Project Manual for:

ITD D3 Highway 16 Maintenance Facility
Water Wells
Meridian, Idaho

November 2026

MA ARCHITECTS

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PROJECT MANUAL FOR

ITD D3 Highway 16 Maintenance Facility
Water Wells
Meridian, Idaho

November 2026

Architect's Project No. 25683

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DIVISION 01 GENERAL REQUIREMENTS

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Work covered by Contract Documents.
2. Unit Price.
3. Work by Owner.
4. Work under separate contracts.
5. Access to site.
6. Work restrictions.
7. Permits.
8. Waste Disposal.
9. Testing and Inspection.
10. Specification and drawing conventions.

B. Related Requirements:
1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The base scope of work includes construction of (2) new potable production water wells located ITD's Property at the intersection of Highway 20 and Highway 16 near Meridian, Idaho. The one domestic water well will have a 6" casing drilled to 175'-0" with filter packs and screens. The second well will be a combination domestic and fire suppression well with an 18" casing drilled to 175'-0" with filter packs and screens. The scope of work includes drilling each well and providing the required testing confirming flow parameters for each well are met. Each well casing shall be prepped to receive the required pitless adapters for future connections and installed with well caps prepped to receive the required electrical conduits.

1.4 UNIT PRICE

A. Contractor to provide a unit price to drill well in additional depth in increments of 10'-0". The price shall include drilling, 10'-0" casing length and disposal of all removed material.
1. Provide unit price for 6" casing.
2. Provide unit price for 18" casing

B. The price will be set once the well reaches the above-listed depth and an appropriate water source is not found. The contractor will test the water at depth and notify the

owner of the results. If results are not acceptable, the owner may elect to drill further using the unit price. The length of the additional drill will be determined by the owner. Contractor shall not proceed until written authorization is given by owner.

C. Price will be valid during the duration of the project unless evidence of material cost escalation can be presented to the owner.

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. Items noted NIC (Not in Contract), will be furnished and installed by the Owner/Agency.

1.6 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

1.7 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
   1. Limits: Confine construction operations to the areas of work indicated on and in the drawings and specifications.
   2. Driveways, Walkways and Entrances: Keep driveways loading areas, etc. 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 use of driveways and entrances by construction operations.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
      c. Contractor parking shall be limited to those areas indicated on the Contract Document and as designated by the Owner.
      d. Maintain clear access to project at all times for firefighting equipment. Maintain exit ways from existing building required by authorities having jurisdiction.
      e. Signs: Provide signs adequate to direct visitors.
         1) Do not install, or allow to be installed, signs other than specified sign(s) and signs identifying the principal entities involved in the project.

C. Security: The contractor shall maintain security of the building and any staging areas throughout the project.

1.8 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 6:00 p.m., Monday through Friday, unless otherwise indicated.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify Owner not less than 3 days in advance of proposed utility interruptions.
   2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
   1. Notify Owner not less than 2 days in advance of proposed disruptive operations.

E. Hazardous Materials: Notify the Design Professional and Owner immediately upon discovery of existing hazardous materials.

F. Nonsmoking Building: Smoking is not permitted on Idaho Transportation Department property.

G. Controlled Substances: Use of tobacco products and other controlled substances is not permitted per Section 72-1717, Idaho Code.

H. Contractor Parking: Coordinate directly with Idaho Transportation Department.

I. On Owner/Tenant occupied projects, maintain cleanliness in areas adjacent to and surrounding the construction area to the satisfaction of the Owner at all times.

J. On Owner/Tenant occupied projects, ensure deliveries and contractor work access are in accordance with previous agreement with Owner and/or as indicated in the Contract Documents.

1.9 PERMITS

A. Furnish all necessary permits for construction of the Work.

1.10 WASTE DISPOSAL

A. The contractor is responsible for any and all demolition and/or removal as necessary and required to fulfill the requirements of the Contract Documents.

1.11 TESTING AND INSPECTION

A. Notify Owner/Engineer at least 24 hours prior to commencement of Work requiring special inspection.

1.12 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 published as part of the U.S. National CAD Standard and scheduled on Drawings.
   3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:
1. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 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 or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit electronic copy 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. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions 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 substitutions 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 as well as names and addresses of architects 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 substitutions 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.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect 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 Architect's Supplemental Instructions for minor changes in the Work.
   b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

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

1.5 PROCEDURES

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

1.6 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
   1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue through contractor 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: Architect 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. Work Change Proposal Requests issued by Architect are not 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.
      e. Quotation Form: Use forms acceptable to Architect.

B. Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
   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 Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Work Change Proposal Request Form: Use form acceptable to Architect.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, the Architect will complete the Owner’s Change Order Form and attach the Proposal Request and back-up. The Architect will then forward this documentation to the Owner’s Project Manager who will create a Change Order for approval of the Owner and Contractor.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Owner’s Representative may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   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

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 SCHEDULE OF VALUES

A. Submit printed schedule on AIA G703 - Continuation Sheet for G702 Contractor's standard form or electronic media printout will be considered for this use.

B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement

C. Format: Use Table of Contents of this Project Manual
   1. Identify each line item with number and title of major Specification Section
   2. Identify line item for site mobilization, bonds and insurance, and project closeout.
   3. Include the following Project identification of the Schedule of Values:
      a. Project name and location
      b. Name of General Contractor
      c. Name of Architect
      d. Owner’s project number
      e. Date of submittal.
   4. 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
   5. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluations of Applications of Payment and progress reports.
   6. Coordinate with the Project Manual table of contents.
   7. Provide several line items for principal subcontract amounts, where appropriate
   8. Round amounts to nearest whole dollar; total shall equal the Contract.
   9. 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 installed.
      a. Differentiate between items stored on-site and items stored off-site.
      b. Include evidence of insurance or bonded warehousing if required.
   10. 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.
   11. Each item in the Schedule of Values and Applications for Payment shall be complete.
      a. Include total cost and proportionate share of general overhead and profit

for each item.

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

D. Include within each line item, direct proportional amount of Contractor's overhead and profit.

E. Revise schedule to list approved Change Orders with each Application for Payment

1.2 APPLICATION FOR PAYMENT

A. Submit one copy of each Application for Payment on AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702 or approved equal.

B. Content and Format: Use Schedule of Values for listing items in Application for Payment

C. Complete every entry on form.
1. Execute by a person authorized to sign legal documents on behalf of Contractor.
2. Architect will return incomplete applications without action.
3. Entries shall match data on the Schedule of Values.
4. Include amounts of Change Orders approved before last day of construction period covered by application.

D. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

E. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor
1. The period of construction work covered by each Application of Payment is the period indicated in the Agreement.

