Invitation to Bid (ITB) 19-302-03
Phase II – Site Work, Lowman Housing
IDAHO TRANSPORTATION DEPARTMENT

Date of Issuance: 12/4/2018
TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION........................................................................................................................................... 4
1 GENERAL INFORMATION .......................................................................................................................................................... 5
   1.1 Purpose............................................................................................................................................................................. 5
   1.2 General Information, Solicitation Instructions and Standard Terms and Conditions ......................................................... 5
   1.3 Inquiries .......................................................................................................................................................................... 5
   1.4 Submission Requirements ................................................................................................................................................ 6
   1.5 Compliance with ............................................................................................................................................................. 6
   1.6 Award .............................................................................................................................................................................. 7
   1.7 Point(s) of Contact/Contract Administration ................................................................................................................ 7
   1.8 Pre-Bid Conference ..................................................................................................................................................... 7
2 SCOPE OF WORK ...................................................................................................................................................................... 7
   2.1 Scope .............................................................................................................................................................................. 7
   2.2 Worksite Cleanup .......................................................................................................................................................... 8
   2.3 Work not noted, detailed, or specified .......................................................................................................................... 8
   2.4 Location ........................................................................................................................................................................ 8
   2.5 Staging Location(s) ...................................................................................................................................................... 8
   2.6 Safety ........................................................................................................................................................................... 8
   2.7 Basis of Payment ......................................................................................................................................................... 8
   2.8 Contract Compliance ................................................................................................................................................... 9
3 GENERAL ARCHITECTURAL AND SPECIAL PROVISIONS .................................................................................................. 9
   3.1 Subletting/Subcontracting ........................................................................................................................................... 9
   3.2 Guarantee ...................................................................................................................................................................... 9
   3.3 Manufacturer Warrantees and Instruction Sheets ......................................................................................................... 9
   3.4 Temporary Utilities ...................................................................................................................................................... 9
   3.5 Permits ......................................................................................................................................................................... 10
   3.6 Codes ........................................................................................................................................................................... 10
   3.7 Protection .................................................................................................................................................................... 10
   3.8 Prior Approval ............................................................................................................................................................ 10
   3.9 Submittals .................................................................................................................................................................... 11
   3.10 As – Built Drawings .................................................................................................................................................... 11
   3.11 Operation, Maintenance Instructions and Manuals ..................................................................................................... 11
   3.12 Dimensions and Measurements ................................................................................................................................... 11
   3.13 Coordination and Control ........................................................................................................................................... 11
   3.14 Use – Tax...................................................................................................................................................................... 11
   3.15 Superintendent ........................................................................................................................................................... 12
   3.16 ITD Use of Building ..................................................................................................................................................... 12
   3.17 Information Given Prior to Award ................................................................................................................................ 12
   3.18 Performance ............................................................................................................................................................... 12
   3.19 Bidding Requirements and Conditions ........................................................................................................................ 12
   3.20 Irregular Bids ............................................................................................................................................................... 13
   3.21 Disqualification of Bidders .......................................................................................................................................... 13
   3.22 Bid Guaranty (Five Percent Bid Bond) ........................................................................................................................ 13
   3.23 Return of Bid Guaranty (Five Percent Bid Bond) .......................................................................................................... 14
   3.24 Surety Bond Requirements (Performance and Payment Bonds) ................................................................................... 14
   3.25 Consideration of Bid / Record of Public Bid Opening (ROPBO) ................................................................................ 14
   3.26 Execution / Award of the Contract .................................................................................................................................. 14
   3.27 Failure to Execute Contract ......................................................................................................................................... 14
   3.28 Authority to Proceed ................................................................................................................................................ 15
4 TERMS AND CONDITIONS .................................................................................................................................................. 15
   4.1 Contract Award............................................................................................................................................................ 15
### ADMINISTRATIVE INFORMATION

<table>
<thead>
<tr>
<th>ITB Title:</th>
<th>Phase II – Site Work, Lowman Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITB Project Description:</td>
<td>in Lowman, ID</td>
</tr>
<tr>
<td>ITB Lead:</td>
<td>Tony Pirc, Facilities Manager Idaho Transportation Department 3311 W. State Street, Boise, Idaho 83703 E-mail: <a href="mailto:tony.pirc@itd.idaho.gov">tony.pirc@itd.idaho.gov</a> Phone: 208-334-8600</td>
</tr>
<tr>
<td>Submit sealed bid: BIDS MUST BE RECEIVED AT THE PHYSICAL ADDRESS DESIGNATED FOR COURIER SERVICE AND TIME/DATA STAMPED BY ITD PRIOR TO THE CLOSING DATE AND TIME.</td>
<td>Address for Courier 3311 W. State Street Boise, Idaho 83703 Address for US Mail (not recommended) P.O. Box 7129 Boise, Idaho 83707</td>
</tr>
<tr>
<td>Pre-Bid Conference: Pre-Bid Conference Location:</td>
<td>11:00 a.m. Mountain Time on December 10, 2018 Phase II – Site Work, Lowman Housing #5 Riverfront Drive Lowman, ID 83637</td>
</tr>
<tr>
<td>Deadline To Receive Questions:</td>
<td>5:00 p.m. Mountain Time on Wednesday, December 12, 2018.</td>
</tr>
<tr>
<td>ITB Closing Date:</td>
<td>1:59:59 p.m. Mountain Time on Tuesday, December 18, 2018.</td>
</tr>
<tr>
<td>ITB Opening Date:</td>
<td>2:05 p.m. Mountain Time on Tuesday, December 18, 2018.</td>
</tr>
<tr>
<td>Initial Term of Contract and Renewals (service completion):</td>
<td>The service performed under the contract will begin upon ITD’s written notice to proceed and must be complete within 30 calendar days.</td>
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1 GENERAL INFORMATION

1.1 Purpose

1. The Idaho Transportation Department (ITD) is requesting bids from qualified bidders to establish a contract between ITD and a Contractor for the construction of a new drain field, 2 septic tanks, sewer piping, water piping from well #2 to 3 housing units, 3 pressure tanks inside housing units, electric power to well #2 and to 3 housing units including heat cable on plumbing in crawl space and site grading as required and other required work in accordance with the specifications contained herein.

Public Works Licensing is Required

1.2 General Information, Solicitation Instructions and Standard Terms and Conditions

This solicitation is issued by the Idaho Transportation Department via:

http://itd.idaho.gov/business/ (click on the Solicitations – Non-Highway Projects tab). The Idaho Transportation Department is the only contact for this solicitation. All correspondence regarding this ITB must be in writing. In the event that it becomes necessary to revise any part of this ITB, addendums will be posted at the website provide above. It is the responsibility of the bidder to monitor this website for any updates or addendums. Any oral interpretations or clarifications of this ITB will not be relied upon. All changes to this ITB must be in writing and posted to the website to be valid. Alternate bids are not allowed.

The current version of the Idaho Transportation Department, Business & Support Management Solicitation Terms and Conditions are incorporated by reference into this solicitation, and any resulting contract, as if set forth in their entirety. This document can be downloaded at or copies obtained by contacting the solicitation’s lead (see Section 1.3, Inquiries). Failure by any submitting bidder to obtain a copy of these documents will in no way constitute or be deemed a waiver by ITD of any term, condition, or requirement contained in the referenced documents; and no liability will be assumed by ITD for a submitting bidder’s failure to consider the Idaho Transportation Department, Business & Support Management Solicitation Terms and Conditions in preparing its response to the solicitation.

1.3 Inquiries

Questions or other correspondence must be submitted in writing to the ITD contact listed below.

QUESTIONS MUST BE RECEIVED BY 5:00 PM Mountain Time (MT) ON THE DATE LISTED IN THE ADMINISTRATIVE INFORMATION PAGE. Timely received written questions will be answered via an addendum which will be posted to http://itd.idaho.gov/business/ (click on the Other Solicitations tab).

Project Lead: Tony Pirc, Facilities Manager
Phone: 208-334-8600
E-mail: tony.pirc@itd.idaho.gov

Any questions regarding the Idaho Transportation Department, Business & Support Management Solicitation Terms and Conditions must also be submitted in writing, by the deadline identified in this subsection. ITD will not consider proposed modifications to these requirements after the date and time set for receiving questions. Questions regarding these requirements must contain the following:

1. The rationale for the specific requirement being unacceptable to the party submitting the question (define the deficiency);
2. Recommended verbiage for ITD’s consideration that is consistent in content, context, and form with ITD’s requirement that is being questioned;

3. Explanation of how ITD’s acceptance of the recommended verbiage is fair and equitable to both ITD and to the party submitting the question.

Bids which condition the bid based upon ITD accepting other terms and conditions not found in the ITB, or which take exception to ITD’s terms and conditions, will be found non-responsive, and no further consideration of the bid will be given.

1.4 Submission Requirements

1.4.1 Required Bid Submission Items

Your bid submission must consist of the following:

1.4.1.1 Bid Schedule (Attachment A)
1.4.1.2 Affidavit: Drug Free Workplace Program (Attachment B)
1.4.1.3 Subcontractor Licensing – if applicable (Attachment C)
1.4.1.4 Signature Page (Attachment D)

1.4.2 Bid Submission Methods

Bids must be submitted manually (via U.S. Mail, courier/hand-delivery) in a sealed envelope/package. Do not fax or e-mail your bid. Your bid must be received at the location and by the date and time specified on the ITB Administrative Information Page. The official time, for bid closing purposes, is ITD’s time clock. Alternate bids will not be allowed.

1.4.2.1 Submission Method Requirements

Seal all required bid submission items in a single envelope or package (be certain to include an original hand-written signature in ink OR an electronic digital I.D. on the Signature Page) and label the outside of the package as follows:

Attn: Melinda Doan, Idaho Transportation Department
Bidder Name: (Company Name)
ITB Number: 19-302-03
ITB Title: Phase II – Site Work, Lowman Housing
ITB Closing Date: December 18, 2018

Bidders must provide one (1) original copy of their bid bid.

1.5 Compliance with

1.5.1 ITD Policy Compliance

The following ITD Policy Compliance applies to this contract when the Contractor is performing work at an ITD facility or when using ITD equipment or other property. These policies will remain in force for the duration of the contract:

5055 Harassment in the Workplace policy
5523 Alcohol and Drug-free Workplace policy
5510 Computer, E-Mail, and Internet Usage policy
5033 Workplace Violence Policy
These policies are and incorporated in this agreement. It is the Contractor’s responsibility to read, understand and comply with these policies; one hundred percent (100%) compliance is mandatory. Furthermore, Contractor is responsible for ensuring that all their employees and subcontractors adhere to these policies. ITD reserves the right to remove from its premises, at any time, any Contractor or his/her employee or subcontractor that fails to follow these policies. ITD also reserves the right to remove its property, at any time, from any Contractor or his/her employee or subcontractor that fails to follow these policies.

All Contractor’s employees and subcontractors are required to wear identification badges at all times while on the ITD’s premises. The Contractor and its employees or subcontractors are not employees of ITD, but ITD retains the right to control its own work place and the use of its property.

If a formal and written complaint is registered with the Contractor in respect to unsatisfactory work performance, the Contractor shall have 72 hours in which to respond in person to the complaint, to remedy the problem(s). Failure to respond in the prescribed time to the complaint or to remedy the problem may result in termination of the contract as provided in the Termination section.

If the district engineer is not satisfied with the results and remediation of the complaint, periodic and joint inspections with the Contractor may be required to discuss and point out contractors violations. Failure of the Contractor to attend these inspections may result in termination of the contract.

1.6 Award

Award will be made, all or none, to the responsive, responsible bidder with the lowest Total Cost, as provided on Attachment A, Bid Schedule.

1.7 Point(s) of Contact/Contract Administration

The contract Administrator(s) and Manager(s) contact information for the resulting contract(s) will be provided upon award of bid.

1.8 Pre-Bid Conference

All interested parties may attend the optional pre-bid conference, at their expense located at #5 Riverfront Drive, Lowman, Idaho 83637 on Tuesday, November 13, 2018 at 11:00 a.m. Mountain Time. Parties interested in attending this conference should notify (in writing) the ITB Lead no later than one (1) business day prior to the date of the pre-bid conference. The written request should specify the name and title of each person who will be attending. A maximum of three (3) persons for each party interested will be allowed to attend in-person.

Failure to attend the optional pre-bid conference will not relieve the bidder of meeting the requirements of this ITB.

2 SCOPE OF WORK

2.1 Scope

2. This item will consist of the construction of a new drain field, 2 septic tanks, sewer piping, water piping from well #2 to 3 housing units, 3 pressure tanks inside housing units, electric power to well #2 and to 3 housing units including heat cable on plumbing in crawl space and site grading as required and other required work. In accordance with these specifications the Contractor shall furnish and install all necessary parts and accessories required for complete installation and other items essential for the complete project.
2.2 **Worksite Cleanup**
The Contractor must keep work areas free of waste materials. Upon completion of work, all waste, tools, supplies, and materials must be removed from ITD’s premises. Any tools and supplies left onsite after work completion will be considered property of ITD.

2.3 **Work not noted, detailed, or specified**
All work required for complete installation or assembly shall be included in the Contractor’s bid. Where minor portions of required work are not noted, detailed, or specified, such work shall be done in accordance with proven construction practice or accepted industry standards at no additional cost to the owner. The contractor shall be held responsible for verification of existing job conditions prior to bid. No additional cost shall be awarded to the successful contractor (or their subcontractors) after bids have been submitted and contracts awarded for failure to verify existing field conditions. Discrepancies or questions arising between actual field conditions and contract documents must be submitted in accordance with Section 1.3, Inquiries.

2.4 **Location**
Project site is located off Highway 21 slightly North of Lowman at #5 Riverfront Drive, Lowman, ID 83637.

2.5 **Staging Location(s)**
Staging location(s) will be determined by the ITD Contract Manager prior to the start of each project.

2.6 **Safety**
The Contractor must have a comprehensive Safety Manual pertaining to the equipment, material, and process demonstrating capability of safely conducting the work specified in the above solicitation.

2.7 **Basis of Payment**
The Contractor must submit invoices to the ITD billing location provided below, for the quantity delivered and accepted. ITD will render payment for a properly executed invoice according to Idaho Code 67-2302 from the date of the invoice, for pay items accepted by ITD.

Invoices must include the following information:

- Contract Number (and name of project/product, if appropriate)
- Identification of Billing Period.
- Total amount billed for the billing period.
- Detailed description of services/products provided and associated # of hours/$ amounts, as appropriate.
- Name of authorized individual/contact information for Contractor

Invoices must be submitted to:

- HQAP@itd.idaho.gov
2.8 Contract Compliance

If a formal and written complaint is registered with the Contractor in respect to unsatisfactory work performance, the Contractor will have seventy-two (72) hours in which to respond in person to the complaint, to remedy the problem(s). Failure to respond in the prescribed time to the complaint or to remedy the problem may result in termination of the contract as provided in the Idaho Transportation Department, Business & Support Management Solicitation Terms and Conditions.

If ITD is not satisfied with the results and remediation of the complaint, periodic and joint inspections with the Contractor may be required to discuss and point out Contractors violations. Failure of the contractor to attend these inspections may result in termination of the contract.

3 GENERAL ARCHITECTURAL AND SPECIAL PROVISIONS

3.1 Subletting/Subcontracting

The Contractor cannot sublet, sell, transfer, assign, or otherwise dispose of the contract or any portion of the contract, or the right, title, or interest in the contract without the ITD’s written consent. If ITD consents to subletting a portion of the work, the Contractor must use its own organization to perform work amounting to at least thirty percent (30%) of the original contract amount.

If subcontracting is proposed, the bidder must complete Attachment , Subcontractor Licensing, giving the name, address, and Public Works Contractors License Number for any and all companies who will, in the event the bidder secures the contract, complete the plumbing, electrical, or HVAC work under the contract in accordance with Section 67-2310, Idaho Code.

Companies must possess an appropriate Idaho Public Works Contractors License issued by the State of Idaho Public Works Contractors State License Board covering the contract work classification in which they are named.

Note: Section 67-2310, Idaho Code, also states "No general contractor shall name any subcontractor in his bid

3.2 Guarantee

Excepting where certain portions of the work call for a longer period, all work shall be guaranteed for a minimum period of one year after the date of final acceptance; during the guarantee period, any repairs or replacements required because of defective workmanship or material shall be at the Contractor’s expense.

3.3 Manufacturer Warranties and Instruction Sheets

Three (3) copies of the manufacturer’s warranties, guarantees, instruction sheets, and parts list for all Contractors’ furnished materials shall be turned over to ITD upon completion of the project.

3.4 Temporary Utilities

The Contractor shall visit the site and determine what measure, if any, will need to be taken to provide for utilities for construction work, which may occur before the time that permanent services will be available.

The contractor shall make arrangements for and furnish at their own expense, all water, sanitary facilities and other utilities necessary for construction purposes. All utilities shall be at the Contractor’s expense until final acceptance.
If existing utilities and sanitary facilities are present at work site location, the Contractor may ask for permission to utilize these services if agency agrees.

3.5 Permits

Pursuant to Section 39-4103 Idaho Code, the Division of Building Safety is responsible for the issuance of building permits and building inspections for construction projects owned by the State of Idaho. This is separate from any required state electrical, plumbing, and mechanical or elevator permits. The contractor shall obtain and pay for all licenses and permits and shall pay fees and charges for connection to outside services to include, water, sewer and electricity and use of public or private property for storage of materials, etc. The Contractor shall comply, without additional expense to ITD, with all State, County and Municipal building ordinances and regulations insofar as the same are binding upon the State. ITD will reimburse the Contractor for utility hookup fees at invoice costs.

3.6 Codes

The Contractor, including subcontractors, shall submit their bid in accordance with plans and specifications. If plans and specifications do not comply with any codes having jurisdiction in that particular place or construction, the Contractor shall notify ITD prior to bidding in writing and faxed to the number stated in the bid document. If prior notification is not given, it shall be assumed that the Contractor’s base bid includes, to the best of their knowledge and experience, all work necessary to comply with such codes.

