loose for further protection such as the high temperature shutdown switch, temperature gauges, pressure gauges, etc. The associated wells or piping connections to these instruments to be installed in the "header assembly".

PART 3 EXECUTION

3.1 INSTALLATION

A. Contractor shall furnish, inspect, store, and install aeration system and blower components in accordance with manufacturer's written instructions and approved submittals.

B. Contractor shall provide all valves, air header piping, pipe supports and concrete deadman as necessary to complete the aeration system as shown on the plans.

C. Contractor shall provide all electrical controls, valves, inlet piping, discharge piping, blower manifold piping, and blower pad as necessary to complete the blower system as shown on the plans.

D. Air piping including blower manifold, header, and laterals must be clean prior to starting up the system.

E. Contractor shall be responsible for cleanliness of piping and may be required to either manually clean pipe, or air or water flush piping as required.

3.2 START-UP

A. After installation is completed, the Contractor shall perform the following field tests in the presence of the Engineer and the Owner.

1. Fill the reactor to the normal operating water level.

2. Operate the blowers at the design air rate and observe air release and air distribution patterns.

3. Adjust any piping or diffusers that show leaks or disproportionate amount of airflow.

4. All water, air, power and labor associated with testing and adjustment of diffuser assemblies are to be supplied by Contractor.

B. Manufacturer's Field Services

1. A manufacturer's representative shall be present at the job site to inspect the installation of the equipment, start-up the system, and train operations and maintenance personnel on the supplied equipment.

2. Services including a total of two (2) trips with a total of four (4) days onsite shall be provided.

PART 4 SPECIAL CONDITIONS

4.1 EQUIPMENT SCHEDULE

A. Aeration Basin

1. Eight (8) Flexair 88SX Magnum Units
2. Three (3) Flexair 44SX Magnum Units

B. Sludge Basin

1. Four (4) Flexair 44SX Magnum Units
2. Six (6) Flexair 88SX Magnum Units

C. Blower Building

1. Three (3) 10 hp Blower Assemblies

END OF SECTION

SECTION 13120

PRE-ENGINEERED WOOD STRUCTURES

PART 1 GENERAL

1.1 SCOPE

A. The work to be performed shall include all labor, materials, equipment, and transportation necessary for constructing the building shown on the drawings or as specified herein. This shall include all lumber, metals, carpentry, finishes, and specialties, as required to construct the building, including framing, wall systems, and roof system.

B. The Contractor shall be responsible for all materials, whether furnished by himself or a subcontractor, and storage of same. The Contractor shall be responsible for following all building codes or ordinances covering the work to be constructed.

1.2 RELATED WORK, BUT NOT LIMITED TO

A. Section 03300 - Cast-in-Place Concrete

B. Section 06190 - Wood Roof Trusses

C. Section 08110 - Hollow Metal Doors and Frames

D. Section 08360 - Sectional Overhead Doors

E. Section 08520 - Aluminum Windows

F. Section 08710 - Door Hardware

G. Section 08800 - Glazing

1.3 REFERENCES

A. ASTM A446 - Steel sheet, zinc-coated (galvanized) by the hot-dip process, structural (physical) quality.

B. ASTM A525 - Steel sheet, zinc-coated (galvanized) by the hot-dip process, general requirements.

C. FS-HH-I-1972/1 - Insulation board, thermal polyurethane or polyisocyanurate, faced with aluminum foil on both sides of the foam.

D. AWPI - American Wood Preservers Institute.

E. NFPA - National Forest Products Association

1.4 SYSTEM DESCRIPTION

A. Clear Span Frame

B. Primary Framing: Wood roof trusses and post columns

C. Secondary Framing: Purlins, girts, bracing, and other items as required.

D. Wall and Roof System: Preformed metal panels of vertical profile and accessory components.

1.5 DESIGN CRITERIA

A. The building shall be designed in accordance with the applicable building code and the AWPI Pole Building Design.

B. All wood members shall be designed in accordance with NFPA National Design Specification for Wood Construction.

C. The specifications herein shall be considered minimum standards to be met by the Contractor and/or the building and equipment suppliers.