F. Administrative actions and submittals that must precede or coincide with submittal of first Application of Payment include the following:
1. List of subcontractors (if applicable)
2. Schedule of Values
3. Submittals Schedule (preliminary if not final).
4. List of Contractor's staff assignments
5. Copies of permits (if applicable)
6. Copies of authorizations and licenses form authorities having jurisdiction for performance of the Work.
7. Initial progress report

G. Submit with transmittal letter as specified for Submittals in Section 01 33 00 - Submittal Procedures
1. One signed original copy of Application for Payment to the Architect

H. Submit updated construction schedule with each Application for Payment

I. After issuing the Certificate of Substantial Completion, submit an Application of Payment showing 95 percent completion of portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

J. Submit final Application for Payment showing 100 percent completion with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
    1. As-Built Drawings
    2. Operation and Maintenance Manual
    3. All Warranties and Guarantees
    4. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
    5. AIA Document G706, “Contractor’s Affidavit of Payment of Debts and Claims”
    6. AIA Document G707, “Consent of Surety to Final Payment”
    7. Letter stating all punch list items are completed and accepted.
    8. Release of Claims form
    9. Project Finalization and Start-Up Form

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Fixed Price Construction Contract and other Division 01 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. Definitions
   2. Informational Submittals
   3. General coordination procedures.
   4. Coordination drawings.
   5. RFIs.
   6. Digital project management procedures.
   7. Project meetings.

B. Related Requirements:
   1. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.3 DEFINITIONS

A. BIM: Building Information Modeling.

B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Key Personnel Names: Within seven (7) days of starting construction operations, 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 e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

   1. Post copies of list in project meeting room, in temporary field office. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

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. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors 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. Processing of submittals.
   5. Progress meetings.
   6. Preinstallation conferences.
   7. Project closeout activities.
   8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
   1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
      a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
      b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
      c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
      d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
      e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
      f. Indicate required installation sequences.
      g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed

resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:
   1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
   2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
   3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
   4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
   5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
   6. Mechanical and Plumbing Work: Show the following:
      a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
      b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
      c. Fire-rated enclosures around ductwork.
   7. Electrical Work: Show the following:
      a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
      b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
      c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
      d. Location of pull boxes and junction boxes, dimensioned from column center lines.
   8. Fire-Protection System: Show the following:
      a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
   9. Review: Design Professional will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Design Professional determines that coordination drawings are not prepared in sufficient scope or detail, or are otherwise deficient, Design Professional will so inform Contractor, who shall make changes as directed and resubmit.
   10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittal Procedures."
   11. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
   1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
   2. File Submittal Format: Submit or post coordination drawing files using PDF format.
   3. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
      a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
      b. Digital Data Software Program: Drawings are available in AutoCad 2013.
      c. Contractor shall execute a data licensing agreement in the form of Agreement included in this Project Manual.

1.7 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI.
   1. Design Professional will approve RFIs with any comments.
   2. Design Professional shall notify Owner of the Design Professional's Representative who will receive and respond to RFIs.
   3. Contractor shall submit RFIs in a prompt manner so as to avoid delays in the 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. RFI subject.
   2. Specification Section number and title and related paragraphs, as appropriate.
   3. Drawing number and detail references, as appropriate.
   4. Field dimensions and conditions, as appropriate.
   5. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   6. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

C. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven (7) working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
   1. The following Contractor-generated RFIs will be returned without action:
      a. Requests for approval of submittals.
      b. Requests for approval of substitutions.
      c. Requests for approval of Contractor's means and methods.
      d. Requests for coordination information already indicated in the Contract Documents.
      e. Requests for adjustments in the Contract Time or the Contract Sum.
      f. Requests for interpretation of Architect's actions on submittals.
      g. Incomplete RFIs or inaccurately prepared RFIs.
   2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.

3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor's proposed change order according to Section 01 26 00 "Contract Modification Procedures".
    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within seven (7) days of receipt of the RFI response.

D. On receipt of Architect's action: Review response and notify Architect within seven (7) days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Digital Drawing Software Program: Contract Drawings are available in AutoCad 2013.
4. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.
    a. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement included in this Project Manual.
5. At Contractor's written request, copies of Architect's Electronic CAD files will be provided to Contractor for Contractor's use in connection with the Project, subject to the following conditions:
    a. Electronic CAD Files of Project Drawings may only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.
    b. The drawings cannot be used for any other project.
    c. The Architect's title block must be removed by the Contractor. The Contractor becomes responsible for the content of the drawings.
        1) User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
    d. Use of files is solely at receiver's risk. Architect does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Architect of discrepancy and use information in hard-copy Drawings and Specifications.
        1) CAD files may not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.
        2) Receiver shall not hold Architect/Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.

3) Receiver shall understand that even though Architect/Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.
4) Receiver shall not hold Architect/Engineer responsible for such viruses or their consequences, and shall hold Architect/Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.

B. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

A. General: The Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.

B. Preconstruction Conference: The Owner will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect.
1. Minutes: The Construction Manager will be responsible for the meeting minutes and will record and distribute to all parties.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for 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 Architect 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:
a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Sustainable design requirements.
i. Review of mockups.
j. Possible conflicts.
k. Compatibility requirements.
l. Time schedules.
m. Weather limitations.
n. Manufacturer's written instructions.
o. Warranty requirements.

p. Compatibility of materials.
q. Acceptability of substrates.
r. Temporary facilities and controls.
s. Space and access limitations.
t. Regulations of authorities having jurisdiction.
u. Testing and inspecting requirements.
v. Installation procedures.
w. Coordination with other work.
x. Required performance results.
y. Protection of adjacent work.
z. 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: The Construction Manager will conduct progress meetings at monthly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Agency, and Architect, 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) Resolution of BIM component conflicts.
4) Status of submittals.
5) Status of sustainable design documentation.
6) Deliveries.
7) Off-site fabrication.
8) Access.
9) Site use.
10) Temporary facilities and controls.
11) Progress cleaning.
12) Quality and work standards.
13) Status of correction of deficient items.

14) Field observations.
15) Status of RFIs.
16) Status of Proposal Requests.
17) Pending changes.
18) Status of Change Orders.
19) As-Built Updates.
20) Pending claims and disputes.
21) Documentation of information for payment requests.

4. Minutes: Construction Manager 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

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Submittal schedule requirements.
   2. Administrative and procedural requirements for submittals.

1.2 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1.3 SUBMITTAL PROCEDURES

A. All submittals will be submitted to the Construction Manager for review. Construction Manager will then transmit the submittal to the architect for approval.