3.7 Protection

The Contractor shall, at all times, protect building from damage; remove and replace with new work any work damaged by failure to provide protection. Replacement of damaged work will be at no additional cost to ITD.

The Contractor shall provide and maintain dust protection, weather protection and heating as required for the protection of the work from the beginning of the work until final completion, acceptance, or occupancy. Methods and extent of protection and heating shall be subject to the Architect’s approval.

3.8 Prior Approval

The references made to materials equipment, appliances or fixtures in the plans or specifications, where manufacturers’ products or brand names are specified, are made to show standards for comparison only as to type, design character, or quality of the article desired, and are not for the purpose of restricting bidders to these products or brand names. The term “or equal” as used herein shall be understood to mean equal to that specified for fulfilling the intended requirements in the judgment of the Architect. THE BURDEN OF PROVING THE EQUILITY SHALL BE THE CONTRACTOR’S RESPONSIBILITY. The Architect’s decision shall be final. Shop drawings or manufacturer’s literature for the substitute item and for the specified item shall be submitted to support the Contractor’s request on all substitutions.

All requests for approval of change in design of function of materials specified must allow 14 days review time, after receipt of all necessary documents, by the Architect. Approval of submittals shall not relieve the Contractor from responsibility for deviations from the plans or specifications, unless they have, in writing, called the Architect’s attention to deviations at the time of submission, and obtained the Architect’s written approval. Approval of submittals does not relieve the Contractor from responsibility for errors in shop drawings or literature.
3.9 **Submittals**

A Minimum of one (1) electronic copy submittal is required on all products.

Submittals shall contain the Project name and the following information:

- Date of submission and dates of any previous submissions.
- The names of the contractor, sub-contractor and manufacturer.
- Contractors stamp, initialed or signed, certifying to review of submittal.
- Identification of any deviation from Plans and Specifications.
- Identify each submittal item by specification section, manufacturer, brand, trade name, number, size, rating, or whatever other date is necessary to properly identify and check materials and equipment. The words “as specified” are not sufficient identification.

The Contractor shall submit all required submittals within 30 days of contract signing. Authority to proceed will be given after submittals are approved by the Architect and returned to the Contractor and construction and material delivery schedules are established.

3.10 **As – Built Drawings**

The Contractor shall provide the Architect with three (3) complete sets of as-built drawings. As-built drawings shall provide detailed and accurate sizes, dimensions and locations of all work items covered under this contract. Contractor shall instruct the separate trades to keep accurate measurements and records of their installation, as the work proceeds. No measurement or payment will be made for as-built drawings, but the cost thereof shall be considered incidental to the items of work under this contract.

3.11 **Operation, Maintenance Instructions and Manuals**

The Contractor shall train ITD personnel in the general use and maintenance of all installed equipment and accessories. The Contractor shall provide three complete copies of “Operations and Maintenance” manuals for ITD use. The manuals will identify all parts of equipment and show complete wiring diagrams. The manuals will include copies of warranties for all items.

3.12 **Dimensions and Measurements**

The Contractor shall field verify all dimensions pertaining to the work and shall be responsible for the determination of all quantities of materials required for the work and for the accuracy of all dimensions of materials and items fabricated for this project. The Contractor shall not rely on the scale drawings in the project drawings for the determination of exact quantities or dimensions.

3.13 **Coordination and Control**

This work shall proceed in an effective sequence so as to eliminate unnecessary work stoppages at the building.

3.14 **Use – Tax**

It is not anticipated that the Contractor will utilize State-owned material on this project.

In the event that the Contractor does utilize State-owned material, the exercise of control over State-owned material by a Contractor who is improving real property (roadways, etc.) will incur the imposition of a use tax.

Bidders are advised to consult Section 63-3609, Idaho Code, and IDAPA 35, Title 01, Chapter 02, Sales Tax Administrative Rule 012, “Contractors Improving Real Property”, and Rule 013, “Road and Paving Contractors”, or contact the Idaho State Tax Commission for guidance. (Telephone No. (208) 334-7617)
3.15 **Superintendent**

The Contractor shall employ a competent Foreman and necessary assistants who shall be in attendance at the Project site during the progress of work. The Foreman shall be satisfactory to the Architect, and shall not be changed except with the consent of the Architect unless the Foreman proves to be unsatisfactory to the Contractor and ceases to be in their employ. Under this circumstance, the new Foreman shall also be satisfactory to the Architect. The Foreman shall represent the Contractor and all communications given to the Foreman shall be as binding as if given to the Contractor. Important communications will be confirmed in writing.

3.16 **ITD Use of Building**

ITD reserves the right to occupy and/or use existing buildings, including portions during the construction period and prior to final acceptance. Such occupancy and/or use shall not constitute acceptance of the Work or any part thereof. The contractor shall take special care to insure that no unnecessary disruptions or normal routines will occur at the project work site. Access to and egress from buildings, grounds, services areas, drives, and streets shall be maintained at all times. Temporary disruptions of building services, equipment, etc. shall be scheduled with ITD. Normal functions shall be restored as quickly as possible.

3.17 **Information Given Prior to Award**

Oral explanations, instructions and interpretations given to bidders prior to award of contract will not be binding. It is the Department's intent to provide all bidders equal opportunity to access and acquire all available pertinent information necessary to formulate a responsive bid. Any information, specifications, plans, data or interpretations which the Department discovers is lacking and may be important to all bidders, will be furnished to all bidders in the form of an addendum, the receipt of which shall be acknowledged.

3.18 **Performance**

Submission of a bid by any Contractor shall be accepted as prima facie evidence that they have satisfied themselves as to the nature and location of the work and all other matters, which can in any way affect the work or cost thereof under the contract. Any failure of the Contractor to acquaint them with all available information, including a physical survey of the site of the proposed work, shall not relieve them from successfully performing all the work required.

3.19 **Bidding Requirements and Conditions**

Sealed Bids will be received at the time and place stated on the Cover Page. Timely receipt of Bids will be determined by the date and time the Bid is received at the address specified. Hand delivery is encouraged to ensure timely receipt. **No Bid will be accepted after the time indicated.** All material that is submitted in accordance with this solicitation becomes the property of the State of Idaho and will not be returned.

The bidder shall submit their bid upon the forms furnished by the Department. All figures shall be written in blue ink or typed. Penciled entries will not be accepted. If entries are in pencil, the bid shall be considered irregular and the bid will be rejected.

The bid shall be signed with blue ink by the individual or agency authorized to sign and submit this bid for the bidder. The bid signature page must include the bidder name and address and the state and address in which the business is domiciled.
3.20 Irregular Bids

Bids will be considered non-responsive and shall be rejected for the following reasons:

1. If the Bid Form(s) are on a form other than that furnished by the State or if the form is altered or any part thereof is detached.
2. If there are unauthorized additions, conditional or alternate bids, omission of addenda, or irregularities of any kind, which tend to make the bid incomplete, indefinite, or ambiguous as to its meaning.
3. If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
4. If the Bid Schedule does not contain a unit price for each pay item listed except in the case of alternate pay items.
5. If the Bid Documents are not sealed, when received by the Department.
6. If the Signature Page is not signed in blue ink and returned with your bid.
7. If Addendums are not signed, in blue ink, and returned with the Bid Documents.
8. If the required Public Works License Number(s) is not inserted on the 'Signature Page'.
9. Bidder fails to submit the proper Bid Guaranty as outlined under Subsection 3.23.

3.21 Disqualification of Bidders

Any of the following reasons may be considered as being sufficient for the disqualification of a bidder and the rejection of their bid or bids:

1. More than one bid, for the same work from an individual, partnership or corporation under the same name or a different name.
2. Evidence of collusion among bidders. Participants in such collusion will receive no recognition as bidders for any future work of the State until any such participant shall have been reinstated as a qualified bidder.
3. Bidder, or its principals or affiliates, is disbarred, suspended, or ineligible from federal contracting; see Idaho Code § 67-5730 (2) (f).

3.22 Bid Guaranty (Five Percent Bid Bond)

No bid will be considered unless accompanied by a 5% Bid Bond of the character and in an amount not less than the amount indicated on the Bid.

Bid Bonds shall be submitted on the most current version of The American Institute of Architects (AIA) Document 310, signed by the bidder and their surety company. Power of Attorney for the person who executes the bond on behalf of the surety as Attorney-In-Fact must accompany the bid bond.

Guarantees submitted via any other obligation WILL NOT be considered and the bid will be rejected.

Please note: Bonding Surety must be registered and licensed with the Idaho Department of Insurance at the time of bid closing. Bid Guaranty will not be accepted if Surety is not registered and licensed in Idaho, and bid will be deemed non-responsive and rejected.
3.23 **Return of Bid Guaranty (Five Percent Bid Bond)**

Bid guaranties, except those of the two lowest responsive bidders, will be returned immediately following the opening and checking of the bids. The retained bid guaranty of the unsuccessful of the two lowest responsive bidders will be returned within 10 days following the award of contract and that of the successful bidder will be returned after satisfactory Surety bonds have been furnished and the contract has been executed.

3.24 **Surety Bond Requirements (Performance and Payment Bonds)**

The lowest responsive, responsible bidder shall furnish a performance bond and a payment bond each in the amount of the contract.

Performance and Payment Bonds shall be submitted on the most current version of The American Institute of Architects (AIA) Document 312, signed by the bidder and their surety company. Power of Attorney for the person who executes the bond on behalf of the surety as Attorney-In-Fact must accompany the bid bond.

Guarantees submitted via any other obligation **WILL NOT** be accepted.

Please note: Bonding Surety must be registered and licensed with the Idaho Department of Insurance. Performance and Payment bonds will not be accepted if Surety is not registered and licensed in Idaho, and contract will not be executed by the Department. If contractor fails to file acceptable bonds within 5 calendar days after the contract has been received by the bidder, this failure may be deemed just cause for the cancellation of the award of contract and the forfeiture of the proposal guaranty which shall become the property of the state, not as a penalty, but in liquidation of damages sustained.

3.25 **Consideration of Bid / Record of Public Bid Opening (ROPBO)**

After the bids are opened and read, they will be compared on the basis of the summation of the products of the approximate quantities shown in the bid schedule by the unit bid prices. The results of such comparisons will be available at [http://itd.idaho.gov/business/](http://itd.idaho.gov/business/) (click on the Solicitations – Non-Highway Projects tab). The right is reserved to reject any or all bids, to waive technicalities, to advertise for new bids, or to proceed to do the work otherwise, if, in the judgment of the Department, it is in the best interest of the State.

3.26 **Execution / Award of the Contract**

The award of contract, if it is awarded, will be made within 5 calendar days after the Intent to Award Notice letter has been mailed to the lowest responsive bidder whose bid complies with all requirements prescribed. However, the award may be deferred beyond 5 calendar days by mutual written agreement between the Department and the lowest responsive bidder.

The contract shall be signed by the lowest responsive responsible bidder and returned within 5 calendar days after the bidder has received the contract. If the contract is not executed by the State within 5 calendar days following receipt from the bidder of the signed contracts, the bidder shall have the right to withdraw their bid without penalty. No contract shall be considered as effective until it has been fully executed by all of the parties thereto.

3.27 **Failure to Execute Contract**

Failure to execute the contract, file acceptable bonds and submit acceptable evidence, if required by contract, of good faith efforts to obtain participation by disadvantaged businesses within 5 calendar days after the contract has been received by the bidder shall be just cause for the cancellation of the award of contract and the forfeiture of the proposal guaranty which shall become the property of the state, not as a penalty, but in
liquidation of damages sustained. Award may then be made to the next lowest responsible bidder or the work may be readvertised and constructed under contract or otherwise, as the state may decide.

3.28 Authority to Proceed

Authority to proceed will be given after the required submittals specified in the Special Provisions are received, approved by the Architect and returned to the Contractor and construction and material delivery schedules are established.

4 TERMS AND CONDITIONS

4.1 Contract Award

Contract Award will be ALL OR NONE based on the “TOTAL BID AMOUNT” on the Bid Schedule.

4.2 Liquidated Damages

The amount of Liquidated Damages for failure to complete the work within 30 calendar days will be $300.00 per day.

4.3 Payment Requirements

The Contractor will be paid in accordance with the bid schedule. Payments otherwise due may be withheld on account of substandard or defective work not remedied.

4.4 Changes

The Department reserves the right to revise the “Work Locations and Schedule” and to make other changes within the general Scope of Work as may be deemed necessary to best serve the interests of the Department. Changes in compensation, which may result from such revisions, shall be documented by formal Amendment to the contract and approved by the Contract Administrator.

4.5 Claims for Adjustment and Disputes

If the Contractor believes that additional compensation is due them for work or material not clearly covered in the contract, or not ordered as extra work, as defined herein, they shall prosecute their claim in the following manner.

Prior to doing the work on which they believe additional compensation is due them, the Contractor shall notify the District Engineer, in writing of their intent to file a claim. If such notification is not given, then the Contractor shall thereby waive their right to any claim for such additional compensation.

At a minimum, the detailed letter shall include a narration of events, citing of entitlement and a showing of the amount of compensation and/or adjustment of time believed due. Full documentation for all elements in the letter shall be included. The claim will be considered and a determination made. The District Engineer will notify the Contractor in writing of the decision.

The decision will be final and conclusive unless, within thirty (30) days from receipt of the District Engineer’s letter, the Contractor submits an appeal in writing to the Purchasing Agent. All pertinent information, references, arguments and data to support the claim shall be included. The Purchasing Agent will review the claim and the Contractor will be notified by mail. This decision will be final and conclusive.
In connection with any appeal proceeding under this subsection, the Contractor will be afforded an opportunity to be heard and offer evidence in support of their claim at any level of review. Pending final decision of a dispute hereunder the Contractor shall proceed diligently with performance of the contract.

4.6 Force Majeure

Neither party shall be liable or deemed to be in default for any Force Majeure delay in shipment or performance occasioned by unforeseeable causes beyond the control and without the fault or negligence of the parties, including, but not restricted to, acts of God or the public enemy, fires, floods, epidemics, quarantine, strikes, freight embargoes, or unusually severe weather, provided that in all cases the Contractor shall notify the State promptly in writing of any cause for delay and the State concurs that the delay was beyond the control and without the fault or negligence of the Contractor. The period for the performance shall be extended for a period equivalent to the period of the Force Majeure delay. Matters of the Contractor’s finances shall not be a Force Majeure.

4.7 Default and Termination of Contract

Should the Contractor neglect to prosecute the work properly, or fails to perform any provision of the contract, the Department, after seven (7) days from written notice to the Contractor, may without prejudice to any other remedy they may have, make good the deficiencies and may deduct the cost thereof from the payment then or thereafter due to the Contractor or, at its option, may terminate the contract and take possession of all materials, tools, fixtures and furnish the work by such means as the Department sees fit, and if the unpaid balance of the contract price exceeds the expense of finishing the work, such excess shall be paid to the Contractor, but if such expense exceeds such unpaid balance, the Contractor’s surety shall pay the difference to the Department.

4.8 Termination for Convenience of the State

The performance of work under this contract may be terminated by the state in accordance with this subsection in whole, or from time to time in part, whenever it shall be determined that such termination is in the best interest of the state. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective.

4.9 Appropriation by Legislature Required

The State is a government entity and this Agreement shall in no way or manner be construed so as to bind or obligate the State of Idaho beyond the term of any particular appropriation of funds by the State’s Legislature as may exist from time to time. The State reserves the right to terminate this Agreement in whole or in part (or any order placed under it) if, in its sole judgment, the Legislature of the State of Idaho fails, neglects, or refuses to appropriate sufficient funds as may be required for the State to continue such payments, or requires any return or “give-back” of funds required for the State to continue payments, or if the Executive Branch mandates any cuts or holdbacks in spending. All affected future rights and liabilities of the parties hereto shall thereupon cease within ten (10) calendar days after notice to the Contractor. It is understood and agreed that the State's payments herein provided for shall be paid from Idaho State Legislative appropriations.

4.10 Indemnification

The Contractor shall indemnify, save harmless, and defend regardless of outcome, the State from the expenses of and against all suits, actions, claims, or costs, expenses, and attorney fees that may be incurred because of any injuries or damages received or sustained by any person, persons, or property on account of the operations of the Contractor or their subcontractors; or on account of or in consequence of any neglect in
safeguarding the work; or through use of unacceptable materials in the work; or because of any act or omission, neglect, or misconduct of the Contractor or their subcontractors; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the Worker's Compensation Act or any other law, ordinance, order or decree.

4.11 Save Harmless

The Contractor shall exonerate, indemnify, and hold the Department harmless from and against and assume full responsibility for payment of all federal, state and local taxes or contributions imposed or required under unemployment insurance, social security, workman's compensation, and income tax laws with respect to the Contractor or the Contractor’s employees engaged in the performance of this Agreement.

The Contractor will maintain Worker’s Compensation Insurance as required by Idaho Code and will provide to the department a certificate of Idaho Worker’s Compensation Insurance issued by a surety licensed to write Idaho Worker’s Compensation in the State of Idaho, or an extraterritorial certificate approved by the Idaho Industrial Commission from a State that has a current reciprocity agreement with the Idaho Industrial Commission. Failure to provide a Certificate of Workman's Compensation Insurance may result in a price adjustment to cover any cost to the Department of providing the necessary workman's compensation insurance. The Department will not assume liability as an employer.

The Contractor shall protect, indemnify, and save the Department harmless from and against any damage, cost, or liability including reasonable attorney’s fees for any or all injuries to persons, property or claims for damages arising from any acts or omissions of the Contractor, its employees, or subcontractors.

It is agreed by and between the parties hereto that in no event shall any official, officer, employee or agent of the Department be in any way personally liable or responsible for any covenant or agreement herein contained whether expressed or implied, nor for any statement, representation or warranty made herein or in any connection with this Agreement.