D. The drawings furnished are to indicate the intent of the Owner as to the type of building construction desired; the dimensions shown on the floor plan drawing and the building height dimension shown on the drawings shall not be changed without approval by the Owner. The submittal shall bear the seal of a Professional Engineer, registered in the State of Ohio, thereby certifying that the structural design of the building fulfills the requirements of: 1) these specifications, 2) 25 lb. per square foot live roof load, and 3) 80 M.P.H., Exposure C, Importance Category III wind load. The maximum column and truss spacing shall be 7'-6" on center for sidewalls and 8'-0" on center for endwalls.

1.6 SUBMITTALS

A. Submit shop drawings sealed by a Professional Engineer in the State of Ohio indicating all member sizes and erection details, including any special foundation requirements.

B. Submit descriptive literature and product data for wall and roof systems.

1.7 REGULATORY REQUIREMENTS

A. Provide certification confirming approval of insulation materials for its intended application by the building authority having jurisdiction.

PART 2 PRODUCTS

2.1 TREATED TIMBER COLUMNS

A. The structural nail laminated timber columns shall be No. 1 or better southern yellow pine, kiln dried to 19% moisture content. The area in contact with the ground shall be pressure treated with a wood preservative to a retention of .8 pounds per cubic foot and kiln dried after treating to 19% maximum moisture content. The wood preservative shall be Chromated Copper Arsenate Type III, Oxide type; or equal as listed in Federal Specification TT-W-571J. The preservative shall penetrate 100% of the sapwood. The treated portion of the column embedded in ground shall be laminated with stainless steel nails.

B. A letter of certification from the wood preserver shall be furnished which certifies the .8 pc preservative retention for a 0 to .75" assay zone.

C. Attachment of column to foundation shall be accomplished by means of a steel column socket. The column socket and anchorage shall be capable of transmitting the required forces to the foundation. The socket shall be anchored to top of wall by 2 - ½" round x 10" "J" bolts embedded 8 ½" into concrete. When inserted, the column shall be secured in socket by 4 ½" round x 2 ½" lag bolts and 4 - 20d ring shank nails.

2.2 BASEBOARDS

A. Perimeter baseboards shall be No. 2 or better southern yellow pine 2" x 8" S2S and center matched. They shall be pressure treated to a net retention of .6 pounds per cubic foot with Chromated Copper Arsenate Type III, Oxide type, or equivalent, in accordance with American Wood Preservers' Association Specification C2. They shall be kiln dried before and after treating to 19% maximum moisture content.

2.3 WOOD TRUSS DESIGN SPECIFICATIONS

A. All lumber used in the design of wood trusses must be kiln dried and graded in accordance with the current grading rules.

side and end sheets shall be one piece from the base trim to the roof.

2.8 ROOF PANELS

A. Roofing panels shall be coated with an AZ55 aluminum-zinc metallic coating (galvalume) (ASTM A-792). Minimum thickness of the galvalume-coated steel shall be 24 gauge. The exposed side of panel shall have a baked plastisol (Plasticized PVC) topcoat over a primer, for a total minimum coating thickness of 4 mils. The panel's back side shall have a two coat baked finish, with a total nominal thickness of .5 mil." Roof sheets shall be one piece from eave to peak through 37'-0" length.

2.9 TRIM

A. Trim for corners, gables, base, and fascia shall be die-formed from the same quality material as siding panels. The color of the trim to be chosen by the Owner.

2.10 GUTTERS AND DOWNSPOUTS

A. Gutters shall be 5" o.g. or Style K type gutters, 0.030 ga aluminum, color to match the trim, and shall be installed on both sides of the building. Downspouts shall be provided as needed at each corner minimum. Color of downspouts shall be selected by the Owner.

2.11 END OVERHANG

A. Each building endwall shall have a 1 foot overhang, as dimensioned on plans, finished underneath with pre-finished (white, brown, charcoal, or ivory) non-vented aluminum soffit, as manufactured by Alcoa Building Products.

2.12 ATTIC VENTILATION

A. Vent-a-ridge shall be used at ridge of building in conjunction with a 1 foot overhang on each side, with underside of overhang finished with pre-finished (white, brown, charcoal, or ivory) vented aluminum soffit, as manufactured by Alcoa Building Products.

B. Soffit and vent-a-ridge to have equal amount of free air opening and installed with proper filler strips, weatherseals, and connectors.