B. Transmit each submittal with AIA G810 - Transmittal Letter or Contractor similar form.

C. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

D. 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 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
   3. Include the following information on label for processing and recording action taken:
      a. Project name
      b. Owner's Project Number
      c. Date
      d. Name and address of Architect
      e. Name and address of Contractor
      f. Name and address of subcontractor, if any
      g. Name and address of supplier
      h. Name and address of Manufacturer
      i. Unique identifier, including revision number
      j. Number and title of appropriate Specification Section
      k. Drawing number and detail references, as appropriate
      l. Other necessary identification

E. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents

F. Transmit each package with transmittal form individually and appropriately for transmittal and handling.
   1. On an attached separate sheet, prepared on Contractor’s letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations.
      a. Include the same label information as the related submittal.
   2. Include Contractor’s certification stating that information submitted complies with requirements of the Contract Documents
   3. Provide locations on transmittal form for the following information.
      a. Project Name
      b. Owner’s Project Number
      c. Date
      d. Destination (To :)
      e. Source (From :)
      f. Names of subcontractor, manufacturer, and supplier
      g. Category and type of submittal
      h. Submittal purpose and description
      i. Submittal and transmittal distribution record
      j. Remarks
      k. Signature of transmitter

G. Schedule submittals to expedite Project and coordinate submission of related items.
   1. For each submittal for review, allow 10 days excluding delivery time to and from Contractor.

H. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

I. Allow space on submittals for Contractor and Architect review stamps.

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

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

L. Submittals not requested will not be recognized nor processed.

M. Complete submittals for each item are required.

N. Incomplete Submittals:
   1. Architect/Engineer will not review.
   2. Delays resulting from incomplete submittals are not the responsibility of Architect.

O. Architect will not review submittal:
   1. Received from sources other than Construction Manager
   2. Without General Contractor’s reviewed stamp
   3. Without a completed transmittal form
   4. Instruct parties to promptly report inability to comply with requirements.

P. Use only final submittals with mark indicating action taken by Architect in connection with construction.

1.2 ELECTRONIC SUBMITTAL PROCEDURES

A. At Contractor's written request, the use of electronic submittals may be approved by the architect.

B. All submittals will be submitted to the Construction Manager for review. Construction Manager will then transmit the submittal to the architect for approval. Submit each submittal in PDF format.

C. Transmit each submittal with electronic equivalent of AIA Form G810
   1. Allow space on submittals for Contractor's review and approval markings.
   2. Allow space on submittals for Contractor and Architect/Engineer review stamps.
   3. Include the following information for processing and recording action:
      a. Name and address of General Contractor
      b. Project name
      c. Owner's/Architects Project Number
      d. Date
      e. Name and address of Architect
      f. Name and address of Contractor
      g. Name and address of subcontractor, if any
      h. Name and address of supplier
      i. Name and address of Manufacturer
      j. Unique identifier, including revision number
      k. Number and title of appropriate Specification Section
      l. Drawing number and detail references, as appropriate
      m. Other necessary identification
      n. Indicate name of firm or entity that prepared each submittal.

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

E. Transmit each package with transmittal form individually and appropriately for transmittal and handling.

F. Complete submittals for each item are required.

G. Incomplete Submittals:
   1. Architect/Engineer will not review.
   2. Delays resulting from incomplete submittals are not the responsibility of Architect.

H. Use only final submittals with mark indicating action taken by Architect in connection with construction.

I. Architect will not review submittal:
   1. Received from sources other than General Contractor
   2. Without General Contractor's reviewed stamp
   3. Without a completed transmittal form
   4. Not in PDF format

J. Schedule submittals to expedite Project and deliver to Architect at business address. Coordinate submission of related items
   1. For each submittal for review, allow 10 days.

K. Identify variations from Contract Documents and product or system limitations which

may be detrimental to successful performance of completed Work.

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

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

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

O. Use only final submittals with mark indicating action taken by Architect in connection with construction.

P. Electronic submittals shall comply with the same requirements contain elsewhere in this section for paper submittals.

1.4 SUBMITTAL REQUIREMENTS

A. 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 published data are unsuitable 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 catalog cuts.
      b. Manufacturer's product specifications.
      c. Standard color charts.
      d. Statement of compliance with specified referenced standards.
      e. Testing by recognized testing agency.
      f. Application of testing agency labels and seals.
      g. Notation of coordination requirements.
      h. Availability and delivery time information.

   4. For equipment, include the following in addition to the above, as applicable:
      a. Wiring diagrams that show factory-installed wiring.
      b. Printed performance curves.
      c. Operational range diagrams.
      d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

   5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.

   1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      a. Identification of products.
      b. Schedules.
      c. Compliance with specified standards.

d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

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

2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
   a. Project name and submittal number.
   b. Generic description of Sample.
   c. Product name and name of manufacturer.
   d. Sample source.
   e. Number and title of applicable Specification Section.
   f. Specification paragraph number and generic name of each item.

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 two (2) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect 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 (3) sets of Samples. Architect will retain one sample set; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
      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 at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: 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:

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a 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. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.5 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: 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 Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include 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.

    1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.6 ARCHITECT'S REVIEW

A. Do not make "mass submittals" to Architect
    1. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week
    2. If "mass submittals" are received, Architect's review time stated above will be extended as necessary to perform proper review
    3. Architect will review "mass submittals" based on priority determined by Architect after consultation with Owner and Contractor

B. Architect will review each submittal, make marks to indicate corrections or modifications required, and return it.
    1. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. Informational submittals and other similar data are for Architect information, do not require Architect responsive action, and will not be reviewed or returned with comment.

D. Submittals made by Contractor that are not required by Contract Documents will not be reviewed and may be discarded.

E. Submittals approval does not authorize change to Contract requirements unless accompanied by Change Order or Architect's Supplemental Instructions.

F. Architect will review submittals twice.
   1. All additional reviews shall be paid for by the Contractor at an established fee.
   2. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-assurance and -control services required by Design Professional, or Owner, or authorities having jurisdiction are not limited by provisions of this Section.
   4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by the Design Professional.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

   1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.

2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Design Professional for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Design Professional for a decision before proceeding.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
   1. Indicate manufacturer and model number of individual components.
   2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
   1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Design Professional.
   2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Design Professional.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
   1. Specification Section number and title.
   2. Entity responsible for performing tests and inspections.
   3. Description of test and inspection.
   4. Identification of applicable standards.
   5. Identification of test and inspection methods.
   6. Number of tests and inspections required.
   7. Time schedule or time span for tests and inspections.
   8. Requirements for obtaining samples.
   9. Unique characteristics of each quality-control service.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 15 days of Notice to Proceed and not less than 2 days prior to preconstruction conference. Submit in format acceptable to Design Professional. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
   1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
   1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
   2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
   3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Design Professional has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting and re-inspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
   1. Name, address, and telephone number of technical 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.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
   1. Name, address, and telephone number of factory-authorized service representative making report.
   2. Statement that equipment complies with requirements.
   3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   4. Statement whether conditions, products, and installation will affect warranty.
   5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

   1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.