4.12 Insurance requirements

Within fifteen (5) calendar days of notification of award (or such other time as designated by the Purchasing Activity), the apparent successful bidder must provide certificates of insurance required herein and must maintain the insurance during the life of the Contract. There are no provisions for exceptions to this requirement. Failure to provide the certificates of insurance within the fifteen (5) calendar day period may be cause for your bid to be declared non-responsive or for your contract to be cancelled.

The Contractor must carry liability and property damage insurance that will protect it and the State of Idaho from claims for damages for bodily injury, including accidental death, as well as for claims for property damages, which may arise from operations under the Contract whether such operations be by themselves or by anyone directly or indirectly employed by either of them.

The Contractor cannot commence work under the Contract until it obtains all insurance required under this provision and furnishes a certificate or other form showing proof of current coverage to the State. All insurance policies and certificates must be signed copies. After work commences, the Contractor must keep in force all required insurance until the contract is terminated.

4.12.1 Commercial General and Umbrella Liability Insurance.

Contractor must maintain Commercial General Liability (CGL) and, if necessary, Commercial Umbrella insurance with a limit of not less than $2,000,000 each occurrence. If such CGL insurance contains a general aggregate limit, it must apply separately to this Contract. For Comprehensive or Commercial
General Liability insurance policy containing an aggregate limit, ensure a limit of at least $4,000,000. The above limits may be met by policies having limits such as $1,000,000 per occurrence, $2,000,000 aggregate plus an umbrella policy of $2,000,000.

CGL insurance must be written on ISO occurrence form CG 00 01 (or a substitute form providing equivalent coverage) and must cover liability arising from premises, operations, independent contractors, products-completed operations, personal and advertising injury, and liability assumed under an insured contract (including the tort liability of another assumed in a business contract).


The Contractor must maintain Commercial Automobile Liability and, if necessary, Commercial Umbrella Liability insurance with a limit of not less than $2,000,000 each accident. Such insurance must cover liability arising out of any auto (including owned, hired, and non-owned autos).

Bidders may request a waiver from providing Commercial Automobile and Commercial Umbrella Liability Insurance in its bid if the bidder will not use any owned, hired or non-owned vehicles to conduct business under the contract, if it is awarded the contract, and the State of Idaho will consider the request. If the bidder submits a request to waive the provision of Commercial Automobile and Commercial Umbrella Liability Insurance after the due date and time for receipt of bids or proposals, the State of Idaho may not consider the request.

4.12.3 Workers Compensation Insurance and Employer's Liability.

The Contractor must maintain workers compensation and employer's liability. The employer's liability must have limits not less than $500,000 each accident for bodily insurance by accident or $500,000 each employee for bodily injury by disease.

The Contractor must provide either a certificate of workers compensation insurance issued by a surety licensed to write workers compensation insurance in the State of Idaho, as evidence that the Contractor has in effect a current Idaho workers compensation insurance policy, or an extraterritorial certificate approved by the Idaho Industrial Commission from a state that has a current reciprocity agreement with the Idaho Industrial Commission.

4.12.4 State of Idaho as Additional Insured.

The liability insurance coverage required for performance of the Contract must include the State of Idaho, the (agency) and its divisions, officers and employees as additional insured, but only with respect to the Contractor's activities to be performed under this Contract.

The Contractor must provide proof of the State of Idaho, the (agency) and its divisions, officers and employees being additional insured by providing endorsements to the liability insurance policies showing the State of Idaho, the (agency) and its divisions, officers and employees as additional insured. The endorsements must also show the policy numbers and the policy effective dates.

If a liability insurance policy provides for automatically endorsing additional insured when required by contract, then, in that case, the Contractor must provide proof of the State of Idaho, the (agency) and its divisions, officers and employees being additional insured by providing copies of the policy pages that clearly identify the blanket endorsement.
4.12.5 Notice of Cancellation or Change.

The Contractor must ensure that should any of the above described policies be cancelled before the expiration date thereof, or if there is a material change, potential exhaustion of aggregate limits or intent not to renew insurance coverage(s), that written notice will be delivered to the ITD in accordance with the policy provisions.

4.12.6 Failure to Comply.

The Contractor must further ensure that all policies of insurance are endorsed to read that any failure to comply with the reporting provisions of this insurance, except for the potential exhaustion of aggregate limits, will not affect the coverage(s) provided to the State of Idaho, and its divisions, officers and employees.

4.12.7 Acceptable Insurers and Deductibles.

Insurance coverage required under the Contract must be obtained from insurers rated A-VII or better in the latest Bests Rating Guide and in good standing and authorized to transact business in Idaho. The Contractor must be financially responsible for all deductibles, self-insured retention’s and/or self-insurance included hereunder. The coverage provided by such policy will be primary to any coverage of the State on or related to the contract and must provide that the insurance afforded applies separately to each insured against whom a claim is made, except with respect to the limitation of liability.

4.12.8 Waiver of Subrogation.

All policies must contain waivers of subrogation. The Contractor waives all rights against the State and its officers, employees, and agents for recovery of damages to the extent these damages are covered by the required policies. Policies may contain deductibles but such deductibles will not be deducted from any damages due to the State.
ATTACHMENT A- BID SCHEDULE

ITB 19-302-03, Phase II – Site Work, Lowman Housing

Company Name of Bidder: ________________________________________________________

Contact Name/Phone: ___________________________________________________________

Contact E-mail: ________________________________________________________________

The bid item shall be filled in completely by the bidder in the bid schedule, by indicating total dollars and cents under the Total Cost Bid. All costs, including hourly rates will be included here and will be fully burdened to include; but not limited to, wages, transportation, lodging, overhead, and per-diem.

All of the items shown or noted on the plans or in these specifications, which are not specifically a bid item, are considered incidental items. The cost of furnishing and installing all incidental items will not be paid for separately, but shall be included in the contract unit prices as bid, unless otherwise noted.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>UNIT PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Provide Septic system, drain field, water lines, trenching and backfill, new well pump at existing well, power as shown in Phase II drawings.</td>
<td>$___________</td>
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</tbody>
</table>

<table>
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<tr>
<th>TOTAL COST</th>
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<td>$__________</td>
<td></td>
</tr>
</tbody>
</table>

THIS ATTACHMENT MUST BE COMPLETED AND RETURNED WITH RESPONSE
ATTACHMENT B- AFFIDAVIT: DRUG FREE WORKPLACE PROGRAM

ITB19-302-03 Phase II – Site Work, Lowman Housing

STATE OF __________________________

COUNTY OF ________________________

The undersigned being duly sworn upon oath deposes and says that _____________________________

(Contractor Name)

complies with the provisions of Section 72-1717 Idaho Code (Drug Free Workplace program); that

_____________________________ provides a drug-free workplace program that complies with the

(Contractor Name)

provisions of Idaho Code, Title 72, Chapter 17 and will maintain such program throughout the life this contract

and that __________________________ will subcontract work only to

(Contractor Name)

subcontractors meeting the requirements of Idaho Code, section 72-1717(1)(a).

_____________________________________

Name of Contractor

_____________________________________

Address

_____________________________________

City and State

By: ________________________________

(Signature)

Subscribed and sworn to before me this __________ day of _____________, in the year __________.

Commission expires: ________________

_____________________________________

NOTARY PUBLIC, residing at

_____________________________________

_____________________________________

THIS ATTACHMENT MUST BE COMPLETED AND RETURNED WITH RESPONSE
ATTACHMENT C - SUBCONTRACTOR LICENSING

ITB19-302-03 Phase II – Site Work, Lowman Housing

Provide the names, addresses, public works contractor license numbers, and contract amounts of the Contractor or Subcontractor(s) who will do the plumbing, electrical, or HVAC work under the contract.

A. **Plumbing work by:** __N/A______________________________ residing at: ________________, whose Idaho Public Works Contractors License No. is: ____________________ , whose State Plumbing Bureau License No. is: _________________. Amount: $______________

B. **Electrical work by:** __N/A______________________________ residing at: ________________, whose Idaho Public Works Contractors License No. is: ____________________ , whose State Electrical Bureau License No. is: _________________. Amount: $______________

C. **HVAC work by:** __N/A______________________________ residing at: ________________, whose Idaho Public Works Contractors License No. is: ____________________ , whose HVAC License No. is: _________________. Amount: $______________

**THIS ATTACHMENT MUST BE COMPLETED AND RETURNED WITH RESPONSE IF SUBCONTRACTING**
ATTACHMENT D- SIGNATURE PAGE

Idaho Transportation Department

ATTN: Melinda Doan
3311 W State Street
Boise, ID 83707-1129

SIGNATURE PAGE for Use with a Submitted ITB Response

Bids and pricing information must be typewritten or handwritten in ink. Originals and copies of the bid must be submitted in accordance with the solicitation documents. Submitted bids must include this signature page with the ORIGINAL signature (ink or electronic digital I.D.) of an individual authorized to bind of the submitting bidder.

NO LIABILITY WILL BE ASSUMED BY THE IDAHO TRANSPORTATION DEPARTMENT FOR A BIDDER’S FAILURE TO OBTAIN THE TERMS AND CONDITIONS AND ANY PROPERLY ISSUED SOLICITATION ADDENDUMS IN A TIMELY MANNER FOR USE IN THE BIDDER’S RESPONSE TO THIS SOLICITATION OR ANY OTHER FAILURE BY THE BIDDER TO CONSIDER THE TERMS, CONDITIONS, AND ANY ADDENDUMS IN THE BIDDER’S RESPONSE TO THE SOLICITATION.

Send your sealed bid package to:  Idaho Transportation Department
ATTN: Melinda Doan
PO Box 7129
Boise, Idaho 83707-1129

OR
FedEx, UPS, or other Couriers:  Idaho Transportation Department
ATTN: Melinda Doan
3311 W State Street
Boise, ID 83707-1129

This ITB or IBR response is submitted in accordance with all documents and provisions of the specified Bid Number and Title detailed below. By my signature below I accept the terms, conditions, and requirements contained in the solicitation in effect at the time this ITB or IBR was issued, as incorporated by reference into this solicitation. As the undersigned I certify I am authorized to sign and submit this response for the named bidder. I further acknowledge I am responsible for reviewing and acknowledging any addendums that have been issued for this solicitation.

Bid Number: ITB 19-302-03  Bid Title: Phase II – Site Work, Lowman Housing

Bidder (Company Name): __________________________________________________________________________________
ADDRESS: _______________________________________________________________________________________________
CITY, ST, ZIP: ____________________________________________________________________________________________
PHONE: ________________________ FAX: _________________________ EMAIL: ____________________________________
PUBLIC WORKS LICENSE NO:___________________________           FEIN:______________________________________

THIS SIGNATURE PAGE MUST BE SIGNED WITH AN ORIGINAL HANDWRITTEN SIGNATURE (PREFERABLY IN BLUE INK) OR AN ELECTRONIC DIGITAL I.D., AND RETURNED WITH YOUR BID FOR YOUR BID TO BE CONSIDERED.

_________________________________________________  _____________________________________
Original Signature (in ink or electronic digital I.D.)    Date

_________________________________________________  _____________________________________
Printed Name        Title
GENERAL NOTES:
1. B&M: ALL BUILDING AND MODULAR BUILDING WIRING SHOWN FROM HOUSE TO TURN¬
   KEYED NOTES:
1. SYMBOL S Shown FOR NOTE CALLOUT.
2. GROUND PER NEC
3. SYMBOL USED FOR NOTE CALLOUT.
4. MECHANICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL WORK THAT IS REQUIRED BY
   PRIOR TO ROUGH-IN. REFER TO AND COORDINATE WITH ARCHITECTURAL,
5. DEVICE LOCATIONS WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DIVISIONS
6. ELECTRICAL CONTRACTOR SHALL COORDINATE ALL ELECTRICAL EQUIPMENT AND
7. LEGEND FOR THE DEFAULT OUTLET HEIGHT WHEN NOT INDICATED ON ELEVATIONS OR
8. REFER TO ARCHITECTURAL ELEVATIONS FOR OUTLET HEIGHT WHERE THE SPECIFIC
9. OUTLET HEIGHT IS NOT INDICATED ON THIS SHEET. REFER TO THE ELECTRICAL
10. THE CONTRACTOR.
11. THESE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE; THEREFORE, THE
12. INFORMATION PRIOR TO BEGINNING WORK. REFER TO THE ELECTRICAL SITE PLAN AND
13. INSTALLATION. ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH
14. INSTALL YELLOW PLASTIC/PVC SLEEVE PROTECTION ON GUY WIRE TO PREVENT
15. INJURIES. ELECTRICAL CONTRACTOR SHALL DIRECT BURY NEW WOOD POLE AS
16. INSTALL NEW WELL PUMP PANEL ON STRUT RACK SHOWN. REFER TO
17. FURNISH AND INSTALL ALL REQUIRED POWER CONNECTIONS, END
18. FOR ADDITIONAL INFORMATION.
19. FURNISH AND INSTALL CONDUIT AND CONDUCTORS NOTED FOR CONNECTION TO
20. FURNISH AND INSTALL 120/240 VOLT, SINGLE PHASE METER PACK WITH TENANT
21. FURNISH AND INSTALL STRUT RACK FOR MOUNTING ELECTRICAL EQUIPMENT SHOWN.
22. REFER TO THE ELECTRICAL SITE PLAN FOR LOCATION AND ADDITIONAL INFORMATION.
23. FURNISH AND INSTALL RAYCHEM PIPE FREEZE PROTECTION HEAT CABLE, 5XL1 OR
24. REFER TO THE ELECTRICAL SITE PLAN FOR ADDITIONAL INFORMATION.
25. FURNISH AND INSTALL NEW CERTIFIED WOOD POLE PER IDAHO POWER COMPANY'S
26. FOR A COMPLETE AND FUNCTIONING SYSTEM.
27. FOR LENGTHS AND ADDITIONAL INFORMATION. COORDINATE WITH THE ARCHITECT
28. PANELBOARD DIRECTORY.
29. MODULAR BUILDING PANELBOARD PRIOR TO BEGINNING WORK. UPDATE
30. MODULAR BUILDING PANELBOARD. FURNISH AND INSTALL (1) 20A, SINGLE POLE, GFEP
31. ROUTE 3/4"C-2#12,1#12G FOR PIPE FREEZE PROTECTION HEATING CABLES TO
32. COPPER CONDUCTORS FROM THE METER PACK UP WOOD POLE TO WEATHERHEADS
33. STANDARDS. WOOD POLE SHALL BE MINIMUM 35'-0" AS DIRECTED BY IDAHO POWER
34. OVERHEAD UTILITY CONDUCTORS TO WEATHERHEADS BY IDAHO POWER COMPANY.
35. REFER TO THE ELECTRICAL PLAN ON THIS SHEET
36. THE PANEL SCHEDULE ON THIS SHEET FOR ADDITIONAL INFORMATION.
37. THE ELECTRICAL SITE PLAN FOR ADDITIONAL INFORMATION.
38. THE INCOMING COLD WATER LINE AND OUTGOING WASTE LINE AS REQUIRED. FURNISH
39. THE FLEETWOOD DRAWINGS. INSTALL HEAT CABLE TO BELOW FROST LINE ON
40. REFER TO THE FLEEWOOD HOMES WASTE LINE AND COLD WATER PIPING DRAWINGS
41. FOR LENGTHS AND ADDITIONAL INFORMATION. COORDINATE WITH THE ARCHITECT
42. APPROVED EQUAL ON THE MODULAR BUILDING'S EXPOSED WASTE LINE AND EXPOSED
43. AND INSTALLED BY MODULAR BUILDING CONTRACTOR.
44. FURNISH AND INSTALL GROUNDING COIL AND GROUNDING ON NEW WOOD
45. THE ELECTRICAL PLAN FOR ADDITIONAL INFORMATION.
46. REFER TO THE ELECTRICAL PLAN FOR ADDITIONAL INFORMATION.
47. REFER TO THE ELECTRICAL PLAN FOR ADDITIONAL INFORMATION.
48. REFER TO THE ELECTRICAL PLAN FOR ADDITIONAL INFORMATION.
SPECIFICATIONS

PHASE II: SITE WORK
LOWMAN HOUSING
Project #19-302-03
for
Idaho Transportation Department
P.O. Box 7129
Boise, Idaho  83707

Owner:
Idaho Transportation Department
P.O. Box 7129
Boise, Idaho  83707

Architect:
Hutchison Smith Architects
270 N. 27th St., Suite A
Boise, ID  83702

Owner:
Idaho Transportation Department
P.O. Box 7129
Boise, Idaho  83707

HSA #18.113
SPECIFICATIONS

Phase II Site Work Lowman Housing

For

Idaho Transportation Department

P.O. Box 7129
Boise, Idaho 83707

DATE: December, 2018

ARCHITECT
Hutchison Smith Architects
270 N. 27th, Suite 200
Boise, ID 83702
Contact: Don Hutchison
Tel: (208) 338-1212

CIVIL ENGINEER
WH Pacific
2141 W. Airport Way #104
Boise, ID 83705
Contact: Matt Munger
Tel: (208) 342-5400

MECHANICAL ENGINEER
Musgrove Engineering, Inc.
234 S. Whisperwood Way
Boise, Idaho 83709
Contact: Bill Carter
Tel: (208) 384-0585

ELECTRICAL ENGINEER
Musgrove Engineering, Inc.
234 S. Whisperwood Way
Boise, Idaho 83709
Contact: Kurt Lechtenberg
Tel: (208) 384-0585
# TABLE OF CONTENTS

**DIVISION 1 - GENERAL REQUIREMENTS**  
Foundation Investigation Report  
01100 Summary  
01250 Contract Modification Procedures  
01290 Payment Procedures  
01310 Project Management and Coordination  
01320 Construction Progress Documentation  
01330 Submittal Procedures  
01500 Temporary Facilities and Controls  
01635 Substitution Procedures  
01770 Closeout Procedures  
01781 Project Record Documents  
01782 Operation and Maintenance Data

**DIVISION 3 – CONCRETE**  
03300 Cast-In-Place Concrete

**DIVISION 4 – MASONRY (NOT USED)**
**DIVISION 5 – METAL (NOT USED)**
**DIVISION 6 - WOOD & PLASTIC (NOT USED)**
**DIVISION 7 - THERMAL & MOISTURE PROTECTION (NOT USED)**
**DIVISION 8 - DOORS AND WINDOWS (NOT USED)**
**DIVISION 9 – FINISHES (NOT USED)**
**DIVISION 10 – SPECIALTIES (NOT USED)**
**DIVISION 11 – EQUIPMENT (NOT USED)**
**DIVISION 12 – FURNISHING (NOT USED)**
**DIVISION 13 - SPECIAL CONSTRUCTION (NOT USED)**
**DIVISION 14 - CONVEYING SYSTEM (NOT USED)**
**DIVISION 15 – MECHANICAL (NOT USED)**
**DIVISION 16 – ELECTRICAL (NOT USED)**

**DIVISION 31 – EARTHWORK**  
311000 Site Clearing  
312000 Earth Moving

**DIVISION 32 – UTILITIES (NOT USED)**

**INDEX OF DRAWINGS**

**GENERAL**  
A0.0 Cover Sheet

**ARCHITECTURAL**  
A1.0  Architectural Site Plan  
A1.1  Partial Architectural Site Plan

**STRUCTURAL**  
S1.0  Structural Design Notes, Structural Notes, Foundation Plan, Section and Details

END OF TABLE OF CONTENTS
Geotechnical Engineering Report

of

ITD Housing

5 River Front Road

Lowman, ID

Prepared for:

Hutchison Smith Architects (HSA)

270 North 27th Street, Suite A

Boise, ID 83702

MTI File Number B181428g
Mr. Don Hutchison  
Hutchison Smith Architects (HSA)  
270 North 27th Street, Suite A  
Boise, ID 83702  
208-338-1212

Re: Geotechnical Engineering Report  
ITD Housing  
5 River Front Road  
Lowman, ID

Dear Mr. Hutchison:

In compliance with your instructions, MTI has conducted a soils exploration and foundation evaluation for the above referenced development. Fieldwork for this investigation was conducted on 24 September 2018. Data have been analyzed to evaluate pertinent geotechnical conditions. Results of this investigation, together with our recommendations, are to be found in the following report. We have provided a PDF copy for your review and distribution.