2.13 OVERHEAD DOOR OPENINGS

A. Overhead door openings shall be 12'-0" wide x 12'-0" high. Openings shall be trimmed with same quality material as siding panels so there is no exposed wood.

2.14 OVERHEAD DOORS

A. Upward acting sectional doors shall be as specified in Section 08360 - Sectional Overhead Doors.

2.15 INSULATION AND VAPOR BARRIER

A. The ceiling shall be insulated with blown-in Rockwool or approved fiberglass with an "R" value of 38. The wall cavity between structural columns shall be insulated with a 6" thick, R19 unfaced fiberglass insulation blanket, without interruption by vertical or horizontal framing members. The entire wall and ceiling surface to be covered with 4 mil plastic vapor barrier with the splice edges lapped a minimum of 12 inches.

2.16 INTERIOR LINER PANELS

A. Painted Metal Liner Panel

1. The metal liner panel shall be coated, galvanized steel sheets; minimum thickness of the galvanized steel shall be .019 inches, and have a G90 zinc coating. The top side of the panel shall have a baked polyester topcoat over .2 mils of primer, for a total nominal paint thickness of 1 mil. The panel's bottom side shall have a two coat baked finish, with a total nominal thickness of .5 mil. The wall panels shall be secured to horizontal stripping (2 x 4's 30" o.c.) with EPDM washer, ring shank nails. Ceiling panels shall be secured directly to the lower chord of the trusses with 1" white-head self-drilling screws. All corner, baseboard, door and window framing shall be covered with die-formed metal trim.

B. Painted Wood Liner Panel

1. The wood liner shall be nominal 7/16" oriented strand board (OSB) product, with a resin saturated paper overlay on the exposed face. The interior liner shall be Smart Panel treated engineered wood ship lap siding as manufactured by Louisiana Pacific Corporation, Portland Oregon, and labeled and classified as conforming to National Evaluation Report 124 and Canadian Construction Materials

Centre 11826L. The wall panels shall be secured to horizontal stripping (2 x 4's 30" o.c.) with ring shank nails.

C. Refer to the Room Finish Schedule or wall sections shown on the plans for the type of liner to be installed.

2.17 WARRANTY

A. The Building Vendor shall supply a warranty to the Owner which shall provide that the vendor will:

1. For a period of 5 years to absorb repair or replacement costs, including material and labor, if any preservative treated timber columns fail due to decay or insect attack.

2. For a period of 5 years to repair, or in its discretion, to replace free of charge the building framework, including sliding doors and roofing or siding panels, if directly damaged by snow loads.

3. For a period of 5 years to repaint free of charge:

   a. Any plastisol coated panel, or Kynar coated siding panel, on which corrosion due to pollutants in the atmosphere has resulted in red rust. (Kynar coated roof panels shall be warranted against red rust for 10 years.)

   b. Any panel on which chalking has occurred in excess of 4 units for plastisol panels and 8 units for Kynar siding panels (ASTM D-659).

   c. Any panel on which color change has occurred in excess of 8 units for plastisol panels, or 5 units for Kynar siding panels (ASTM D-2244).

   d. Any roof or siding panels on which the paint has separated from the panels due to checking or peeling.

4. For a period of 5 years to repair free of charge any roof leaks due to defects in materials or workmanship.

5. For a period of 5 years to repair, or in its discretion, to replace free of charge the building framework, including sliding doors and roofing or siding panels, if directly damaged by wind loads, unless damage is caused by flying or falling objects.

6. For a period of 1 year to repair other building parts that prove to be defective in materials or workmanship.

PART 3 EXECUTION

3.1 ERECTION

A. Maximum column spacing shall be 7'-6" o.c. for sidewalls and 8'-0" for endwalls.

B. Wall girts shall be spaced at a maximum of 30 inches o.c.

C. Roof purlins shall be spaced at a maximum of 20 inches o.c. and installed in accordance with the manufacturer's instructions.