2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
   d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
   e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
   f. When testing is complete, remove test specimens, assemblies, and mock-ups; do not reuse products on Project unless authorized by the Design Professional.
2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Design Professional and Commissioning Authority with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services. These services, or special inspections, provided to the Owner are for the express purpose of meeting the testing requirements required under the authorities having jurisdiction and shall not in any way be considered to replace the Contractor’s responsibility for quality assurance and control for the project.
1. Contractor will coordinate and schedule all testing and special inspections with the Owner’s testing agency.
2. Under no circumstances will the Owner’s testing agency perform quality control or quality assurance work for the Contractor.
3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor**,** and the Contract Sum will be adjusted by Change Order.
4. Initial reports (handwritten as a minimum) will be given to the Contractor by the Owner’s testing Agency before leaving the site the day of the inspection.
5. Final reports will be issued later to the Contractor, Design Professional, and Owner.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
   1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
   2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
      a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
   3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
   4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
   5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
   6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Owner, Design Professional, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify Owner, Design Professional, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service to Owner, Design Professional, and Contractor.
   5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
   6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
   1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Design Professional, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner as follows:
1. Schedule of Special Inspections by Owner: See individual specification sections for specific requirements.

B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Owner, Design Professional, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Owner, Design Professional, and Contractor, and to authorities having jurisdiction if required.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and re-inspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Owner and Design Professional’s reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Requirements:
1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

1.2 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 engaged in the Project 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: Agency will pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Agency will pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Agency will pay electric-power-service use charges for electricity used by all entities for construction operations.

E. Water and Sewer Service from Existing System: Water from Agency's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

D. Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.
   1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
   2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
   3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
   1. Locations of dust-control partitions at each phase of work.
   2. HVAC system isolation schematic drawing.
   3. Location of proposed air-filtration system discharge.
   4. Waste-handling procedures.
   5. Other dust-control measures.
   6. Noise control measures.

1.4 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.

C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.5 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 EQUIPMENT

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

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
   1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
   2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
   3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities 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. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 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.

3.3 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 or facilities.
   1. Toilets: Use of Owner's existing toilet facilities may be permitted, if authorized, as long as facilities are cleaned and maintained in a condition acceptable to the Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

E. Temporary Heating and Cooling: Provide temporary heating and cooling 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.
   1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
   1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
      a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
      b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
   2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
   3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

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 overhead 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.

3.4 SUPPORT FACILITIES INSTALLATION

A. Traffic Controls: Comply with requirements of authorities having jurisdiction.
   1. Protect existing site improvements to remain including curbs, pavement, and utilities.
   2. Maintain access for fire-fighting equipment and access to fire hydrants.

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

C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."

D. 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.

E. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
   1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

F. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
   1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. 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.

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

D. 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 or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

E. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

   1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
   2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.

3. Provide walk-off mats at each entrance through temporary partition.

F. 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. Comply with additional limits on smoking specified in other Sections.
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 standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

B. Exposed Construction Period: 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.

C. Partially Enclosed Construction Period: 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 and replace stored or installed material that begins to grow mold.

7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
   1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
   2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
   3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.7 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, cooling, 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. Owner reserves right to take possession of Project identification signs.
   2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 01 25 00 "Substitution Procedures" for requests for substitutions.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within seven (7) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

    a. Form of Architect's Approval of Submittal: As specified in Section 01 33 00 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.

4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: …"

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: …"

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

    a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"

4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.

    a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: …"

5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

    a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.

    a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: …"

7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.

Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 73 00

EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Quality Assurance.
2. Materials.
3. Examination.
4. Preparation.
5. Construction layout.
6. Field engineering and surveying.
7. Installation of the Work.
8. Cutting and patching.
9. Progress cleaning.
10. Starting and adjusting.
11. Protection of installed construction.

B. Related Requirements:

1. Section 01 10 00 "Summary" for limits on use of Project site.
2. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.2 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

a. Water, moisture, or vapor barriers.
b. Membranes and flashings.
c. Exterior curtain-wall construction.
d. Sprayed fire-resistive material.
e. Equipment supports.
f. Piping, ductwork, vessels, and equipment.
g. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
   a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
6. Dates: Indicate on the contractor’s schedule when cutting and patching will be performed.

B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework,

investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

C. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of in occupied spaces and in unoccupied spaces, or as required by authorities having jurisdiction.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Remove and replace damaged, defective, or non-conforming Work.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
   a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
   b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
   a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 AGENCY-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner’s and Agency construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner and Agency construction personnel.
1. Construction Schedule: Inform Owner/Agency of Contractor's preferred construction schedule for Owner/Agency portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner/Agency in a timely manner if changes to schedule are required due to differences in actual construction progress.

2. Preinstallation Conferences: Include Owner/Agency construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner/Agency work. Attend preinstallation conferences conducted by Owner/Agency construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      a. Use containers intended for holding waste materials of type to be stored.
   4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

B. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.
   5. Repair of the Work.

C. Related Requirements:
   1. Section 01 78 23 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
   2. Section 01 79 00 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at final completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Idaho Division of Public Works Close-Out requirements. The “Project Finalization” form is required unless specifications indicate otherwise.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of seven (7) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
5. Submit sustainable design submittals not previously submitted.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
7. A final report of Special Inspections to be attached to the Substantial Completion. If no Special Inspections are required, Design Professional can initial as such on the Substantial Completion form.
8. Submit O&M Manuals for compliance with the contract documents.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of seven (7) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for final completion.

1.5 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
   1. Submit final Application for Payment according to Section 01 29 00 "Payment Procedures".
   2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   3. Idaho Division of Public Works Close-Out requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will approve/initial punch list after inspection or will notify Contractor of construction that must be completed or corrected before final documents will be signed.

1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
   1. Organize list of spaces in sequential order.
   2. Retain the subparagraph below if default submittal format in Section 01 33 00 "Submittal Procedures" is not appropriate.
   3. Submit list of incomplete items in the following format:
      a. MS Excel electronic file. Architect will return annotated file.
      b. PDF electronic file. Architect will return annotated file.

1.7 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within ten (10) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit on digital media acceptable to Architect.

E. Warranties in Paper Form:
   1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
   4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

F. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
   1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
      a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
      b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
      c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
      d. Remove tools, construction equipment, machinery, and surplus material from Project site.

e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations, as well as any damage to surrounding areas. Repair includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition before requesting inspection for determination of Substantial Completion.
1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

B. Repair, or remove and replace, defective construction.

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
   1. Closeout Submittals
   2. Operation and maintenance documentation directory manuals.
   3. Emergency manuals.
   4. Systems and equipment operation manuals.
   5. Systems and equipment maintenance manuals.
   6. Product maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
   1. Architect and Agency will comment on whether content of operation and maintenance submittals is acceptable.
   2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:
   1. Submit on digital media acceptable to Architect.
   2. Submit three paper copies. Architect will return two copies.

C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 7 (seven) days before commencing demonstration and training. Architect will return copy with comments.
   1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

D. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
   1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
   1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
   2. 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.

1.4 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: 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.
   3. Manual contents.

B. Title Page: Include the following information:
   1. Subject matter included in manual.
   2. Name and address of Project.
   3. Name and address of Owner.
   4. Date of submittal.
   5. Name and contact information for Contractor.
   6. Name and contact information for Construction Manager.
   7. Name and contact information for Architect.
   8. Name and contact information for Commissioning Authority.
   9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
   10. 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.