Often, questions arise concerning soil conditions because of design and construction details that occur on a project. MTI would be pleased to continue our role as geotechnical engineers during project implementation. Additionally, MTI can provide materials testing and special inspection services during construction of this project. If you will advise us of the appropriate time to discuss these engineering services, we will meet with you at your convenience.

MTI appreciates this opportunity to be of service to you and looks forward to working with you in the future. If you have questions, please call (208) 376-4748.

Respectfully Submitted,

Materials Testing & Inspection

Maren Tanberg, E.I.T.  
Staff Engineer

Reviewed by: Monica Sacullés, P.E.  
Senior Geotechnical Engineer

cc: Matt Munger, WH Pacific (PDF Copy); Joe Presher, HSA (PDF Copy)
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>Project Description</td>
<td>3</td>
</tr>
<tr>
<td>Authorization</td>
<td>3</td>
</tr>
<tr>
<td>Purpose</td>
<td>3</td>
</tr>
<tr>
<td>Scope of Investigation</td>
<td>3</td>
</tr>
<tr>
<td>Warranty and Limiting Conditions</td>
<td>4</td>
</tr>
<tr>
<td>SITE DESCRIPTION</td>
<td>5</td>
</tr>
<tr>
<td>Site Access</td>
<td>5</td>
</tr>
<tr>
<td>Regional Geology</td>
<td>5</td>
</tr>
<tr>
<td>General Site Characteristics</td>
<td>5</td>
</tr>
<tr>
<td>Regional Site Climatology and Geochemistry</td>
<td>6</td>
</tr>
<tr>
<td>SEISMIC SITE EVALUATION</td>
<td>6</td>
</tr>
<tr>
<td>Geoseismic Setting</td>
<td>6</td>
</tr>
<tr>
<td>Seismic Design Parameter Values</td>
<td>6</td>
</tr>
<tr>
<td>SOILS EXPLORATION</td>
<td>8</td>
</tr>
<tr>
<td>Exploration and Sampling Procedures</td>
<td>8</td>
</tr>
<tr>
<td>Laboratory Testing Program</td>
<td>8</td>
</tr>
<tr>
<td>Soil and Sediment Profile</td>
<td>8</td>
</tr>
<tr>
<td>Volatile Organic Scan</td>
<td>9</td>
</tr>
<tr>
<td>SITE HYDROLOGY</td>
<td>9</td>
</tr>
<tr>
<td>Groundwater</td>
<td>9</td>
</tr>
<tr>
<td>Soil Infiltration Rates</td>
<td>9</td>
</tr>
<tr>
<td>FOUNDATION AND SLAB DISCUSSION AND RECOMMENDATIONS</td>
<td>10</td>
</tr>
<tr>
<td>Foundation Design Recommendations</td>
<td>10</td>
</tr>
<tr>
<td>Floor Slab-on-Grade</td>
<td>11</td>
</tr>
<tr>
<td>CONSTRUCTION CONSIDERATIONS</td>
<td>11</td>
</tr>
<tr>
<td>Earthwork</td>
<td>11</td>
</tr>
<tr>
<td>Dry Weather</td>
<td>12</td>
</tr>
<tr>
<td>Wet Weather</td>
<td>12</td>
</tr>
<tr>
<td>Frozen Subgrade Soils</td>
<td>12</td>
</tr>
<tr>
<td>Structural Fill</td>
<td>12</td>
</tr>
<tr>
<td>Backfill of Walls</td>
<td>13</td>
</tr>
<tr>
<td>Excavations</td>
<td>14</td>
</tr>
<tr>
<td>Groundwater Control</td>
<td>14</td>
</tr>
<tr>
<td>GENERAL COMMENTS</td>
<td>14</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>15</td>
</tr>
<tr>
<td>APPENDICES</td>
<td>16</td>
</tr>
<tr>
<td>Acronym List</td>
<td>16</td>
</tr>
<tr>
<td>Geotechnical General Notes</td>
<td>17</td>
</tr>
<tr>
<td>Geotechnical Investigation Test Pit Log</td>
<td>18</td>
</tr>
<tr>
<td>Plate 1: Vicinity Map</td>
<td>20</td>
</tr>
<tr>
<td>Plate 2: Site Map</td>
<td>21</td>
</tr>
</tbody>
</table>
INTRODUCTION

This report presents results of a geotechnical investigation and analysis in support of data utilized in design of structures as defined in the 2015 International Building Code (IBC). Information in support of groundwater and stormwater issues pertinent to the practice of Civil Engineering is included. Observations and recommendations relevant to the earthwork phase of the project are also presented. Revisions in plans or drawings for the proposed structures from those enumerated in this report should be brought to the attention of the soils engineer to determine whether changes in the provided recommendations are required. Deviations from noted subsurface conditions, if encountered during construction, should also be brought to the attention of the soils engineer.

Project Description

The proposed development is in the central portion of the City of Lowman, Boise County, ID, and occupies a portion of the NW¼NE¼ Section 34, Township 9 North, Range 7 East, Boise Meridian. This project will consist of construction of 3 modular houses with associated carports and a new septic system. Total settlements are limited to 1 inch. Loads of up to 4,000 pounds per lineal foot for wall footings, and column loads of up to 50,000 pounds were assumed for settlement calculations. Retaining walls are not anticipated as part of the project. MTI has not been informed of the proposed grading plan.

Authorization

Authorization to perform this exploration and analysis was given in the form of a written authorization to proceed from Mr. Don Hutchison of Hutchison Smith Architects (HSA) to Casey Heck of Materials Testing and Inspection (MTI), on 18 September 2018. Said authorization is subject to terms, conditions, and limitations described in the Professional Services Contract entered into between Hutchison Smith Architects (HSA) and MTI. Our scope of services for the proposed development has been provided in our proposal dated 23 August 2018 and repeated below.

Purpose

The purpose of this Geotechnical Engineering Report is to determine various soil profile components and their engineering characteristics for use by either design engineers or architects in:

- Preparing or verifying suitability of foundation design and placement
- Preparing site drainage designs
- Indicating issues pertaining to earthwork construction

Scope of Investigation

The scope of this investigation included review of geologic literature and existing available geotechnical studies of the area, visual site reconnaissance of the immediate site, subsurface exploration of the site, field and laboratory testing of materials collected, and engineering analysis and evaluation of foundation materials. Our scope of work did not include pavement recommendations.
Warranty and Limiting Conditions

MTI warrants that findings and conclusions contained herein have been formulated in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology only for the site and project described in this report. These engineering methods have been developed to provide the client with information regarding apparent or potential engineering conditions relating to the site within the scope cited above and are necessarily limited to conditions observed at the time of the site visit and research. Field observations and research reported herein are considered sufficient in detail and scope to form a reasonable basis for the purposes cited above.

Limitations
Test pit 1 was limited because of a pipe encountered at roughly 4 feet bgs. In test pit 2, depth was limited because of large boulders impeding excavation.

Exclusive Use
This report was prepared for exclusive use of the property owner(s), at the time of the report, and their retained design consultants (“Client”). Conclusions and recommendations presented in this report are based on the agreed-upon scope of work outlined in this report together with the Contract for Professional Services between the Client and Materials Testing and Inspection (“Consultant”). Use or misuse of this report, or reliance upon findings hereof, by parties other than the Client is at their own risk. Neither Client nor Consultant make representation of warranty to such other parties as to accuracy or completeness of this report or suitability of its use by such other parties for purposes whatsoever, known or unknown, to Client or Consultant. Neither Client nor Consultant shall have liability to indemnify or hold harmless third parties for losses incurred by actual or purported use or misuse of this report. No other warranties are implied or expressed.

Report Recommendations are Limited and Subject to Misinterpretation
There is a distinct possibility that conditions may exist that could not be identified within the scope of the investigation or that were not apparent during our site investigation. Findings of this report are limited to data collected from noted explorations advanced and do not account for unidentified fill zones, unsuitable soil types or conditions, and variability in soil moisture and groundwater conditions. To avoid possible misinterpretations of findings, conclusions, and implications of this report, MTI should be retained to explain the report contents to other design professionals as well as construction professionals.

Since actual subsurface conditions on the site can only be verified by earthwork, note that construction recommendations are based on general assumptions from selective observations and selective field exploratory sampling. Upon commencement of construction, such conditions may be identified that require corrective actions, and these required corrective actions may impact the project budget. Therefore, construction recommendations in this report should be considered preliminary, and MTI should be retained to observe actual subsurface conditions during earthwork construction activities to provide additional construction recommendations as needed.

Since geotechnical reports are subject to misinterpretation, do not separate the soil logs from the report. Rather, provide a copy of, or authorize for their use, the complete report to other design professionals or contractors.
Locations of exploratory sites referenced within this report should be considered approximate locations only. For more accurate locations, services of a professional land surveyor are recommended.

This report is also limited to information available at the time it was prepared. In the event additional information is provided to MTI following publication of our report, it will be forwarded to the client for evaluation in the form received.

**Environmental Concerns**
Comments in this report concerning either onsite conditions or observations, including soil appearances and odors, are provided as general information. These comments are not intended to describe, quantify, or evaluate environmental concerns or situations. Since personnel, skills, procedures, standards, and equipment differ, a geotechnical investigation report is not intended to substitute for a geoenvironmental investigation or a Phase II/III Environmental Site Assessment. If environmental services are needed, MTI can provide, via a separate contract, those personnel who are trained to investigate and delineate soil and water contamination.

**SITE DESCRIPTION**

**Site Access**

Access to the site may be gained via Highway 21. From Idaho City, drive northeast and north on Highway 21 approximately 33.6 miles to its intersection with River Front Road. From this intersection, proceed south 275 feet. The site occupies the flat area south of the Idaho Transportation Department (ITD) building. Presently the site exists a parking area and residential area for the ITD building. The location is depicted on site map plates included in the *Appendix*.

**Regional Geology**

The project site is located within the central portion of the Idaho Batholith. The Idaho Batholith covers approximately 15,400 square miles in central Idaho and is composed of granitic plutons that were intruded during the Late Cretaceous (75 to 100 million years ago). Since the emplacement of these plutons, uplift and fluvial erosion has dominated the topography of the region. The city of Lowman is located at the confluence of the south fork of the Payette River and Clear Creek. Sediments in the area are derived from granitic rocks of the batholith and are generally composed of alluvial sands and gravels along with relatively immature colluvium deposits.

**General Site Characteristics**

This proposed development consists of approximately 1.4 acres of relatively flat terrain. The project site is largely a gravel parking lot with three snowsheds. The central and eastern snowsheds cover manufactured homes that are used by ITD workers. The western snowshed shelters a mobile trailer. East of the trailer is a small copse of trees. Two ITD warehouses are located to the north of the existing residences. East of the warehouses is stockpiled fill materials. A fence surrounds the parking and storage areas of the ITD facilities. Throughout the majority of the site, surficial materials consist of sandy gravel fill. Vegetation primarily consists of mature trees and other native grass varieties typical of arid to semi-arid environments.
Regional drainage is south toward the Payette River. Stormwater drainage for the site is achieved by percolation through surficial soils. The site is situated so that it is unlikely that it will receive any stormwater drainage from off-site sources. Stormwater drainage collection and retention systems are not in place on the project site and do not currently exist within the vicinity of the project site.

**Regional Site Climatology and Geochemistry**

According to the Western Regional Climate Center, the average precipitation for west central Idaho mountain valleys is on the order of 18 to 37 inches per year, with an annual snowfall of approximately 137 inches with an annual high of 242 inches. The monthly mean temperatures range from 22º F to 62º F with daily extremes ranging from -35º F to 100º F. The annual average wind speed is approximately 4 miles per hour from the northwest. Soils and sediments in the area are primarily derived from granitic materials and exhibit low electro-chemical potential for corrosion of metals or concretes. Surface waters, groundwaters, and soils in the region typically have pH levels ranging from 6.4 to 7.8.

**SEISMIC SITE EVALUATION**

**Geoseismic Setting**

Soils on site are classed as Site Class D in accordance with Chapter 20 of the American Society of Civil Engineers (ASCE) publication ASCE/SEI 7-10. Structures constructed on this site should be designed per IBC requirements for such a seismic classification. Our investigation did not reveal hazards resulting from potential earthquake motions including: slope instability, liquefaction, and surface rupture caused by faulting or lateral spreading. Incidence and anticipated acceleration of seismic activity in the area is low.

**Seismic Design Parameter Values**

The United States Geological Survey National Seismic Hazard Maps (2008), includes a peak ground acceleration map. The map for 2% probability of exceedance in 50 years in the Western United States in standard gravity (g) indicates that a peak ground acceleration of 0.363 is appropriate for the project site based on a Site Class D.

The following section provides an assessment of the earthquake-induced earthquake loads for the site, including identification of the earthquake spectral response acceleration for short periods, $S_{MS}$, and at 1-second period, $S_{M1}$, adjusted for site class effects as required by the 2015 IBC based on the following equations:

$$S_{MS} = F_a S_1$$

$$S_{M1} = F_v S_1$$
Where:

\[ F_a = \text{Site coefficient defined in Table 1613.3.3(1) in the 2015 IBC.} \]
\[ F_v = \text{Site coefficient defined in Table 1613.3.3(2) in the 2015 IBC.} \]
\[ S_s = \text{The mapped spectral accelerations for short periods.} \]
\[ S_I = \text{The mapped spectral accelerations for 1-second periods.} \]

The USGS National Seismic Hazards Mapping Project includes a program that provides values for ground motion at a selected site based on the same data that were used to prepare the USGS ground motion maps. The maps were developed using attenuation relationships for soft rock sites; the source model, assumptions, and empirical relationships used in preparation of the maps are described in Petersen and others (1996). The following values are based on a site specific Site Class of D.

\[ S_s \text{ and } S_I = \text{Mapped Spectral Acceleration Values} \]
\[ \text{Site Class D} \]
\[ F_a = 1.312 \]
\[ F_v = 2.107 \]

<table>
<thead>
<tr>
<th>Period (sec)</th>
<th>( S_a ) (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>0.610 (( S_s ), Site Class D)</td>
</tr>
<tr>
<td>1.0</td>
<td>0.173 (( S_I ), Site Class D)</td>
</tr>
</tbody>
</table>

\[ S_{MS} = 0.800 \]
\[ S_{MI} = 0.365 \]

Design spectral response acceleration parameters as presented in the 2015 IBC are defined as a 5% damped design spectral response acceleration at short periods, \( S_{DS} \), and at 1-second period, \( S_{DI} \), as calculated from the following equations:

\[ S_{DS} = \frac{2}{3} S_{MS} \]
\[ S_{DI} = \frac{2}{3} S_{MI} \]

For the proposed project site, the 5% damped design spectral response acceleration at short periods, as calculated using the program supplied by the USGS are as follows:

\[ S_{DS} = 0.533 \]
\[ S_{DI} = 0.243 \]
SOILS EXPLORATION

Exploration and Sampling Procedures

Field exploration conducted to determine engineering characteristics of subsurface materials included a reconnaissance of the project site and investigation by test pit. Test pit sites were located in the field by means of a Global Positioning System (GPS) device and are reportedly accurate to within fifteen feet. Upon completion of investigation, each test pit was backfilled with loose excavated materials. Re-excavation and compaction of these test pit areas are required prior to construction of overlying structures.

In addition, samples were obtained from representative soil strata encountered. Samples obtained have been visually classified in the field by professional staff, identified according to test pit number and depth, placed in sealed containers, and transported to our laboratory for additional testing. Subsurface materials have been described in detail on logs provided in the Appendix. Results of field and laboratory tests are also presented in the Appendix. MTI recommends that these logs not be used to estimate fill material quantities.