3.2 WALL SYSTEM

A. Install in accordance with manufacturer's instructions.

B. Fasten cladding system to structural supports, aligned level and plumb.

C. Panels shall be sealed at the base with closures.

D. Install sealant and gaskets to prevent weather penetration.

E. Wall panels shall be bonded and grounded in accordance with the applicable building and electric codes.

3.3 ROOFING SYSTEM

A. Install in accordance with manufacturer's instructions.

B. Fasten cladding system to structural supports, aligned level and plumb.

C. Roof panels shall be bonded and grounded in accordance with the applicable building and electric codes.

3.4 INSTALLATION OF ACCESSORIES

A. Install framing for all wall and roof openings and accessories in accordance with manufacturer's instructions.

B. Seal wall and roof accessories watertight and weathertight with sealant.

3.5 GUTTER AND DOWNSPOUT ERECTION

A. Rigidly support and secure components. Joint lengths with formed seams and sealed watertight. Flash and seal gutters to downspouts.

B. Preformed closures shall be installed to close wall and roof corrugations prior to installation of gutters and trim.

C. Apply bituminous paint on surfaces in contact with cementitious materials.

3.6 INSULATION

A. Install in accordance with manufacturer's instructions.

PART 4 SPECIAL PROVISIONS

4.1 METAL LINER PANEL

A. Wall and ceiling metal liner panels in the Sludge Dewatering Building shall be white metal liner panels meeting the requirements of paragraph 2.16 A.1.

END OF SECTION

SECTION 15100

PROCESS PIPING AND VALVES

PART 1 GENERAL

1.1 SCOPE

A. Piping, fittings, valves and accessories.

B. Testing.

1.2 RELATED SECTIONS

A. The Drawings and General Conditions of the Contract, including Supplementary General Conditions, apply to this section.

B. Section 02220 - Excavation and Backfill.

C. Section 09910 - Painting.

D. Division 15 - Plumbing.

1.3 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this Section.

1.4 SUBMITTALS

A. Submit shop drawings indicating dimensions, layout of piping, gradient of slope between corners and intersections, locations and elevations of manholes, cleanouts.

B. Submit product data and manufacturer's installation instructions for pipe, pipe accessories.

1.5 PROJECT RECORD DRAWINGS

A. Accurately record locations of pipe runs, connections, manholes, cleanouts, and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

2. Approved type forged steel beam clamps in the case of steel construction.

3. Supplementary channels, plates, etc., where supports are required between building structural members, spanning the space and attached to building structural members by welding, bolting, or with concrete anchors. Angles shall be used in pairs, back to back.

4. All rods, angles, rails, struts, brace plates, platform, etc., required for suspension or support of piping, conduit, and equipment.

5. Hangers, rollers, threaded rods, turnbuckles, saddles, insulation protectors, anchors, etc., and all miscellaneous specialties for the attachment of hangers and supports to the structure.

6. Vibration hangers, spring or rubber shear for pipes connected to rotating equipment.

D. Types of Supports

1. Beam clamps shall be used where piping is supported from steel structure of building. Clamps shall be selected on basis of load to be supported. Beam clamps shall be malleable iron with bolt, nut, and pocket threaded for rod connection as required to fit beams. C-clamp type shall only be hung from truss panel points unless otherwise approved by the Engineer.

2. In precast slab areas supports shall be hung from tabs. Tabs shall not be overloaded. The Contractor shall not drill into poured-in-place or precast slabs unless approved by the Engineer.

3. Cast-in inserts shall be used for suspending hangers from concrete. Insert shall be ceiling type, individual inserts; Grinnell CB - Universal concrete inserts, Figure 282 or Figure 279, Elcen, or equal. The Contractor shall not drill into poured-in-place or precast slabs unless approved by the Engineer.

4. Vertical piping shall be supported at base by hanger placed in horizontal line near riser, or by base fitting set on pedestal or foundation. Risers shall be laterally supported at intermediate points with riser clamps with two point bearing as required to make rigid. Riser clamps shall be

wrought steel, with extension lugs, bolt, and nuts; Grinnell Figure 261, Elcen, or equal. Use only in unfinished areas where approved by the Engineer. Fee & Mason Figure 368, Grinnell, or equal, shall be used for copper pipe.

5. Other means of support must be approved by the Engineer. Do not hang pipes from other pipes.

6. Anchors and guides shall be installed as shown on the Drawings. Where anchors and guides are not specified by manufacturer's number, they shall be designed for a specific job condition. Submit drawings of proposed anchors and guides for approval. Where piping is adjacent to walls or steel columns, welded steel brackets may be used.