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.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.5 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:
   1. Type of emergency.
   2. Emergency instructions.
   3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
   1. Fire.
   2. Flood.
   3. Gas leak.
   4. Water leak.
   5. Power failure.
   6. Water outage.
   7. System, subsystem, or equipment failure.
   8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:
   1. Instructions on stopping.
   2. Shutdown instructions for each type of emergency.
   3. Operating instructions for conditions outside normal operating limits.
   4. Required sequences for electric or electronic systems.
   5. Special operating instructions and procedures.

1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

B. 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. Use designations for systems and equipment indicated on Contract Documents.

2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

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

F. Piped Systems: Diagram piping as installed and identify color coding where required for identification.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds, as described below.

C. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
   1. Standard maintenance instructions and bulletins; 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.
      a. 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.
   2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
   3. Identification and nomenclature of parts and components.
   4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
   1. Test and inspection instructions.
   2. Troubleshooting guide.
   3. Precautions against improper maintenance.
   4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   5. Aligning, adjusting, and checking instructions.
   6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. 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.

H. 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.

1.8 PRODUCT MAINTENANCE MANUALS

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

B. 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.

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

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
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 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:
   1. Record Drawings.
   2. Record Specifications.
   3. Record Product Data.

B. Related Requirements:
   1. Section 01 73 00 "Execution"
   2. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit one set(s) of marked-up record prints.
   2. Number of Copies: Submit copies of record Drawings as follows:
      a. Initial Submittal:
         1) Submit one paper-copy set(s) of marked-up record prints.
         2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
      b. Final Submittal:
         1) Submit one paper-copy set of marked-up record prints.
         2) Architect will review for completeness.

B. Record Specifications: Submit one paper copy annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy annotated PDF electronic files and directories of each submittal.
   1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

1.3 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper or electronic copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
   1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

      a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.

b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:
   a. Dimensional changes to Drawings.
   b. Revisions to details shown on Drawings.
   c. Depths of foundations.
   d. Locations and depths of underground utilities.
   e. Revisions to routing of piping and conduits.
   f. Revisions to electrical circuitry.
   g. Actual equipment locations.
   h. Duct size and routing.
   i. Locations of concealed internal utilities.
   j. Changes made by Change Order or Construction Change Directive.
   k. Changes made following Architect's written orders.
   l. Details not on the original Contract Drawings.
   m. Field records for variable and concealed conditions.
   n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Format: DWG, Version , Microsoft Windows operating system.
3. Format: Annotated PDF electronic file with comment function enabled.
4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
5. Refer instances of uncertainty to Architect for resolution.
6. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
   a. See Section 01 31 00 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
   b. Architect will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. If required, bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.

4. Identification: As follows:
    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect.
    e. Name of Contractor.

1.4 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
    1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
    2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
    3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
    4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
    5. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as paper copy or scanned PDF electronic file(s) of marked-up paper copy of Specifications.

1.5 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
    1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
    2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
    3. Note related Change Orders, record Specifications, and record Drawings where applicable.

C. Format: Submit record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.
    1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.6 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1. Instruction in operation and maintenance of systems, subsystems, and equipment.
   2. Demonstration and training video recordings.

1.2 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
   1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

1.3 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit one copy (1) within seven (7) days of end of each training module.
   1. At completion of training, submit complete training manual(s) for Owner's use prepared in same format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Preconstruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination."

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.6 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
   1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
      a. System, subsystem, and equipment descriptions.
      b. Performance and design criteria if Contractor is delegated design responsibility.
      c. Operating standards.
      d. Regulatory requirements.
      e. Equipment function.
      f. Operating characteristics.
      g. Limiting conditions.
      h. Performance curves.
   2. Documentation: Review the following items in detail:
      a. Emergency manuals.
      b. Systems and equipment operation manuals.
      c. Systems and equipment maintenance manuals.
      d. Product maintenance manuals.
      e. Project Record Documents.
      f. Identification systems.
      g. Warranties and bonds.
      h. Maintenance service agreements and similar continuing commitments.
   3. Emergencies: Include the following, as applicable:
      a. Instructions on meaning of warnings, trouble indications, and error messages.
      b. Instructions on stopping.
      c. Shutdown instructions for each type of emergency.
      d. Operating instructions for conditions outside of normal operating limits.
      e. Sequences for electric or electronic systems.
      f. Special operating instructions and procedures.
   4. Operations: Include the following, as applicable:
      a. Startup procedures.

b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:
   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
   a. Diagnostic instructions.
   b. Test and inspection procedures.
7. Maintenance: Include the following:
   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning.
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.
8. Repairs: Include the following:
   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   d. Instructions for identifying parts and components.
   e. Review of spare parts needed for operation and maintenance.

1.7 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.8 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
   1. Schedule training with Owner with at least ten (10) days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Cleanup: Collect used and leftover educational materials and remove from Project. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.9 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
   1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Digital Video Recordings: Provide high-resolution, digital video.
   1. Submit video recordings on USB thumb drive.

C. Recording: Display continuous running time.

D. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION

STATE OF IDAHO

Idaho Transportation Department

Training Confirmation Sign-In Sheet

Project Name: _____ Project Location: _____

Representative: _____ Date & time:_____

Name	Company	E-mail	Telephone	Signature

PROJECT FINALIZATION AND START-UP

Upon completion of the equipment and systems installation and connections, the contractor shall assemble all equipment factory representative and subcontractors together for system start-up.

These people shall assist in start-up and check out their system(s) and remain at the site until the total system operation is acceptable and understood by the agency's representative(s). The factory representative and system subcontractor shall also give instructions on operation and maintenance of their equipment to the agency's maintenance and/or operation personnel. To prove acceptance of operation and instruction by the agency's representative(s), this written statement of acceptance shall be signed below.

> "I, the Contractor, associated factory representative and subcontractors, have started each system and the total system; and have proven their normal operation to the agency's representative(s) and maintenance/operation personnel and have instructed him/them in the operation and maintenance thereof."

Agency's Representative	Contractor
Signature	Signature
Date	Date

Site and Infrastructure

DIVISION 33 SITE UTILITIES

SECTION 33 21 00

DOMESTIC AND FIRE SUPPLY WELLS: DRILLING, CONSTRUCTION, AND TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Scope of Work: The Contractor shall obtain the IDWR well drilling permits for the wells, and shall drill, construct, develop, test, and disinfect two (2) water supply wells for the ITD D3 Highway 16 Maintenance Facility, 6505 W Chinden Blvd, Meridian, Idaho 83646, in accordance with the well designs prepared by the Hydrogeologist, a member of the design team retained by the Architect. The Contractor shall work with the Hydrogeologist throughout permitting, drilling, construction, development, and testing so that each well meets the requirements of this section and the certification criteria of Article 3.20. The Well 2 pilot borehole shall be drilled first, and zone tested where directed by the Hydrogeologist, for the design of both wells (Article 3.4).