Laboratory Testing Program

Along with our field investigation, a supplemental laboratory testing program was conducted to determine additional pertinent engineering characteristics of subsurface materials necessary in an analysis of anticipated behavior of the proposed structures. Laboratory tests were conducted in accordance with current applicable American Society for Testing and Materials (ASTM) specifications, and results of these tests are to be found on the accompanying logs located in the Appendix. The laboratory testing program for this report included: Atterberg Limits Testing – ASTM D4318 and Grain Size Analysis – ASTM C117/C136.

Soil and Sediment Profile

The profile below represents a generalized interpretation for the project site. Note that on site soils strata, encountered between test pit locations, may vary from the individual soil profiles presented in the logs, which can be found in the Appendix.

Fill materials were encountered at ground surface. These poorly graded gravel with sand fills were greyish to light brown or brown, dry, medium dense, and contained fine to coarse-grained sand and fine to coarse gravels. In test pit 2, tree roots were encountered in this horizon. Beneath the fill material was poorly graded sand with silt. These sediments were brown, dry, medium dense to loose, and contained fine to coarse-grained sand. In test pit 2, boulders were encountered in the poorly graded sand with silt in the lower portion of the test pit.

Competency of test pit sidewalls varied little in either of the test pits. In general, granular sediments readily sloughed. Moisture contents will also affect wall competency with saturated soils having a tendency to readily slough when under load and unsupported.
Volatile Organic Scan

No environmental concerns were identified prior to commencement of the investigation. Therefore, soils obtained during on-site activities were not assessed for volatile organic compounds by portable photoionization detector. Samples obtained during our exploration activities exhibited no odors or discoloration typically associated with this type of contamination. No groundwater was encountered.

SITE HYDROLOGY

Existing surface drainage conditions are defined in the General Site Characteristics section. Information provided in this section is limited to observations made at the time of the investigation. Either regional or local ordinances may require information beyond the scope of this report.

Groundwater

During this field investigation, groundwater was not encountered in test pits advanced to a maximum depth of 7.8 feet bgs. Soil moistures in the test pits were generally dry throughout. In the vicinity of the project site, groundwater levels are controlled in large part by the stage and flow of the Payette River. Maximum groundwater elevations likely occur during late spring to early summer runoff season. According to United States Geological Survey (USGS) monitoring well data within the site area, groundwater was measured at depths ranging from 25.68 to 27.55, measured during a period from 1992 to 2010. Based on evidence of this investigation and background knowledge of the area, MTI estimates groundwater depths to remain greater than approximately 10 feet bgs throughout the year. This depth can be confirmed through long-term groundwater monitoring.

Soil Infiltration Rates

Soil permeability, which is a measure of the ability of a soil to transmit a fluid, was not tested in the field. Given the absence of direct measurements, for this report an estimation of infiltration is presented using generally recognized values for each soil type and gradation. Of soils comprising the generalized soil profile for this study, poorly graded sand with silt sediments typically exhibit infiltration values in excess of 12 inches per hour. Infiltration testing is generally not required within these sediments because of their free-draining nature.

It is recommended that infiltration facilities constructed on the site be extended into native poorly graded sand with silt sediments. Excavation depths of approximately 1 foot bgs should be anticipated to expose these poorly graded sand with silt sediments. Because of the high soil permeability, ASTM C33 filter sand, or equivalent, should be incorporated into design of infiltration facilities. An infiltration rate of 8 inches per hour should be used in design. Actual infiltration rates should be confirmed at the time of construction.
FOUNDATION AND SLAB DISCUSSION AND RECOMMENDATIONS

Various foundation types have been considered for support of the proposed structures. Two requirements must be met in the design of foundations. First, the applied bearing stress must be less than the ultimate bearing capacity of foundation soils to maintain stability. Second, total and differential settlement must not exceed an amount that will produce an adverse behavior of the superstructure. Allowable settlement is usually exceeded before bearing capacity considerations become important; thus, allowable bearing pressure is normally controlled by settlement considerations.

Considering subsurface conditions and the proposed construction, it is recommended that the structure be founded upon conventional spread footings and continuous wall footings. Total settlements should not exceed 1 inch if the following design and construction recommendations are observed.

Foundation Design Recommendations

Based on data obtained from the site and test results from various laboratory tests performed, MTI recommends the following guidelines for the net allowable soil bearing capacity:

<table>
<thead>
<tr>
<th>Soil Bearing Capacity</th>
<th>Footing Depth</th>
<th>ASTM D1557 Subgrade Compaction</th>
<th>Net Allowable Soil Bearing Capacity</th>
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<tr>
<td></td>
<td>Footings must bear on competent, undisturbed, native poorly graded sand with silt sediments or compacted structural fill. Existing organic materials and fill materials must be completely removed from below foundation elements. Excavation depths ranging from roughly 0.7 to 0.8 feet bgs should be anticipated to expose proper bearing soils. However, in areas where trees are/were present, deeper excavation depths should be anticipated.</td>
<td>Not Required for Native Soil 95% for Structural Fill</td>
<td>2,000 lbs/ft² A ⅓ increase is allowable for short-term loading, which is defined by seismic events or designed wind speeds.</td>
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1It will be required for MTI personnel to verify the bearing soil suitability for each structure at the time of construction.

The following sliding frictional coefficient values should be used: 1) 0.35 for footings bearing on native poorly graded sand with silt sediments and 2) 0.45 for footings bearing on granular structural fill. A passive lateral earth pressure of 453 pounds per square foot per foot (psf/ft) should be used for poorly graded sand with silt sediments. For compacted sandy gravel fill, a passive lateral earth pressure of 496 psf/ft should be used.

Footings should be proportioned to meet either the stated soil bearing capacity or the 2015 IBC minimum requirements. Total settlement should be limited to approximately 1 inch, and differential settlement should be limited to approximately ½ inch. Objectionable soil types encountered at the bottom of footing excavations should be removed and replaced with structural fill. Excessively loose or soft areas that are encountered in the footings subgrade will require over-excavation and backfilling with structural fill. To minimize the effects of slight differential movement that may occur because of variations in the character of supporting soils and seasonal moisture content, MTI recommends continuous footings be suitably reinforced to make them as rigid as possible. For frost protection, the bottom of external footings should be 36 inches below finished grade.
**Floor Slab-on-Grade**

Uncontrolled fill was encountered in portions of the site. MTI recommends that these fill materials be excavated to a sufficient depth to expose competent, native soils. MTI personnel must be present during excavation to identify these materials.

Organic, loose, or obviously compressive materials must be removed prior to placement of concrete floors or floor-supporting fill. In addition, the remaining subgrade should be treated in accordance with guidelines presented in the Earthwork section. Areas of excessive yielding should be excavated and backfilled with structural fill. Fill used to increase the elevation of the floor slab should meet requirements detailed in the Structural Fill section. Fill materials must be compacted to a minimum 95 percent of the maximum dry density as determined by ASTM D1557.

A free-draining granular mat (drainage fill course) should be provided below slabs-on-grade. This should be a minimum of 4 inches in thickness and properly compacted. The mat should consist of a sand and gravel mixture, complying with Idaho Standards for Public Works Construction (ISPWC) specifications for ¾-inch (Type 1) crushed aggregate. The granular mat should be compacted to no less than 95 percent of the maximum dry density as determined by ASTM D1557. A moisture-retarder should be placed beneath floor slabs to minimize potential ground moisture effects on moisture-sensitive floor coverings. The moisture-retarder should be at least 15-mil in thickness and have a permeance of less than 0.01 US perms as determined by ASTM E96. Placement of the moisture-retarder will require special consideration with regard to effects on the slab-on-grade and should adhere to recommendations outlined in the ACI 302.1R and ASTM E1745 publications. Upon request, MTI can provide further consultation regarding installation.

**CONSTRUCTION CONSIDERATIONS**

Recommendations in this report are based upon structural elements of the project being founded on competent, native poorly graded sand with silt or compacted structural fill. Structural areas should be stripped to an elevation that exposes these soil types.

**Earthwork**

Excessively organic soils, deleterious materials, or disturbed soils generally undergo high volume changes when subjected to loads, which is detrimental to subgrade behavior in the area of pavements, floor slabs, structural fills, and foundations. Mature trees and grasses with associated root systems were noted at the time of our investigation. It is recommended that organic or disturbed soils, if encountered, be removed to depths of 1 foot (minimum), and wasted or stockpiled for later use. However, in areas where trees are/were present, deeper excavation depths should be anticipated. Stripping depths should be adjusted in the field to assure that the entire root zone or disturbed zone or topsoil are removed prior to placement and compaction of structural fill materials. Exact removal depths should be determined during grading operations by MTI personnel, and should be based upon subgrade soil type, composition, and firmness or soil stability. If underground storage tanks, underground utilities, wells, or septic systems are discovered during construction activities, they must be decommissioned then removed or abandoned in accordance with governing Federal, State, and local agencies. Excavations developed as the result of such removal must be backfilled with structural fill materials as defined in the Structural Fill section.
MTI should oversee subgrade conditions (i.e., moisture content) as well as placement and compaction of new fill (if required) after native soils are excavated to design grade. Recommendations for structural fill presented in this report can be used to minimize volume changes and differential settlements that are detrimental to the behavior of footings, pavements, and floor slabs. Sufficient density tests should be performed to properly monitor compaction. For structural fill beneath building structures, one in-place density test per lift for every 5,000 square feet is recommended. In parking and driveway areas, this can be decreased to one test per lift for every 10,000 square feet.

**Dry Weather**

If construction is to be conducted during dry seasonal conditions, many problems associated with soft soils may be avoided. However, some rutting of subgrade soils may be induced by shallow groundwater conditions related to springtime runoff or irrigation activities during late summer through early fall. Problems may also arise because of lack of moisture in native and fill soils at time of placement. This will require the addition of water to achieve near-optimum moisture levels. Low-cohesion soils exposed in excavations may become friable, increasing chances of sloughing or caving. Measures to control excessive dust should be considered as part of the overall health and safety management plan.

**Wet Weather**

If construction is to be conducted during wet seasonal conditions (commonly from mid-November through May), problems associated with soft soils must be considered as part of the construction plan. During this time of year, fine-grained soils such as silts and clays will become unstable with increased moisture content, and eventually deform or rut. Additionally, constant low temperatures reduce the possibility of drying soils to near optimum conditions.

**Frozen Subgrade Soils**

Prior to placement of structural fill materials or foundation elements, frozen subgrade soils must either be allowed to thaw or be stripped to depths that expose non-frozen soils and wasted or stockpiled for later use. Stockpiled materials must be allowed to thaw and return to near-optimal conditions prior to use as structural fill.

**Structural Fill**

Soils recommended for use as structural fill are those classified as GW, GP, SW, and SP in accordance with the Unified Soil Classification System (USCS) (ASTM D2487). Use of silty soils (USCS designation of GM, SM, and ML) as structural fill may be acceptable. However, use of silty soils (GM, SM, and ML) as structural fill below footings is prohibited. These materials require very high moisture contents for compaction and require a long time to dry out if natural moisture contents are too high and may also be susceptible to frost heave under certain conditions. Therefore, these materials can be quite difficult to work with as moisture content, lift thickness, and compactive effort becomes difficult to control. If silty soil is used for structural fill, lift thicknesses should not exceed 6 inches (loose), and fill material moisture must be closely monitored at both the working elevation and the elevations of materials already placed. Following placement, silty soils must be protected from degradation resulting from construction traffic or subsequent construction.
Recommended granular structural fill materials, those classified as GW, GP, SW, and SP, should consist of a 6-inch minus select, clean, granular soil with no more than 50 percent oversize (greater than ¾-inch) material and no more than 12 percent fines (passing No. 200 sieve). These fill materials should be placed in layers not to exceed 12 inches in loose thickness. Prior to placement of structural fill materials, surfaces must be prepared as outlined in the Construction Considerations section. Structural fill material should be moisture-conditioned to achieve optimum moisture content prior to compaction. For structural fill below footings, areas of compacted backfill must extend outside the perimeter of the footings for a distance equal to the thickness of fill between the bottom of foundation and underlying soils, or 5 feet, whichever is less. All fill materials must be monitored during placement and tested to confirm compaction requirements, outlined below, have been achieved.

Each layer of structural fill must be compacted, as outlined below:

- **Below Structures and Rigid Pavements:** A minimum of 95 percent of the maximum dry density as determined by ASTM D1557.
- **Below Flexible Pavements:** A minimum of 92 percent of the maximum dry density as determined by ASTM D1557 or 95 percent of the maximum dry density as determined by ASTM D698.

The ASTM D1557 test method must be used for samples containing up to 40 percent oversize (greater than ¾-inch) particles. If material contains more than 40 percent but less than 50 percent oversize particles, compaction of fill must be confirmed by proof rolling each lift with a 10-ton vibratory roller (or equivalent) until the maximum density has been achieved. Density testing must be performed after each proof rolling pass until the in-place density test results indicate a drop (or no increase) in the dry density, defined as maximum density or “break over” point. The number of required passes should be used as the requirements on the remainder of fill placement. Material should contain sufficient fines to fill void spaces, and must not contain more than 50 percent oversize particles.

**Backfill of Walls**

Backfill materials must conform to the requirements of structural fill, as defined in this report. For wall heights greater than 2.5 feet, the maximum material size should not exceed 4 inches in diameter. Placing oversized material against rigid surfaces interferes with proper compaction, and can induce excessive point loads on walls. Backfill shall not commence until the wall has gained sufficient strength to resist placement and compaction forces. Further, retaining walls above 2.5 feet in height shall be backfilled in a manner that will limit the potential for damage from compaction methods and/or equipment. It is recommended that only small hand-operated compaction equipment be used for compaction of backfill within a horizontal distance equal to the height of the wall, measured from the back face of the wall.

Backfill should be compacted in accordance with the specifications for structural fill, except in those areas where it is determined that future settlement is not a concern, such as planter areas. In nonstructural areas, backfill must be compacted to a firm and unyielding condition.
Excavations

Shallow excavations that do not exceed 4 feet in depth may be constructed with side slopes approaching vertical. Below this depth, it is recommended that slopes be constructed in accordance with Occupational Safety and Health Administration (OSHA) regulations, Section 1926, Subpart P. Based on these regulations, on-site soils are classified as type “C” soil, and as such, excavations within these soils should be constructed at a maximum slope of 1½ feet horizontal to 1 foot vertical (1½:1) for excavations up to 20 feet in height. Excavations in excess of 20 feet will require additional analysis. Note that these slope angles are considered stable for short-term conditions only, and will not be stable for long-term conditions.

During the subsurface exploration, sloughing of native granular sediments from test pit sidewalls was observed. For deep excavations, native granular sediments cannot be expected to remain in position. These materials are prone to failure and may collapse, thereby undermining upper soil layers. This is especially true when excavations approach depths near the water table. Care must be taken to ensure that excavations are properly backfilled in accordance with procedures outlined in this report.

Groundwater Control

Groundwater was not encountered during the investigation and is anticipated to be below the depth of most construction. Special precautions may be required for control of surface runoff and subsurface seepage. It is recommended that runoff be directed away from open excavations. Silty soils may become soft and pump if subjected to excessive traffic during time of surface runoff. Ponded water in construction areas should be drained through methods such as trenching, sloping, crowning grades, nightly smooth drum rolling, or installing a French drain system. Additionally, temporary or permanent driveway sections should be constructed if extended wet weather is forecasted.

GENERAL COMMENTS

Based on the subsurface conditions encountered during this investigation and available information regarding the proposed structures, the site is adequate for the planned construction. When plans and specifications are complete, and if significant changes are made in the character or location of the proposed structures, consultation with MTI must be arranged as supplementary recommendations may be required. Suitability of subgrade soils and compaction of structural fill materials must be verified by MTI personnel prior to placement of structural elements. Additionally, monitoring and testing should be performed to verify that suitable materials are used for structural fill and that proper placement and compaction techniques are utilized.
REFERENCES


## APPENDICES

### ACRONYM LIST

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
</tr>
<tr>
<td>ACI</td>
<td>American Concrete Institute</td>
</tr>
<tr>
<td>ASCE</td>
<td>American Society of Civil Engineers</td>
</tr>
<tr>
<td>ASTM</td>
<td>American Society for Testing and Materials</td>
</tr>
<tr>
<td>bgs</td>
<td>below ground surface</td>
</tr>
<tr>
<td>CBR</td>
<td>California Bearing Ratio</td>
</tr>
<tr>
<td>D</td>
<td>natural dry unit weight, pcf</td>
</tr>
<tr>
<td>ESAL</td>
<td>Equivalent Single Axle Load</td>
</tr>
<tr>
<td>GS</td>
<td>grab sample</td>
</tr>
<tr>
<td>IBC</td>
<td>International Building Code</td>
</tr>
<tr>
<td>ITD</td>
<td>Idaho Transportation Department</td>
</tr>
<tr>
<td>LL</td>
<td>Liquid Limit</td>
</tr>
<tr>
<td>M</td>
<td>water content</td>
</tr>
<tr>
<td>MSL</td>
<td>mean sea level</td>
</tr>
<tr>
<td>N</td>
<td>Standard &quot;N&quot; penetration: blows per foot, Standard Penetration Test</td>
</tr>
<tr>
<td>NP</td>
<td>nonplastic</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>PCCP</td>
<td>Portland Cement Concrete Pavement</td>
</tr>
<tr>
<td>PERM</td>
<td>vapor permeability</td>
</tr>
<tr>
<td>PI</td>
<td>Plasticity Index</td>
</tr>
<tr>
<td>PID</td>
<td>photoionization detector</td>
</tr>
<tr>
<td>PVC</td>
<td>polyvinyl chloride</td>
</tr>
<tr>
<td>Qc</td>
<td>cone penetrometer value, unconfined compressive strength, psi</td>
</tr>
<tr>
<td>Qp</td>
<td>Penetrometer value, unconfined compressive strength, tsf</td>
</tr>
<tr>
<td>Qu</td>
<td>Unconfined compressive strength, tsf</td>
</tr>
<tr>
<td>RMR</td>
<td>Rock Mass Rating</td>
</tr>
<tr>
<td>RQD</td>
<td>Rock Quality Designation</td>
</tr>
<tr>
<td>R-Value</td>
<td>Resistance Value</td>
</tr>
<tr>
<td>SPT</td>
<td>Standard Penetration Test (140:pound hammer falling 30 in. on a 2:in. split spoon)</td>
</tr>
<tr>
<td>USCS</td>
<td>Unified Soil Classification System</td>
</tr>
<tr>
<td>USDA</td>
<td>United States Department of Agriculture</td>
</tr>
<tr>
<td>UST</td>
<td>underground storage tank</td>
</tr>
<tr>
<td>V</td>
<td>vane value, ultimate shearing strength, tsf</td>
</tr>
</tbody>
</table>
# Geotechnical General Notes