7. If concrete has been poured, hangers for light loads shall be secured to the side of concrete beams or slabs by means of drilled holes and expansion shields and bolts or other methods approved by the Engineer.

E. Unless otherwise noted, hangers shall be as follows:

1. Uninsulated piping 2 inch and smaller, Grinnell Figure 97, Elcen, or equal, malleable iron adjustable nut and steel band.

2. Uninsulated piping 2 inch and larger, Grinnell Figure 260, Elcen, or equal, carbon steel adjustable wrought clevis type.

3. Uninsulated copper tubing, Fee & Mason Figure 500, Elcen, or equal, carbon steel ring and malleable iron adjusting nut completely copper plated.

F. Trapeze Hangers and Brackets

1. Where several pipes occur at the same elevation, trapeze type hangers or other equivalent types may be used.

2. Trapeze hangers shall be preformed channel Fee & Mason Figure 500 or Figure 521, Grinnell, or equal, with galvanized finish. Figure 8500 pipe clamps or Figure 8600 tubing clamps shall be used to secure piping to channel framing.

3. Brackets shall be Fee & Mason Figure 150, 151, or 155, Grinnell, or equal, as required for weight of pipe.

I. When pipe joints are made at the joint of the pipeline with the pump nozzle, all bolts and nuts shall be installed loose until after the entire pipeline has been installed aligned and checked.

J. Reaction or thrust blocking shall be constructed where shown on the Drawings or as required. As a general rule, reaction or thrust blocking shall be installed at all bends, tees, and where pipe diameter changes in size. Blocking shall be constructed against vertical surfaces, either undisturbed earth or sheeting left in place as directed. Blocking shall be of the size and shape indicated, and the actual or projected bearing area perpendicular to the direction of the resultant thrust of the pipeline shall be as shown or required. Blocking shall be installed so that the pipe and fitting joints will be accessible for repairs or future removal.

K. The Contractor shall remove all existing pipe, fittings, valves, pipe supports and blocking and all other items necessary to provide space for making connections to existing pipe and installing all piping which is to be done under this Contract. Removal work shall be performed in accordance with Specification Section 02060 - Demolition.

3.3 INSTALLATION OF FLANGED PIPING

A. Flanged piping shall be carefully centered to the indicated position and leveled to the correct elevation with all flanges plumb and level. Flanged faces and bolt holes shall be well cleaned of all foreign matter before assembly. All bolts holes shall straddle vertical center line of flange. When joints are made up, the bolts shall be tightened uniformly and progressively on opposite sides of the flanges so there will be no strain on the flange or piping. Gaskets shall be well cleaned before being installed. When making difficult connections, rubber cement or light string may be used to hold the gasket in place.

B. Install pipe, fittings, and accessories in accordance with the applicable standards and manufacturer's instructions.

C. Install in a neat and workmanlike manner, true to line and plumb.

D. Provide piers or other pipe supports to properly support the pipe per Item 2.4, Pipe Supports. Place supports so

that normal maintenance of valves, fittings, etc. is not impaired.

E. Provide a ductile iron wall pipe or sleeve where the pipe passes through a wall or slab. Grout the pipe water tight after installation.

3.4 TESTING

A. General

1. Contractor shall be responsible for all testing cost incurred.

2. Testing shall be performed in accordance with the applicable standards and shall comply with the Environmental Protection Agency's regulations.

3. Any pipe not passing a test shall be repaired or replaced and retested at no cost to the Owner.

4. All visible leakage shall be repaired even though tests may be satisfactory.

B. The water pipe leakage testing shall conform to AWWA C600 for ductile iron.

C. All pipe shall be tested at a minimum of 85 psi pressure, but no higher than the manufacturer's recommendations. Leakage shall not exceed 10 gallons per inch diameter per mile of pipe per day.

D. Chlorination and disinfection of pipe shall comply with AWWA C601 for ductile iron pipe and shall comply with the manufacturer's recommendation for PVC pipe. Before the system can be put into service, a successful bacteriological test will be required.

E. All water used for testing and disinfection shall be paid for by the Owner.

F. Any taps, valves or extra equipment necessary to facilitate testing or chlorination shall be provided by the Contractor at no extra cost.

G. All testing and chlorination costs shall be included with the lump sum bid.

END OF SECTION