B. The Wells

1. Well 1 – Domestic Supply Well: 6-inch nominal minimum steel casing, with final casing selection by the Hydrogeologist to house the domestic submersible pump within the pump envelope (Article 2.10.B).
2. Well 2 – Fire Supply and Redundant Domestic Well: 24-inch nominal minimum steel casing, with final casing selection by the Hydrogeologist to house both the fire pump and a domestic submersible pump within the pump envelope (Article 2.10.B), so that either well can supply the domestic demand. Well 2 is drilled first as a pilot borehole, zone tested where directed by the Hydrogeologist, and then reamed and completed as the fire supply well.

C. Design Flows (basis for the well design, testing, and certification)

1. Domestic (Well 1, and the domestic pump in Well 2): 30 gpm. For information, the domestic pumps will be designed by others to deliver 30 gpm at not less than 125 psi at the Top of Well.
2. Fire (Well 2): rated fire pump capacity of 1,500 gpm; tested and certified at 150 percent, 2,250 gpm. The State Fire Marshal requires fire flow for a minimum duration of 2 hours. No fire water storage tank will be provided; fire flow will be supplied directly from Well 2. For information, the fire pump will be designed and provided by others for 1,500 gpm at 100 psi at the Top of Well, not less than 65 psi at 2,250 gpm, and a shutoff pressure not more than 140 percent of rated pressure (NFPA 20).

D. Project Roles

1. Owner: Idaho Transportation Department (ITD). The Owner, directly or through the Architect, will review submittals and the Work for general conformance with the Owner's requirements in the Contract Documents and will accept the Work. Such review is for the Owner's benefit only and does not relieve the Contractor of responsibility for constructing the wells in accordance with the well designs and the Contract Documents, for its means and methods, or for compliance with applicable rules.
2. Hydrogeologist: Retained by the Architect as a member of the Owner's design

team, and the designer of record for the wells. Responsible for checking the well locations shown on the Drawings against the setbacks of Article 1.6; water right permitting on the Owner's behalf (Article 1.5.B); final well designs; direction of logging, sampling, development, and testing; test analysis; Technical Memorandum and well certification; and the well information for pump selection by others (Article 2.10.D). The Hydrogeologist does not select or size the permanent pumps, motors, pitless adapters, permanent well caps, power supply, standby generator, or pump controller room. The Hydrogeologist will work with the Contractor during permitting, drilling, construction, development, and testing so that each well meets the requirements of this section. The Hydrogeologist does not direct or control the Contractor's means, methods, sequences, procedures, or safety.

3. Project Architect: The Architect designated by the Owner to assist with construction administration, including processing Requests for Information and submittals. Requests for Information concerning well design or hydrogeologic conditions will be referred to the Hydrogeologist, as designer of record, for response. The Project Architect will review responses and submittals only for general conformance with the Owner's requirements. The Project Architect does not supervise, direct, or control the Work and is not responsible for the Contractor's means, methods, sequences, or safety. The Project Architect's presence at or observation of the Work does not make it responsible for the Contractor's means, methods, techniques, sequences, procedures, or site safety, or for the Contractor's failure to perform the Work in accordance with the Contract Documents. The Project Architect prepared the preliminary well schematics on the Drawings as a basis for bidding only. Well siting and the final well designs are the responsibility of the Hydrogeologist as designer of record; construction of the wells in accordance with the well designs, and the means, methods, and safety of the Work, are the responsibility of the Contractor.

4. Contractor: An Idaho-licensed well drilling contractor. Responsible for IDWR well drilling permits; for drilling, constructing, developing, testing, and disinfecting the wells in accordance with the Hydrogeologist's well designs and this section, while coordinating its Work with the Hydrogeologist; and for the means, methods, sequences, procedures, and safety of the Work. The Contractor is responsible for workmanship and for constructing the wells as designed. Changes required by subsurface conditions are addressed in Article 1.9.

E. Work Included: Coordination with the Hydrogeologist and support of the Hydrogeologist's logging, sampling, design, and testing activities; IDWR well drilling permits; well data and test volumes for the Hydrogeologist's water right permitting (Article 1.5.B); mobilization and site access; Well 2 pilot drilling, geophysical logging, geologic sampling, and zone testing where directed by the Hydrogeologist, for the design of both wells; geologic sampling and logging of Well 1; reaming; conductor and permanent casing, screen, filter pack, and surface seal; development; alignment and plumbness testing; video inspection; pre-test and final disinfection; step-rate and constant-rate pumping tests with all test equipment and temporary power; water quality sampling and laboratory analysis; disposal of drilling, development, and test fluids; casing termination ready for installation of the pitless adapters by others, with a temporary sanitary well cap (Articles 2.8 and 2.9); IDWR Well Driller's Reports; and the construction records and data required for the Hydrogeologist's Technical Memorandum and certification (Articles 3.19 and 3.20).

F. Work Not Included

1. Selection, sizing, purchase, and installation of the permanent pumps, motors, drop pipe and column, power cable, pump appurtenances, controllers, and variable frequency drives, which will be provided by others.
2. Pitless adapters, pitless units, and permanent sanitary well caps, which will be selected, sized, furnished, and installed by others,
3. Permanent pumps and motors, pump controllers, permanent power and electrical service, standby generator (including selection and sizing), transfer switches, fire pump controller room or pump house, water distribution system, fire service main, and discharge piping from the pitless adapters. These are provided by others; the Contractor has no responsibility for their selection, design, furnishing, installation, or coordination.

1.2 REFERENCES

A. Comply with the edition of the following in effect on the bid date, as adopted by the authority having jurisdiction, except where a specific edition is stated. Where a reference is adopted in this section as a project standard rather than as a regulatory requirement, it is so stated. Requirements of the IDWR well drilling permits govern where more stringent.

1. IDAPA 37.03.09, Well Construction Standards Rules, Idaho Department of Water Resources (IDWR), edition in effect on the bid date.
2. Idaho Code Title 42, including Sections 42-111 and 42-227 (domestic exemption), 42-201 (water rights; firefighting use), 42-202 and 42-229 (applications and ground water permits), 42-235 (well drilling permits), and 42-238 (well driller licensing).
3. ANSI/AWWA A100, Water Wells.
4. ANSI/AWWA C654, Disinfection of Wells; ANSI/AWWA C655, Field Dechlorination; ANSI/AWWA C206, Field Welding of Steel Water Pipe.
5. NSF/ANSI/CAN 60 (drinking water treatment chemicals) and NSF/ANSI/CAN 61 (drinking water system components).
6. ASTM A53 (steel pipe); ASTM C150 (Portland cement).
7. NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection (Section 1.5 equivalency acceptance of the submersible fire pump; Chapter 7 well installation and submergence; Chapter 14 acceptance testing; well test requirements).
8. DEQ, Guidance for Public Water System Disposal of Water from Construction, Maintenance, and Operations.
9. NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems (periodic fire pump test volumes, Article 1.5.B).
10. NFPA 70, National Electrical Code, Article 695 (Fire Pumps), for coordination of the fire pump power supply by others.
11. 2018 International Fire Code and 2018 International Building Code, as adopted by the State of Idaho (IDAPA 18.08.01).
12. IDAPA 37.03.10, Well Driller Licensing Rules, Idaho Department of Water Resources.
13. Water Systems Council PAS-97, Performance Standard for Pitless Adapters, Pitless Units, and Well Caps (Articles 2.8 and 2.9).