## Relative Density and Consistency Classification

<table>
<thead>
<tr>
<th>Coarse-Grained Soils</th>
<th>SPT Blow Counts (N)</th>
<th>Fine-Grained Soils</th>
<th>SPT Blow Counts (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Loose:</td>
<td>&lt; 4</td>
<td>Very Soft:</td>
<td>&lt; 2</td>
</tr>
<tr>
<td>Loose:</td>
<td>4-10</td>
<td>Soft:</td>
<td>2-4</td>
</tr>
<tr>
<td>Medium Dense:</td>
<td>10-30</td>
<td>Medium Stiff:</td>
<td>4-8</td>
</tr>
<tr>
<td>Dense:</td>
<td>30-50</td>
<td>Stiff:</td>
<td>8-15</td>
</tr>
<tr>
<td>Very Dense:</td>
<td>&gt;50</td>
<td>Very Stiff:</td>
<td>15-30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hard:</td>
<td>&gt;30</td>
</tr>
</tbody>
</table>

## Moisture Content

<table>
<thead>
<tr>
<th>Description</th>
<th>Field Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry</td>
<td>Absence of moisture, dusty, dry to touch</td>
</tr>
<tr>
<td>Moist</td>
<td>Damp but not visible moisture</td>
</tr>
<tr>
<td>Wet</td>
<td>Visible free water, usually soil is below water table</td>
</tr>
</tbody>
</table>

## Cementation

<table>
<thead>
<tr>
<th>Description</th>
<th>Field Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weakly</td>
<td>Crumbles or breaks with handling or slight finger pressure</td>
</tr>
<tr>
<td>Moderately</td>
<td>Crumbles or breaks with considerable finger pressure</td>
</tr>
<tr>
<td>Strongly</td>
<td>Will not crumble or break with finger pressure</td>
</tr>
</tbody>
</table>

## Particle Size

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
<th>Soil Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulders: &gt;12 in.</td>
<td></td>
<td>Coarse-Grained Sand: 5 to 0.6 mm</td>
</tr>
<tr>
<td>Cobble: 12 to 3 in.</td>
<td></td>
<td>Medium-Grained Sand: 0.6 to 0.2 mm</td>
</tr>
<tr>
<td>Gravel: 3 in. to 5 mm</td>
<td></td>
<td>Fine-Grained Sand: 0.2 to 0.075 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Silts: 0.075 to 0.005 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clays: &lt;0.005 mm</td>
</tr>
</tbody>
</table>

## Unified Soil Classification System

<table>
<thead>
<tr>
<th>Major Divisions</th>
<th>Symbol</th>
<th>Soil Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse-Grained Soils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50% coarse fraction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>passes No.200 sieve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravel &amp; Gravelly Soils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50% coarse fraction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>passes No.4 sieve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GW</td>
<td></td>
<td>Well-graded gravels; gravel/sand mixtures with little or no fines</td>
</tr>
<tr>
<td>GP</td>
<td></td>
<td>Poorly-graded gravels; gravel/sand mixtures with little or no fines</td>
</tr>
<tr>
<td>GM</td>
<td></td>
<td>Silty gravels; poorly-graded gravel/sand/silt mixtures</td>
</tr>
<tr>
<td>GC</td>
<td></td>
<td>Clayey gravels; poorly-graded gravel/sand/clay mixtures</td>
</tr>
<tr>
<td>Sand &amp; Sandy Soils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;50% coarse fraction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>passes No.4 sieve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SW</td>
<td></td>
<td>Well-graded sands; gravelly sands with little or no fines</td>
</tr>
<tr>
<td>SP</td>
<td></td>
<td>Poorly-graded sands; gravelly sands with little or no fines</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Silty sands; poorly-graded sand/gravel/silt mixtures</td>
</tr>
<tr>
<td>SC</td>
<td></td>
<td>Clayey sands; poorly-graded sand/clay mixtures</td>
</tr>
<tr>
<td>Fine Grained Soils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;50% coarse fraction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>passes No.200 sieve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ML</td>
<td></td>
<td>Inorganic silts; sandy, gravelly or clayey silts</td>
</tr>
<tr>
<td>CL</td>
<td></td>
<td>Lean clays; inorganic, gravelly, sandy, or silty, low to medium-plasticity clays</td>
</tr>
<tr>
<td>OL</td>
<td></td>
<td>Organic, low-plasticity clays and silts</td>
</tr>
<tr>
<td>Highly Organic Soils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT</td>
<td></td>
<td>Peat, humus, hydric soils with high organic content</td>
</tr>
</tbody>
</table>
### Geotechnical Investigation Test Pit Log

**Test Pit Log #: TP-1**  
**Date Advanced:** 24 Sept 2018  
**Logged by:** Maren Tanberg, E.I.T.  
**Excavated by:** Preferred Excavation  
**Location:** See Site Map Plates  
**Latitude:** 44.0803084  
**Longitude:** -115.6157646  
**Depth to Water Table:** Not Encountered  
**Total Depth:** 4.0 Feet bgs

<table>
<thead>
<tr>
<th>Depth (Feet bgs)</th>
<th>Field Description and USCS Soil and Sediment Classification</th>
<th>USDA Soil Classification and Design Soil Subgroup</th>
<th>Sample Type</th>
<th>Sample Depth (Feet bgs)</th>
<th>Qp</th>
<th>Lab Test ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-0.8</td>
<td>Poorly Graded Gravel with Sand Fill (GP-FILL): <em>Brown, dry, medium dense, with fine to coarse grained sand and fine to coarse gravel.</em></td>
<td>Unsuitable*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.8-4.0</td>
<td>Poorly Graded Sand with Silt (SP-SM): <em>Brown, dry, medium dense, with fine to coarse-grained sand. --Refusal because of unmarked galvanized pipe at 4.0 feet bgs.</em></td>
<td>Sand A-2a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*This horizon is considered unsuitable because it is fill.*
## GEOTECHNICAL INVESTIGATION TEST PIT LOG

**Test Pit Log #:** TP-2  
**Date Advanced:** 24 Sept 2018  
**Logged by:** Maren Tanberg, E.I.T.  
**Excavated by:** Preferred Excavation  
**Location:** See Site Map Plates  
**Depth to Water Table:** Not Encountered  
**Total Depth:** 7.8 Feet bgs

<table>
<thead>
<tr>
<th>Depth (Feet bgs)</th>
<th>Field Description and USCS Soil and Sediment Classification</th>
<th>USDA Soil Classification and Design Soil Subgroup</th>
<th>Sample Type</th>
<th>Sample Depth (Feet bgs)</th>
<th>Qp</th>
<th>Lab Test ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-0.7</td>
<td>Poorly Graded Gravel with Sand Fill (GP-FILL): Greyish to light brown, dry, medium dense, with fine to coarse grained-sand and fine gravel. --Tree roots primarily encountered to 0.7 feet, but a few roots were also noted to 4.6 feet bgs.</td>
<td>Unsuitable*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.7-7.8</td>
<td>Poorly Graded Sand with Silt (SP-SM): Brown, dry, medium dense to loose, with fine to coarse-grained sand. --18-inch-minus boulders were encountered at 6.2 feet bgs and was met with refusal.</td>
<td>Sand A-2a</td>
<td>GS</td>
<td>4.0-4.5</td>
<td></td>
<td>A</td>
</tr>
</tbody>
</table>

*This horizon is considered unsuitable because it is fill.

### Lab Test ID

<table>
<thead>
<tr>
<th>Lab Test ID</th>
<th>M</th>
<th>LL</th>
<th>PI</th>
<th>Sieve Analysis (% passing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>#4</td>
</tr>
<tr>
<td>A</td>
<td>1.8</td>
<td>NP</td>
<td>NP</td>
<td>98</td>
</tr>
</tbody>
</table>

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SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. See 1.3, Page 1, General Information of ITD requirements.
   2. Project information.
   4. Work by Owner.
   5. Owner-furnished products.
   6. Access to site.
   7. Work restrictions.
   8. Specification and drawing conventions.

B. Related Requirements:
   1. Section 01500 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: Lowman Housing, Project #19-302
   1. Project Location: Lowman, Idaho.

B. Owner: Idaho Transportation Department, P.O. Box 7129, Boise, Idaho, 83707.
   1. Owner's Representative: Tony Pirc

C. Architect: Don Hutchison, Hutchison Smith Architects.

D. Consultants: ITD has retained the following design professionals who have prepared designated portions of the Contract Documents:
   1. Civil Engineer: Matt Munger, WH Pacific, Boise, Idaho. 208-342-5400
1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. The purpose of this ITB is to solicit sealed bids to establish a contract between ITD and a Contractor for the construction of a new drain field, 2 septic tanks, sewer piping, water piping from well #2 to 3 housing units, 3 pressure tanks inside housing units, electric power to well #2 and to 3 housing units including heat cable on plumbing in crawl space and site grading as required.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.

1. 3 Concrete foundations
2. Water well #2
3. Chain link fence removal
4. Install new chain link fence
5. Remove trees and stumps

1.6 ACCESS TO SITE

A. Use of Site: Limit use of Project site to areas within the limits set by ITD. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

   a. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.7 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
B. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 4:00 p.m., Monday through Friday, unless otherwise indicated.

1. Weekend Hours: With written permission of ITD
2. Early Morning Hours: With written permission of ITD.
3. Hours for Utility Shutdowns: With written permission of ITD.
4. Noise: Equipment must have original exhaust mufflers or equivalent.

C. Existing Utility Interruptions: Do not interrupt utilities serving adjacent facilities unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Obtain Owner’s written permission before proceeding with utility interruptions.

D. Noise, Vibration, Dust and Odors: Coordinate operations that may result in high levels of noise, dust, vibration, odors, or other disruption with Owner and Authority having jurisdiction. Maintain low dust using low pressure water spray to maintain clean air

E. Nonsmoking: Smoking is not permitted on the entire site.

F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

H. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with Owner's representative.

I. Trash: Contractor shall maintain onsite dumpster and arrange for pickup to maintain a clean site.

J. Burning: Onsite burning is prohibited.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes tech info specification found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections include the following:
   1. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Design Professional will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Design Professional will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Design Professional are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

   a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
   b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
   c. Include costs of labor and supervision directly attributable to the change.
   d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and
finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Design Professional.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal, Design Professional will issue a Change Order for signatures of Owner and Contractor on Change Order Form provided by Architect.

1.6 CONSTRUCTION CHANGE DIRECTIVE


1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 01250
SECTION 01290 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:
   1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
   2. Division 1 Section “Project Closeout” for additional requirements related to Final Payment application.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

   1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
      a. Application for Payment forms with Continuation Sheets.
      b. Submittals Schedule.
      c. Contractor's Construction Schedule showing Phased Construction.

   2. Submit the Schedule of Values to Design Professional at Pre-Construction Meeting.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the Schedule of Values:

   a. Project name and location.
   b. Project Number.
   c. Name of Design Professional.
   d. Design Professional's project number.
   e. Contractor's name and address.
   f. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Change Orders (numbers) that affect value.
   d. Dollar value.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

   a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

9. Project Closeout – Provide a separate line item for performing project closeout procedures.

1.5 APPLICATIONS FOR PAYMENT

   A. Each Application for Payment shall be consistent with previous applications and payments as certified by Design Professional and paid for by Owner.
1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: Progress payments shall be submitted to Design Professional by the fifth day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month or as otherwise agreed to.

C. Payment Application Forms: Use AIA G702 and G703 Applications for Payment or pre-approved application by the Architect that has similar format.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Design Professional will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit (1) One signed and notarized original copy of each Application for Payment to Design Professional by a method ensuring receipt.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
2. All signatures shall be in blue ink.

F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).
4. Submittals Schedule (preliminary if not final).
5. List of Contractor's staff assignments.

G. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete (Phased). Provide documents per Section 01770 – Project Closeout.

H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted per Specification Section 01770 – Project Closeout and Specification Section 01781 – Project Record Documents.

1. As-Built Drawings
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01290
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General project coordination procedures.
2. Administrative and supervisory personnel.
3. Requests for Information (RFIs).
4. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Sections:
1. Division 1 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation.
3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Owner, Design Professional, or Contractor seeking information from each other during construction.

1.4 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
B. Prepare memoranda for distribution to each party involved, outlining special procedures
required for coordination. Include such items as required notices, reports, and list of attendees
at meetings.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative
procedures with other construction activities to avoid conflicts and to ensure orderly progress of
the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Startup and adjustment of systems.
8. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with
consideration given to conservation of energy, water, and materials. Coordinate use of
temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually
incorporated into, the Work. Refer to other Sections for disposition of salvaged materials
that are designated as Owner's property.

1.5 KEY PERSONNEL

A. Key Personnel Names: At Pre-Construction Meeting, submit a list of key personnel
assignments, including superintendent and other personnel in attendance at Project site. Identify
individuals and their duties and responsibilities; list addresses and telephone numbers, including
home, office, and cellular telephone numbers and email addresses. Provide names, addresses,
and telephone numbers of individuals assigned as standbys in the absence of individuals
assigned to Project.

1. Post copies of list in designated location. Keep list current at all times.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of
the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Design Professional will return RFIs submitted to Design Professional by other entities
controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's
work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or
interpretation and the following:

1. Project No.
2. Project name and location
3. Date.
4. Name of Contractor.
5. Name of Design Professional.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
   a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Standard Request for Information Form.

D. Design Professional's Action: Design Professional will review each RFI, determine action required, and respond. Allow seven working days for Design Professional's response for each RFI. RFIs received by Design Professional after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:
   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for coordination information already indicated in the Contract Documents.
   d. Requests for adjustments in the Contract Time or the Contract Sum.
   e. Requests for interpretation of Design Professional's actions on submittals.
   f. Incomplete RFIs or inaccurately prepared RFIs.

2. Design Professional's action may include a request for additional information, in which case Design Professional's time for response will date from time of receipt of additional information.

3. Design Professional's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Design Professional in writing within seven days of receipt of the RFI response.

E. On receipt of Design Professional's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Design Professional within seven days if Contractor disagrees with response.

F. RFI Log: Prepare, maintain, and submit a tabular log in digital format of RFIs organized by the RFI number. Log shall contain the following:
1. Project No.
2. Project name and location.
3. Name and address of Contractor.
4. Name and address of Design Professional.
5. RFI number including RFIs that were dropped and not submitted.
6. RFI description.
7. Date the RFI was submitted.
8. Date Design Professional's response was received.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Design Professional of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Design Professional, within three days of the meeting.

B. Preconstruction Conference: The Architect will schedule a preconstruction conference before starting construction, at a time convenient to the Owner and the Contractor. The meeting will review responsibilities and personnel assignments. The Design Professional will chair the meeting and the Design Professional will distribute minutes within three (3) days after the meeting.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Design Professional, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:
   a. Tentative construction schedule.
   b. Phasing.
   c. Critical work sequencing and long-lead items.
   d. Designation of key personnel and their duties.
   e. Lines of communications.
   f. Procedures for processing field decisions and Change Orders.
   g. Procedures for RFIs.
   h. Procedures for testing and inspecting.
   i. Procedures for processing Applications for Payment.
   j. Distribution of the Contract Documents.
   k. Submittal procedures.
   l. Preparation of record documents.
m. Use of the premises and existing building.

n. Work restrictions.

o. Working hours.

p. Owner's occupancy requirements.

q. Responsibility for temporary facilities and controls.

r. Procedures for disruptions and shutdowns.

s. Construction waste management and recycling.

t. Parking availability.

u. Office, work, and storage areas.

v. Equipment deliveries and priorities.

w. First aid.

x. Security.

y. Progress cleaning.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Design Professional and Owner of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:


   b. Options.

   c. Related RFI.

   d. Related Change Orders.

   e. Purchases.

   f. Deliveries.

   g. Submittals.

   h. Review of mockups.

   i. Possible conflicts.

   j. Compatibility problems.

   k. Time schedules.

   l. Weather limitations.

   m. Manufacturer's written recommendations.

   n. Warranty requirements.

   o. Compatibility of materials.

   p. Acceptability of substrates.

   q. Temporary facilities and controls.

   r. Space and access limitations.

   s. Regulations of authorities having jurisdiction.

   t. Testing and inspecting requirements.

   u. Installation procedures.

   v. Coordination with other work.

   w. Required performance results.

   x. Protection of adjacent work.

   y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at monthly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Design Professional, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      1) Review schedule for next period.
   b. Review present and future needs of each entity present, including the following:
      1) Interface requirements.
      2) Sequence of operations.
      3) Status of submittals.
      4) Deliveries.
      5) Off-site fabrication.
      6) Access.
      7) Site utilization.
      8) Temporary facilities and controls.
      9) Progress cleaning.
     10) Quality and work standards.
     11) Status of correction of deficient items.
     12) Field observations.
     13) Status of RFI.
     14) Status of proposal requests.
     15) Pending changes.
     16) Status of Change Orders.
     17) Pending claims and disputes.
     18) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310
SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Contractor's construction schedule.
   2. Construction schedule updating reports.
   3. Daily construction reports.
   4. Site condition reports.
   5. Special reports.

B. Related Requirements:
   1. Section 01330 "Submittal Procedures" for submitting schedules and reports.
   2. Section 01400 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

   1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
   2. Predecessor Activity: An activity that precedes another activity in the network.
   3. Successor Activity: An activity that follows another activity in the network.

B. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

C. Event: The starting or ending point of an activity.

D. Float: The measure of leeway in starting and completing an activity.

   1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
   2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. One paper copy.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a pdf of schedule and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

D. Daily Construction Reports: Submit at weekly intervals.

1.5 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days.
2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 30 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

4. Startup and Testing Time: Include no fewer than 5 days for startup and testing.

5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Design Professional's administrative procedures necessary for certification of Substantial Completion.

6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.

2. Work Restrictions: Show the effect of the following items on the schedule:
   a. Coordination with existing construction.
   b. Limitations of continued occupancies.
   c. Uninterruptible services.
   d. Use of premises restrictions.

3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
   a. Submittals.
   b. Fabrication.
   c. Deliveries.
   d. Installation.
   e. Tests and inspections.
   f. Adjusting.
   g. Startup and placement into final use and operation.

4. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion and the following interim milestones:

1. Start of on-site work in each building.

2. Substantial Completion of each building.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART OR BAR CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 10 days of date established for the Notice to Proceed or at the Contractors’ option provide a Bar Chart type Construction Schedule

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events.
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

A. General: Submit special reports to Owner and Design Professional within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At two week intervals, update schedule to reflect actual construction progress and activities. Issue schedule two days before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.

3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Design Professional, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.

2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01320
SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections include the following:
   1. Division 1 Section “Product Requirements” for submittal of substitution request.
   2. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
   3. Division 1 Section "Project Closeout" for submitting warranties.
   4. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
   5. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
   6. Divisions 2 through 16 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Design Professional's responsive action.

B. Informational Submittals: Written information that does not require Design Professional's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Design Professional for Contractor's use in preparing submittals.
   1. Contractor will be required to sign Design Professional’s release form prior to Design Professional’s release of Electronic Drawing files.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

   a. Design Professional reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Design Professional’s receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

   1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Design Professional will advise Contractor when a submittal being processed must be delayed for coordination.
   2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
   3. Resubmittal Review: Allow 5 working days for review of each resubmittal.

D. Identification: Place a permanent label or title block on each submittal for identification.

   1. Indicate name of firm or entity that prepared each submittal on label or title block.
   2. Provide a space approximately 4 x 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Design Professional.
   3. Include the following information on label for processing and recording action taken:
      a. Project name and Project number.
      b. Date.
      c. Name and address of Design Professional.
      d. Name and address of Contractor.
      e. Name and address of subcontractor.
      f. Name and address of supplier.
      g. Name of manufacturer.
      h. Number and title of appropriate Specification Section.
      i. Drawing number and detail references, as appropriate.
      j. Location(s) where product is to be installed, as appropriate.
      k. Other necessary identification.

E. Deviations: Highlight, cloud, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

F. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Design Professional will return submittals, without review, discard submittals received from sources other than Contractor.

   1. Transmittal Form: Contractor’s standard transmittal form. Provide locations on form for the following information:
      a. Project name and project number.
      b. Date.
      c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Transmittal number, numbered consecutively.
k. Remarks.
l. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Design Professional on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.
   2. Note date and content of revision in label or title block and clearly indicate extent of revision.
   3. Resubmit submittals until they are marked "Reviewed" or "Furnish as Corrected".

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Use only final submittals with mark indicating "Reviewed" or “Furnish as Corrected" taken by Design Professional.

1.5 CONTRACTOR'S USE OF DESIGN PROFESSIONAL’S CAD FILES

A. General: At Contractor's written request, copies of Design Professional's CAD files may be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
   1. CAD files may only be used for purposes related to the specific project for which they were requested.
   2. All designs, images and representations are to remain solely the copyright of the Design Professional.
   3. The Design Professional does not warrant the accuracy of any CAD files and assumes no responsibility for errors, omissions or discrepancies contained therein.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.
B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
   a. Manufacturer's written recommendations.
   b. Manufacturer's product specifications.
   c. Manufacturer's installation instructions.
   d. Standard color charts.
   e. Manufacturer's catalog cuts.
   f. Wiring diagrams showing factory-installed wiring.
   g. Printed performance curves.
   h. Operational range diagrams.
   i. Standard product operation and maintenance manuals.
   j. Compliance with specified referenced standards.
   k. Testing by recognized testing agency.
   l. Application of testing agency labels and seals.
   m. Notation of coordination requirements.

4. Submit Product Data before or concurrent with Samples.
5. Number of Copies: Submit six (6) copies of Product Data, unless otherwise indicated. Design Professional will return two copies. Mark up and retain one returned copy as a Project Record Document.

C. Shop Drawings: Prepare Project-specific information, verified on site and drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Dimensions.
   b. Identification of products.
   c. Fabrication and installation drawings.
   d. Roughing-in and setting diagrams.
   e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
   f. Shopwork manufacturing instructions.
   g. Templates and patterns.
   h. Schedules.
   i. Design calculations.
   j. Compliance with specified standards.
   k. Notation of coordination requirements.
   l. Notation of dimensions established by field measurement.
   m. Relationship to adjoining construction clearly indicated.
   n. Seal and signature of professional engineer if specified.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 24 by 36 inches.

3. Number of Copies: Submit six (6) opaque (bond) copies of each submittal. Design Professional will return two copies.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

2. Identification: Attach label on unexposed side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Design Professional will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples: Submit three sets of Samples. Design Professional will retain two Sample sets; remainder will be returned.
1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit sets of units that show approximate limits of variations.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product.
2. Number and name of room or space.
3. Location within room or space.
4. Number of Copies: Submit six copies of product schedule or list, unless otherwise indicated. Design Professional will return two copies.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation" for Construction Manager's action.

G. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

H. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."

I. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit six (6) copies of each submittal, unless otherwise indicated. Design Professional will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

B. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

C. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.
8. Design Professional will review submittals that include MSDSs.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Design Professional.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 DESIGN PROFESSIONAL'S ACTION

A. General: Design Professional will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Design Professional will review each submittal, make marks to indicate corrections or modifications required, and return it. Design Professional will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
   1. Reviewed.
   2. Furnish as Corrected.
   3. Revise and resubmit.
   4. Rejected.

C. Informational Submittals: Design Professional will review each submittal and will not return it, or will return it if it does not comply with requirements. Design Professional will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01330
SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES
A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.
C. Water Service: Pay water-service use charges for water used by all entities for construction operations.
D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

1.4 INFORMATIONAL SUBMITTALS
A. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
B. Dust and HVAC-Control Plan: Submit narrative that indicates the dust control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Fuel Spill: Contractor shall comply with all regulations to handle any fuel spills, containment shall be available on site at all times.

1.5 QUALITY ASSURANCE
A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.


1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
   1. Store combustible materials apart from building.

2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service underground unless otherwise indicated.

H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.

1. At each telephone, post a list of important telephone numbers.

   a. Police and fire departments.
   b. Ambulance service.
   c. Contractor's home office.
   d. Contractor's emergency after-hours telephone number.
   e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

2. Provide superintendent with cellular telephone.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
   1. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads: Construct and maintain temporary roads adequate for construction operations.

C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
   1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
   2. Remove snow and ice as required to minimize accumulations.

E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
   1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of the current EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
   1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
   2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

E. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

G. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

H. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating is needed and permanent enclosure is incomplete, insulate temporary enclosures.

I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary fire extinguishers for fire protection.

3.5 MOISTURE AND MOLD CONTROL

A. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

B. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard, replace, or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01770 "Closeout Procedures."

END OF SECTION 01500
SECTION 01635 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Sections:
   1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
   2. Divisions 2 through 16 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor that are not required in order to meet other Project requirements but may offer advantage to Contractor.

1.4 SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

   1. Substitution Request Form: Use CSI Form 13.1A.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
      b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of
the Work specified. Include annotated copy of applicable specification section.
Significant qualities may include attributes such as performance, weight, size,
durability, visual effect, sustainable design characteristics, warranties, and specific
features and requirements indicated. Indicate deviations, if any, from the Work
specified.
d. Product Data, including drawings and descriptions of products and fabrication and
installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and
addresses and names and addresses of Design Professionals and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test
results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project,
from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed
substitution with products specified for the Work, including effect on the overall
Contract Time. If specified product or method of construction cannot be provided
within the Contract Time, include letter from manufacturer, on manufacturer's
letterhead, stating date of receipt of purchase order, lack of availability, or delays
in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in
the Contract Documents except as indicated in substitution request, is compatible
with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently
become necessary because of failure of proposed substitution to produce indicated
results.

3. Design Professional's Action: If necessary, Design Professional will request additional
information or documentation for evaluation within seven days of receipt of a request for
substitution. Design Professional will notify Contractor of acceptance or rejection of
proposed substitution within 15 days of receipt of request, or seven days of receipt of
additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Design
Professional's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Design Professional does not issue a decision on use of a
proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed
substitution with related products and materials. Engage qualified testing agency to perform
compatibility tests recommended by manufacturers.
1.6 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Design Professional will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Design Professional will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed after 10 days prior to bid opening.

C. Substitutions for Convenience: Design Professional will consider requests for substitution if received before 10 days prior to bid opening. Requests received after that time may be considered or rejected at discretion of Design Professional.

1. Conditions: Design Professional will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Design Professional will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Design Professional for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01635
SECTION 01770 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Inspection procedures.
2. Reinspection.
3. Final Acceptance.
4. Closeout Procedures

B. Related Sections include the following:

1. Division 1, Section "PROJECT RECORD DOCUMENTS" for project record document requirements.
3. Division 1, Section “OPERATION AND MAINTENANCE DATA" for operating and maintenance manual requirements.
4. Division 1, Section “PRODUCT REQUIREMENTS” for warranty requirements.

C. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions-2 through -16.

1.3 SUBSTANTIAL COMPLETION

A. Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. (List exceptions in the request).

1. Advise Owner/Agency of pending change-over requirements.
2. Obtain and submit releases enabling the Owner/Agency unrestricted use of the Work and access to services and utilities.
3. Submit record drawings, maintenance and operational manuals, and similar final record information.
   a. Submittal of record drawings, O & M Manuals, etc., must occur a minimum of 15 days prior to a written request for Substantial Completion inspection.
4. Deliver tools, spare parts, extra stock, and similar items, if any required in Divisions 2 through 16.
5. Complete start-up testing of systems, and instruction of the Owner/Agency's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
6. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

7. All systems, including emergency systems, shall have been completely tested in the presence of the appropriate Project Engineer. Submit a form signed by the appropriate engineer stating this has been done in their presence and all systems are working as designed and satisfactorily.

B. Substantial Completion Inspection Procedures: On receipt by the Design Professional of a written request from the Contractor for substantial completion inspection (punch list items), the Design Professional will either proceed with inspection or advise the Contractor of unfilled requirements (paragraph A under 1.3 above). The Design Professional will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The certificate of substantial completion will be issued when the project is substantially complete.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE TO MAKE FINAL PAYMENT

A. Procedures: Before requesting final inspection for certification of final acceptance and final payment the following has to be completed. List exceptions in the request.

1. Submit the final payment request at the end of the final phase of work with required releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
2. Submit a certified copy of the Design Professional's substantial completion inspection list of items that were to be completed and corrected, stating that each item has been completed or otherwise resolved for acceptance.
3. Record Drawings must have been submitted to the Design Professional and approved (paragraph A under 1.3, Item 3 above).
4. Maintenance and Operations manuals must have been submitted to the Design Professional and approved (paragraph A under 1.3, Item 3 above).
5. Submit specific warranties, final certifications and similar documents.
6. Any maintenance and operational training of Agency personnel must have been completed (paragraph A under 1.3, Item 3 above).
7. Consent of Surety (A.I.A. Form G707) Release of Claims and Contractor's Affidavit of Payment of Debts and Claims (A.I.A. Form G706) must be executed by the contractor and submitted to the Design Professional.
8. A final pay estimate must be submitted requesting 100% payment including retainage. The documents in item 7 must be attached to the Final Pay Request.
9. State of Idaho Tax Release. Request for Tax Release Form is included in the agreement and is to be submitted to the Idaho State Tax Commission. The Tax Release issued by the Tax Commission is to be submitted with Closeout Documents.

B. Final Inspection Procedure: The Design Professional will reinspect the Work upon receipt of notice that the Work, including punch list items from earlier inspections have been completed.
1. Upon completion of reinspection, the Design Professional will prepare a letter of final acceptance or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner/Agency's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials (if any).
4. Tools.
5. Lubricants.
6. Fuels.
7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties.
12. Maintenance and similar continuing commitments.

3.2 FINAL ACCEPTANCE

A. The Contractor is required to submit to the Design Professional required documents.

1. The Design Professional will not approve final payment until all items have been received, reviewed and found to be acceptable and in compliance with the Contract Documents.

END OF SECTION 01700
SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for Project Record Documents.

B. Project Record Documents required include:
   1. Marked-up (red line corrected) copies of Contract Drawings.
   2. Marked-up (red line corrected) copies of Shop Drawings and Product Data Submittals.
   3. Marked-up (red line corrected) copies of Specifications, addenda and Change Orders.
   4. Field records for variable and concealed conditions.

C. Specific record copy requirements that expand requirements of this Section are included in the individual Sections of Divisions-2 through -16.

D. General project closeout requirements are included in Division 1 Section "Project Closeout."

E. Maintenance of Documents: Store record documents in the field office apart from Contract Documents used for construction. Do not permit Project Record Documents to be used for construction purposes. Maintain record documents in good order, and in a clean, dry, legible condition. Make documents available at all times for inspection by the Design Professional.

1.3 RECORD DRAWINGS

A. Mark-up (red line corrected) Procedure: During the construction period, maintain a set of (1 copy) black-line white-prints of Contract Drawings and Shop Drawings for Project Record Document purposes.

   1. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:

      a. Dimensional changes to the Drawings.
      b. Revisions to details shown on the Drawings.
      c. Locations and depths of underground utilities.
      d. Revisions to routing of piping and conduits.
      e. Revisions to electrical circuitry.
      f. Actual equipment locations.
      g. Locations of concealed internal utilities.
      h. Changes made by Change Order.
i. Details not on original Contract Drawings.

2. Mark completely and accurately record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.

3. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.

4. Mark important additional information which was either shown schematically or omitted from original Drawings.

5. Note construction change directive numbers, alternate numbers, Change Order numbers and similar identification.

6. Responsibility for Markup: Where feasible, the individual or entity who obtained record data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on record Drawings.

a. Accurately record information in an understandable Drawing technique. Record drawings will be returned to the contractor to correct the information that is not understandable or not clearly annotated.

b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.

7. At time of Substantial Completion, submit record Drawings to Design Professional for Owner/Agency's records. Organize into sets, bind and label sets for Owner/Agency's continued use.

B. Copies and Distribution: After completing the preparation of record drawings bind each set with durable paper cover sheets, with appropriate identification, including titles, dates and other information on cover sheets prior to submitting to Design Professional for Owner/Agency's records.

1.4 RECORD SPECIFICATIONS

A. During the construction period, maintain one (1) copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.

1. Mark the Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to information on concealed installations that would be difficult to identify or measure and record later.

a. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.

b. Note related record Product Data, where applicable. For each principal product specified, indicate whether record Product Data has been submitted in maintenance manual instead of submitted as record Product Data.

2. Upon completion of mark-up, submit record Specifications to the Design Professional for Owner/Agency's records.

a. The Contractor for General Construction is responsible for submitting the complete set of record Specifications as specified.
1.5 RECORD PRODUCT DATA

A. During the construction period, maintain one (1) copy of each Product Data submittal for Project Record Document purposes.

1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site, and changes in manufacturer's instructions and recommendations for installation.

2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

3. Note related Change Orders and mark-up of record Drawings, where applicable.

4. Upon completion of mark-up, submit a complete set of record Product Data to the Design Professional for the Owner/Agency's records.

5. Where record Product Data is required as part of maintenance manuals, submit marked-up Product Data as an insert in the manual, instead of submittal as record Product Data.

1.6 MISCELLANEOUS RECORD SUBMITTALS

A. Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Design Professional for the Owner/Agency's records.

1. Categories of requirements resulting in miscellaneous records include, but are not limited to the following:

   a. Locations and elevations of underground lines.

   b. Certifications received in lieu of labels on bulk products.

   c. Final inspection and correction procedures.

   d. Inspections and certifications by governing authorities.

   e. Final inspection and correction procedures.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 RECORDING

A. Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project. The Design Professional will periodically review record documents to assure compliance with this requirement.

END OF SECTION 01781
SECTION 01782 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Maintenance manuals for the care and maintenance of systems and equipment as well as specialty products, materials, and finishes.

B. Related Sections include the following:

1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
4. Divisions 2 through 16 Sections for specific operation and maintenance manual requirements for products in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit (2) two draft copies of each manual at least (15) fifteen days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Design Professional will return (1 copy) of draft and mark whether general scope and content of manual are acceptable.

1. Final Submittal: Submit (3) copies of each manual in final form prior to substantial completion inspection.
1.5 Coordination

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 Operation and Maintenance Documentation Directory

A. Organization: Include a section in the directory for each of the following:
   1. List of documents.
   2. List of systems.
   3. List of equipment.
   4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of a system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with the same designation used in the Contract Documents.

2.2 Manuals, General

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
   1. Title page.
   2. Table of contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
   1. Subject matter included in manual.
   2. Name and address of Project.
   3. Project Number.
   4. Name and address of Owner.
   5. Date of submittal.
   6. Name, address, and telephone number of Contractor.
   7. Name and address of Design Professional.
8. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (115-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

   b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, Project Number and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.

3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.

4. Supplementary Text: Prepared on 8-1/2-by-11-inch (115-by-280-mm), 20-lb/sq. ft. (75-g/sq. m) white bond paper.

5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.

   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Precautions against improper use.
9. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Engineering data and tests.
8. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Routine and normal operating instructions.
3. Regulation and control procedures.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

2.4 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
5. Reordering information for specially manufactured products.
D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
1. Do not use original Project Record Documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."