1.3 DEFINITIONS

A. Owner: Idaho Transportation Department (ITD).

B. Project Architect: The Architect designated by the Owner to provide construction administration services for the Work of this section on the Owner's behalf, including processing Requests for Information and submittals, as described in Article 1.1.D.3.

C. Hydrogeologist: The Idaho-licensed Professional Geologist or Professional Engineer, experienced in water supply well design, retained by the Architect as a member of the Owner's design team, who is the designer of record for the wells and seals the well designs, Technical Memorandums and well certifications. Field observation, logging, sampling, and test direction may be performed by personnel under the Hydrogeologist's responsible charge. Where this section refers to the well design, it means the design prepared by the Hydrogeologist.

D. Contractor: The Idaho-licensed well drilling contractor contracted by the Owner to perform the Work of this section.

E. State Fire Marshal: The Idaho State Fire Marshal, the authority having jurisdiction for fire protection on this project.

F. Final Well Design: The sealed design for each well issued by the Hydrogeologist to the Contractor through the Project Architect, for both wells after the Well 2 pilot drilling, logging, and any zone testing (Article 3.6).

G. Review: Review, comment, release of hold points, or acceptance by the Owner or the Project Architect is solely for general conformance with the Owner's requirements. It shall not be construed as approval of the Contractor's means and methods or as a waiver of any requirement, and it does not relieve the Contractor of responsibility for constructing the wells in accordance with the Contract Documents, for compliance with codes and permits, or for errors or omissions in its Work.

H. Certified Well: A well that has met the certification criteria of Article 3.20 and has been certified by the Hydrogeologist.

I. Top of Well: The pitless adapter discharge at each pump, at the depth below finished grade shown in the final well design (Article 2.10.D). It is a reference point for the casing termination under this section and for the pump design by others.

J. 150 Percent Flow: 150 percent of the rated fire pump capacity. The basis of bid is a rated capacity of 1,500 gpm (Article 1.1.C.2), giving a 150 Percent Flow of 2,250 gpm (150 percent of 1,500 gpm). If the State Fire Marshal requires a higher fire flow, or the Owner revises the rated fire pump capacity, the 150 Percent Flow and the Well 2 design, test, and certification rates will be revised to 150 percent of the revised rating, and the resulting changes to the Work will be addressed by change order (Article 1.9.C). A revision after the Well 2 constant-rate test may require retesting or redesign of Well 2.

K. Stabilized Drawdown: A drawdown trend with a water level change of less than 0.1 foot per hour over the final two hours of the stabilized period, as determined by the Hydrogeologist.

L. BGS: Below ground surface.

M. Geotechnical Engineer: The Idaho-licensed professional engineer retained for the project who establishes the minimum fire pump submergence in accordance with NFPA 20 (Article 2.10.D.4).

1.4 PROJECT INFORMATION

A. Project Location: ITD D3 Highway 16 Maintenance Facility , Hwy 16, 6505 W Chinden

Blvd, Meridian, Idaho 83646 (Ada County), outside the City of Meridian city limits. The approximate well locations are shown on the Drawings. Final well locations are as shown on Drawings, selected by the Owner and Architect within the setbacks in Article 1.6, and checked by the Hydrogeologist before drilling.

B. Site Examination: The Contract Price is deemed to include the Contractor's examination of the site and of access conditions to each well location. Bidding requirements, including any site visit or pre-bid meeting, are stated in the Instructions to Bidders.

C. Subsurface Information: IDWR Well Driller's Reports for wells in the vicinity of the site are public records available from IDWR and are not part of the Contract Documents. The well schematics on the Drawings and the reference depths in Article 1.9.A.1 are a basis of design for bidding only. Subsurface conditions are not warranted. The Contractor shall make its own evaluation of the site and subsurface conditions affecting its means, methods, equipment, and schedule.

D. Occupancy: The Owner has confirmed in writing that the facility, including seasonal winter operations, contractors, and visitors, will have fewer than 20 persons on site, below the DEQ public water system threshold of an average of 25 individuals daily for at least 60 days per year (IDAPA 58.01.08). The water system will serve a single service connection. This occupancy is the basis for the design assumption in Article 1.5.A.1.

1.5 REGULATORY AND PERMITTING REQUIREMENTS

A. Water System Classification

1. Design assumption: The water system is not a public water system under IDAPA 58.01.08, based on the occupancy in Article 1.4.D (fewer than 20 persons, served by a single service connection). The wells are designed, and shall be bid, on this basis. Public water system requirements and IDAPA 58.01.08 are not part of this Contract.

2. Basis: A public water system under IDAPA 58.01.08 has at least 15 service connections or serves an average of at least 25 individuals daily at least 60 days per year. Accordingly, the following public water system requirements do not apply: DEQ source redundancy, fire flow pumping redundancy, and standby power requirements; DEQ well site approval; and DEQ review of plans and specifications.

3. DEQ determination: The Owner has confirmed the occupancy in Article 1.4.D in writing, and no DEQ review approval, or determination is required. If DEQ determines otherwise, resulting changes will be addressed by change order (Article 1.9.C).

4. Owner Requirements: The Owner has elected to apply the following requirements to the wells. IDAPA 58.01.08 does not apply to this project. These requirements are for quality purposes only and do not classify the system as a public water system or imply DEQ review or approval. Where IDAPA 37.03.09 is more stringent than an Owner requirement below, IDAPA 37.03.09 governs. The Owner requirements are:

a. Setbacks of IDAPA 37.03.09 as modified in Article 1.6.C (Articles 1.6.B and 1.6.C).

b. Well Construction: casing (Article 2.2), screens (Article 2.3), surface seal not less than 58 feet deep (Article 2.5.B; IDAPA 37.03.09 minimum: 38 feet), sealants (Articles 2.5.D and 3.10), geologic sampling (Article 3.5), alignment and plumbness (Article 3.12), and retention of well records (Article 3.21.C).

c. Disinfection of tools and equipment inserted in the borehole (Articles 2.1.E and 3.14).

d. Development and testing: sand content not more than 5 ppm (Article 3.11; IDAPA 37.03.09 limit: 15 ppm) and pumping tests (Article 3.15).

e. Technical Memorandum (Article 3.19 and source water quality testing (Article 3.16).

f. Abandonment (Article 3.22).