F. Comply with Division 1 Section "Closeout Procedures" for the schedule for submitting operation and maintenance documentation.

END OF SECTION 01782
SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

   1. Footings.
   2. Foundation walls.
   3. Slabs-on-grade.

B. Related Sections:

   1. Section 02300 "Earthwork" for drainage fill under slabs-on-grade.

1.3 DEFINITIONS

A. Cementitious Materials:  Portland cement alone or in combination with one or more of the following:  blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 ACTION SUBMITTALS

A. Product Data:  For each type of product indicated.

B. Design Mixtures:  For each concrete mixture.  Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

   1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings:  Placing drawings that detail fabrication, bending, and placement.  Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Construction Joint Layout:  Indicate proposed construction joints required to construct the structure.
1. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Welding certificates.

C. Material Certificates: For each of the following, signed by manufacturers:
   1. Cementitious materials.
   2. Admixtures.
   3. Form materials and form-release agents.
   4. Steel reinforcement and accessories.
   5. Fiber reinforcement.
   6. Curing compounds.
   7. Floor and slab treatments.
  10. Vapor retarders.
  11. Semirigid joint filler.

D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
   1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

E. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

F. Field quality-control reports.

G. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
C. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

H. Mockups: Cast concrete slab-on-grade and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.

1. Build panel approximately 100 sq. ft. for slab-on-grade and 25 sq. ft. for formed surface in the location indicated or, if not indicated, as directed by Architect.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

I. Preinstallation Conference: Conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
   a. Contractor's superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. Ready-mix concrete manufacturer.
   d. Concrete subcontractor.
   e. Special concrete finish subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation,
floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
   a. High-density overlay, Class 1 or better.
   b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
   c. Structural 1, B-B or better; mill oiled and edge sealed.
   d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.


E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.


F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, ASTM A 706/A 706M, deformed bars, assembled with clips.
D. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
E. Deformed-Steel Wire: ASTM A 496/A 496M.
F. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.
B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
   1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
   2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
   3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
   1. Portland Cement: ASTM C 150, Type I/II. Supplement with the following:
a. Fly Ash: ASTM C 618, Class F.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

2. Blended Hydraulic Cement: ASTM C 595, Type IS, portland blast-furnace slag, Type IP, portland-pozzolan, Type I (PM), pozzolan-modified portland, Type I (SM), slag-modified portland cement.

B. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregates: ASTM C 33, Class 3S, Class 3M, Class 1N coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.


2.5 ADMIXTURES


B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. Axim Italcemmenti Group, Inc.; CATEXOL CN-CI.
   b. BASF Construction Chemicals - Building Systems; Rheocrete CNI.
   c. Euclid Chemical Company (The), an RPM company;
   d. Grace Construction Products, W. R. Grace & Co.; DCI.
   e. Sika Corporation; Sika CNI.
D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. BASF Construction Chemicals - Building Systems; Rheocrete 222+.
   b. Cortec Corporation; MCI-2005NS.
   c. Grace Construction Products, W. R. Grace & Co.; DCI-S.
   d. Sika Corporation; FerroGard 901.

2.6 FIBER REINFORCEMENT

A. Synthetic Micro-Fiber: Monofilament or fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches, 1 to 2-1/4 inches long.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Monofilament Micro-Fibers:
      1) Axim Italcementi Group, Inc.; Fibrasol II P.
      2) Euclid Chemical Company (The), an RPM company; Fiberstrand 150.
      3) FORTA Corporation; FORTA Econo-Mono.
      5) Metalcrete Industries; Polystrand 1000.
      6) Nycon, Inc.; ProConM.
      7) Propex Concrete Systems Corp.; Fibermesh 150.
      8) Sika Corporation; Sika Fiber PPM.
   b. Fibrillated Micro-Fibers:
      1) Axim Italcementi Group, Inc.; Fibrasol F.
      2) Euclid Chemical Company (The), an RPM company; Fiberstrand F.
      3) FORTA Corporation; FORTA Ultra-Net.
      5) Nycon, Inc.; ProConF.
      6) Propex Concrete Systems Corp.; Fibermesh 300.
      7) Sika Corporation; Sika Fiber PPF.

B. Synthetic Macro-Fiber: Polyolefin macro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1 to 2-1/4 inches long.

1. Products: Subject to compliance with requirements, provide one of the following:[available products that may be incorporated into the Work include, but are not limited to, the following]:
   a. 3M; Scotchcast Polyolefin Fibers 2".
   b. Euclid Chemical Company (The), an RPM company; Tuf-Strand SF.
c. FORTA Corporation; FORTA FERRO.
e. Nycon, Inc.; XL.
f. Propex Concrete Systems Corp.; Fibermesh 650.
g. Sika Corporation; Sika Fiber MS10.

2.7 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products: Subject to compliance with requirements, provide the following:
   a. Stego Industries, LLC; Stego Wrap 10 mil Class A.

B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

C. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.8 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. ChemMasters; Chemisil Plus.
   b. ChemTec Int'l; ChemTec One.
   c. Conspec by Dayton Superior; Intraseal.
   d. Curecrete Distribution Inc.; Ashford Formula.
   e. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).
   f. Edoco by Dayton Superior; Titan Hard.
   g. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
   h. Kaufman Products, Inc.; SureHard.
   i. L&M Construction Chemicals, Inc.; Seal Hard.
   j. Meadows, W. R., Inc.; LIQUI-HARD.
   k. Metalcrete Industries; Floorsaver.
   l. Nox-Crete Products Group; Duro-Nox.
   m. Symons by Dayton Superior; Buff Hard.
   n. US SPEC, Division of US Mix Products Company; US SPEC Industraseal.
   o. Vexcon Chemicals, Inc.; Vexcon StarSeal PS Clear.
2.9 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Axim Italcementi Group, Inc.; CATEXOL CimFilm.
   b. BASF Construction Chemicals - Building Systems; Confilm.
   c. ChemMasters; SprayFilm.
   d. Conspec by Dayton Superior; Aquafilm.
   e. Dayton Superior Corporation; Sure Film (J-74).
   f. Edoco by Dayton Superior; BurkeFilm.
   g. Euclid Chemical Company (The), an RPM company; Eucobar.
   h. Kaufman Products, Inc.; Vapor-Aid.
   i. Lambert Corporation; LAMBCO Skin.
   j. L&M Construction Chemicals, Inc.; E-CON.
   k. Meadows, W. R., Inc.; EVAPRE.
   l. Metalcrete Industries; Waterhold.
   m. Nox-Crete Products Group; MONOFILM.
   n. Sika Corporation; SikaFilm.
   o. SpecChem, LLC; Spec Film.
   p. Symons by Dayton Superior; Finishing Aid.
   q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
   r. Unitex; PRO-FILM.
   s. Vexcon Chemicals, Inc.; Certi-Vex Envio Set.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
   b. BASF Construction Chemicals - Building Systems; Kure 200.
   c. ChemMasters; Safe-Cure Clear.
   d. Conspec by Dayton Superior; W.B. Resin Cure.
   e. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
   f. Edoco by Dayton Superior; Res X Cure WB.
   g. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
   i. Lambert Corporation; AQUA KURE - CLEAR.
   j. L&M Construction Chemicals, Inc.; L&M Cure R.
F. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type I, Class A.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. BASF Construction Chemicals - Building Systems; Kure-N-Seal 25 LV.
   b. ChemMasters; Spray-Cure & Seal Plus.
   c. Conspec by Dayton Superior; Sealcure 1315.
   d. Dayton Superior Corporation; Day-Chem Cure and Seal (J-22UV).
   e. Edoco by Dayton Superior; Cureseal 1315.
   f. Euclid Chemical Company (The), an RPM company; Super Diamond Clear; LusterSeal 300.
   g. Kaufman Products, Inc.; Sure Cure 25.
   h. Lambert Corporation; UV Super Seal.
   i. L&M Construction Chemicals, Inc.; Lumiseal Plus.
   k. Metalcrete Industries; Seal N Kure 30.
   l. Right Pointe; Right Sheen 30.
   m. Vexcon Chemicals, Inc.; Certi-Vex AC 1315.

2. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.10 RELATED MATERIALS


B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

   1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
E. Reglets: Fabricate reglets of not less than \textit{0.022-inch} thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

F. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than \textit{0.034 inch} thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.11 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from \textit{1/8 inch} and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, \textit{1/8 to 1/4 inch} or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than \textbf{4100 psi (29 MPa)} at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from \textit{1/4 inch (6.4 mm)} and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, \textit{1/8 to 1/4 inch} or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than \textbf{5000 psi (34.5 MPa)} at 28 days when tested according to ASTM C 109/C 109M.

2.12 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 20 percent.
2. Combined Fly Ash and Pozzolan: 20 percent.
3. Ground Granulated Blast-Furnace Slag: 40 percent.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 40 percent Portland cement minimum, with fly ash or pozzolan not exceeding 20 percent.
5. Silica Fume: 5 percent.
6. Combined Fly Ash, Pozzolans, and Silica Fume: 30 percent with fly ash or pozzolans not exceeding 20 percent and silica fume not exceeding 5 percent.
7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 40 percent with fly ash or pozzolans not exceeding 20 percent and silica fume not exceeding 5 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
   4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture indicated on plans.
B. Foundation Walls: Proportion normal-weight concrete mixture indicated on plans.
C. Slabs-on-Grade: Proportion normal-weight concrete mixture indicated on plans.
D. Building Walls: Proportion normal-weight concrete mixture indicated on plans.

2.14 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.15 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.
   1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:


D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.6 STEEL REINFORCEMENT

A. General: Comply with CRSl's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

G. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.
3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls at 50’ 0.c. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Section 07920 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.
3.8 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
   1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
   2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
   3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least \( 6 \) inches \((150\ mm)\) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below \( 40 \) deg F \((4.4\ deg\ C)\) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.
3.10 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic, paint, or another thin-film-finish coating system.

2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
   a. Specified overall values of flatness, F(F) 25; and of levelness.

3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.12 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after
loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. **Moisture Curing:** Keep surfaces continuously moist for not less than seven days with the following materials:
   
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. **Moisture-Retaining-Cover Curing:** Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

   a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
   b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
   c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. **Curing Compound:** Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

   a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. **Curing and Sealing Compound:** Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.13 **LIQUID FLOOR TREATMENTS**

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than three days old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.14 JOINT FILLING
A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.15 CONCRETE SURFACE REPAIRS
A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.16 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner may engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:
1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31/C 31M.
   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
   b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
   a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
   b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

15. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

3.17 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 03300
SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.


1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Stripping and stockpiling rock.
6. Removing above- and below-grade site improvements.
7. Disconnecting, capping or sealing, and abandoning site utilities in place.
8. Temporary erosion and sedimentation control.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary erosion- and sedimentation-control measures.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.

D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.
F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS
A. Preinstallation Conference: Conduct conference at Project site.

1.5 MATERIAL OWNERSHIP
A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 INFORMATIONAL SUBMITTALS
A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
   1. Use sufficiently detailed photographs or video recordings.
   2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.
B. Topsoil stripping and stockpiling program.
C. Rock stockpiling program.
D. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.7 QUALITY ASSURANCE
A. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.
B. Rock Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

1.8 FIELD CONDITIONS
A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

C. Utility Locator Service: Notify Dig Line (811) for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. Tree- and Plant-Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."

F. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015639 "Temporary Tree and Plant Protection."

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways,
according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXISTING UTILITIES

A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.

C. Locate, identify, and disconnect utilities indicated to be abandoned in place.

D. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Do not proceed with utility interruptions without Architect's written permission.

E. Excavate for and remove underground utilities indicated to be removed.

F. Removal of underground utilities is included in earthwork sections; in applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security, and utilities sections; and in Section 024116 "Structure Demolition" and Section 024119 "Selective Demolition."
3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots larger than 3 inches in diameter, obstructions, and debris to a depth of 2 ft. below exposed subgrade.
3. Use only hand methods or air spade for grubbing within protection zones.
4. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth indicated on Drawings of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within protection zones.
3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.7 STOCKPILING ROCK

A. Remove from construction area naturally formed rocks that measure more than 1 foot across in least dimension. Do not include excavated or crushed rock.

1. Separate or wash off non-rock materials from rocks, including soil, clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

B. Stockpile rock away from edge of excavations without intermixing with other materials. Cover to prevent windblown debris from accumulating among rocks.
1. Limit height of rock stockpiles to 36 inches.
2. Do not stockpile rock within protection zones.
3. Dispose of surplus rock. Surplus rock is that which exceeds quantity indicated to be stockpiled or reused.
4. Stockpile surplus rock, as directed by the Owner, to allow later use by the Owner.

3.8 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
   1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
   2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Burning tree, shrub, and other vegetation waste is permitted according to burning requirements and permitting of authorities having jurisdiction. Control such burning to produce the least smoke or air pollutants and minimum annoyance to surrounding properties. Burning of other waste and debris is prohibited.

C. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000
SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.


1.2 SUMMARY

A. Section Includes:
   1. Excavating and filling for rough grading the Site.
   2. Excavating and backfilling for foundations.
   3. Subsurface drainage backfill for walls and trenches.
   4. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:
   1. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
   1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
   2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.

2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.

3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Equipment for Footing, Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 8,400 lbf with extra-long reach boom.

2. Equipment for Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket.

I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D1586.

J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

K. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

L. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

M. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct preexcavation conference at Project site.

1. Review methods and procedures related to earthmoving, including, but not limited to, the following:
a. Personnel and equipment needed to make progress and avoid delays.
b. Coordination of Work with utility locator service.
c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
d. Extent of trenching by hand or with air spade.
e. Field quality control.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Controlled low-strength material, including design mixture.
3. Geofoam.
4. Warning tapes.

B. Samples for Verification: For the following products, in sizes indicated below:

2. Warning Tape: 12 inches long; of each color.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D2487.
2. Laboratory compaction curve according to ASTM D698 ASTM D1557.

C. Blasting plan approved by authorities having jurisdiction.

D. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

1.7 QUALITY ASSURANCE

A. Blasting not approved without special permission by Owner.

1.8 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Utility Locator Service: Notify Dig Line (811) for area where Project is located before beginning earth-moving operations.

D. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 015000 "Temporary Facilities and Controls" and Section 311000 "Site Clearing" are in place.

E. Do not commence earth-moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

F. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Erection of structures.
4. Impoundment of water.
5. Excavation or other digging unless otherwise indicated.
6. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

G. Do not direct vehicle or equipment exhaust towards protection zones.

H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification as determined by licensed Geotechnical Engineer.

C. Unsatisfactory Soils: As determined by licensed Geotechnical Engineer.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 4 inch sieve and not more than 12 percent passing a No. 200 sieve.
E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 95 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2 inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and zero to 5 percent passing a No. 4 sieve.

J. Sand: ASTM C33/C33M; fine aggregate.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Apparent Opening Size: No. 40 sieve, maximum; ASTM D4751.
3. Permittivity: 0.5 per second, minimum; ASTM D4491.
4. UV Stability: 50 percent after 500 hours' exposure; ASTM D4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Apparent Opening Size: No. 60 sieve, maximum; ASTM D4751.
3. Permittivity: 0.02 per second, minimum; ASTM D4491.
4. UV Stability: 50 percent after 500 hours' exposure; ASTM D4355.
2.3 CONTROLLED LOW-STRENGTH MATERIAL

A. Controlled Low-Strength Material: Self-compacting, low-density, flowable concrete material produced from the following:

1. As outlined in the ISPWC.

2.4 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Provide dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

B. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site.

1. Perform blasting without damaging adjacent structures, property, or site improvements.
2. Perform blasting without weakening the bearing capacity of rock subgrade and with the least-practicable disturbance to rock to remain.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
   a. 24 inches outside of concrete forms other than at footings.
   b. 12 inches outside of concrete forms at footings.
   c. 6 inches outside of minimum required dimensions of concrete cast against grade.
   d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
   e. 6 inches beneath bottom of concrete slabs-on-grade.
   f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

B. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract Time may be authorized for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.

   a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
   a. 24 inches outside of concrete forms other than at footings.
   b. 12 inches outside of concrete forms at footings.
   c. 6 inches outside of minimum required dimensions of concrete cast against grade.
   d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
   e. 6 inches beneath bottom of concrete slabs-on-grade.
   f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
   1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
   2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

B. Excavations at Edges of Tree- and Plant-Protection Zones:
   1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
   2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.
   1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
   1. Clearance: 12 inches each side of pipe or conduit.
C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

E. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.7 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.

B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 033000 "Cast-in-Place Concrete."
D. Trenches under Roadways: Provide 4-inch-thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in Section 033000 "Cast-in-Place Concrete."

E. Backfill voids with satisfactory soil while removing shoring and bracing.

F. Initial Backfill:
   1. Soil Backfill: Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
      a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
   2. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 3 inches over the pipe or conduit. Coordinate backfilling with utilities testing.

G. Final Backfill:
   1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
   2. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

H. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:
   1. Under grass and planted areas, use satisfactory soil material.
   2. Under walks and pavements, use satisfactory soil material.
   3. Under steps and ramps, use engineered fill.
   4. Under building slabs, use engineered fill.
   5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.13 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D698:
   1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
   2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
   3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
   4. For utility trenches, compact each layer of initial and final backfill soil material as directed above.

3.15 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
   1. Turf or Unpaved Areas: Plus or minus 1 inch.
   2. Walks: Plus or minus 1 inch.
   3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.
3.16 SUBSURFACE DRAINAGE

A. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D698.

B. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D698.
2. Place and compact impervious fill over drainage backfill in 6-inch thick compacted layers to final subgrade.

3.17 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
2. Determine that fill material classification and maximum lift thickness comply with requirements.
3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

E. Testing agency will test compaction of soils in place according to ASTM D1556, ASTM D2167, ASTM D2937, and ASTM D6938, as applicable. Tests will be performed at the following locations and frequencies:
1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.

2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length but no fewer than two tests.

3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.18 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000