B. Water Right Permitting: The Hydrogeologist will prepare the water right permitting for the wells on behalf of the Owner, for filing in the name of the Owner. Water right permitting is not part of the Contractor's Work, except that the Contractor shall furnish the pumping test volumes, test durations, and well data the Hydrogeologist requires (Articles 1.11.B and 3.15). Issuance of a water right permit or exemption determination is not a condition of well certification or final payment under this section. The water right permitting will include:

1. A written determination of whether the facility use qualifies for the domestic exemption under Idaho Code 42-111 and 42-227. The Owner has stated that the facility domestic demand will remain below 30 gpm; the annual diversion volume will be estimated from the ITD Maintenance Shed building design. Under current statute, a commercial or business use qualifies only if the total diversion from all wells on the property does not exceed 2.8 acre-feet per year, and exemptions may not be stacked across multiple wells on one property.

2. If the use does not qualify for the domestic exemption under Article 1.5.B.1, the application for permit to appropriate ground water (Idaho Code 42-202 and 42-229) with IDWR for the Owner's signature, responses to IDWR requests for information, and pursuit of the application to issuance of the permit. IDWR filing and publication fees will be paid by the Owner. Water right mitigation and any contested case resulting from a protest are not part of this Contract.

3. Accounting with IDWR for well test, development, and periodic fire pump test volumes, unless the Owner has furnished IDWR's written position with the bid documents (Article 1.5.E). Use of water to extinguish an existing fire or prevent its spread is permitted without a water right (Idaho Code 42-201(3)(a)); this allowance does not cover well testing, development, or periodic fire pump testing, which will be included in the exemption determination or water right application.

C. Other Permits: The Contractor shall obtain, pay for, and comply with:

1. IDWR well drilling permits for each well (Idaho Code 42-235), with construction by an Idaho-licensed well driller (Idaho Code 42-238) in accordance with IDAPA 37.03.09.

2. Local agency coordination: The site is outside the City of Meridian city limits, and the project is a State of Idaho project. City of Meridian ordinances do not govern the Work; the State may refer the project to the City of Meridian for input but is not obligated to comply with the City's recommendations. The Contractor shall obtain any Ada County or other local permits that apply to drilling and site work on a State project, and shall coordinate any City of Meridian input through the Project Architect.

3. Authorization for disposal of drilling, development, test, and chlorinated water, and any construction stormwater coverage required under the Idaho Pollutant Discharge Elimination System (IPDES).

D. Fire Protection

1. The authority having jurisdiction for fire protection is the Idaho State Fire Marshal. Local fire department or fire district requirements do not govern this project unless adopted by the State Fire Marshal.

2. State Fire Marshal position: The Owner will obtain the State Fire Marshal's written position on (a) acceptance of the submersible fire pump arrangement under NFPA 20 Section 1.5 (Equivalency), and (b) whether a redundant fire pump, second fire supply well, fire water storage, or other secondary supply is required, and (c) the required duration of the Well 2 constant-rate test at 150 percent of the rated fire pump capacity, and will furnish it with the bid documents (Article 1.5.E) or before the Well 2 final well design is issued (Article 1.10.A.2). The Contractor shall comply with the State Fire Marshal's requirements for the wells and well testing in that position. Requirements first furnished after bid that change the scope of the wells, such as a second fire supply well or a change in the Well 2 casing diameter, will be addressed by change order (Article 1.9.C). State Fire Marshal requirements for the pumps, controllers, or power supply are not part of the Contractor's Work and will be addressed by the Owner.

3. The Well 2 constant-rate test (Article 3.15) is intended to satisfy the NFPA 20 well test and shall be witnessed by the State Fire Marshal unless the State Fire Marshal waives witnessing in writing. The Contractor shall schedule the test with the State Fire Marshal, provide not less than 7 days' notice to the State Fire Marshal and the Project Architect, and submit the witness record or written waiver to the Owner, with a copy to the Project Architect.

E. Owner-Furnished Agency Positions: The Owner will furnish with the bid documents any written positions it has obtained before bid from the State Fire Marshal, DEQ, or IDWR concerning the matters in this Article. Where furnished, those positions govern over the corresponding obligations to obtain them in Article 1.5.B.3. The DEQ determination and the State Fire Marshal's position are obtained by the Owner (Articles 1.5.A.3 and 1.5.D.2). The Owner does not warrant that any position will be obtained before bid.

F. The Contractor shall advise the Project Architect in writing of any conflict between this section and applicable regulatory requirements.

1.6 WELL SITING AND WELLHEAD PROTECTION

A. The well locations are shown on the Drawings and were selected by the Owner and Architect within the setbacks of Articles 1.6.B and 1.6.C. The Hydrogeologist will check the locations against those setbacks before drilling. The Contractor shall stake each well at the coordinates shown on the Drawings and shall locate all utilities affecting the well sites before drilling.

B. Minimum setback distances from each well (Owner Requirement), or the setbacks of IDAPA 37.03.09 if greater, except as modified in Article 1.6.C:

Potential Source	Minimum Distance
Frost-free hydrant	5 feet
Property line	50 feet
Gravity wastewater line; any potential source of contamination	50 feet
Pressure wastewater line	100 feet
Class A municipal reclaimed wastewater pressure distribution line	50 feet
Septic tank, disposal field, seepage pit, privy, standard drainfield	100 feet
Livestock	50 feet
Canals, streams, ditches, ponds; tanks storing non-potable substances	50 feet

Storm water facilities receiving storm water from off the well site	50 feet
Large soil absorption system	150 – 300 feet (IDAPA 58.01.03)
Municipal or industrial wastewater treatment plant	500 feet
Biosolids application site	1,000 feet

C. Owner Modifications to the Setbacks: The Owner modifies the setback table in Article 1.6.B as follows: (1) 'Gravity wastewater line' and 'pressure wastewater line' mean sewer main lines and sub-mains serving multiple sources, with setbacks of 50 feet (gravity) and 100 feet (pressurized) in accordance with IDAPA 37.03.09.025.01.d. A secondary sewer or floor drain collection line serving only the ITD Maintenance Shed building shall be located not less than 25 feet from either well and shall be pressure tested, in accordance with IDAPA 37.03.09.025.01.d. (2) The generator fuel storage, an above-ground UL-listed double-wall tank, is an above-ground chemical storage tank under IDAPA 37.03.09.025.01.d and shall be located not less than 20 feet from either well (Owner requirement). (3) Permanent buildings, other than those housing the well or plumbing apparatus, shall be not less than 10 feet from either well (IDAPA 37.03.09.025.01.d).

D. Contamination: No contamination is known at the proposed locations. If contamination is encountered, stop work and notify the Project Architect. Contract adjustments will be made by change order (Article 1.9.C). Bids shall assume no contamination is present.

E. Any well constructed through contamination, or where mineralized or contaminated water is encountered, shall be constructed as directed by the Hydrogeologist to seal out the poor-quality water (IDAPA 37.03.09 Rule 35.02), including double casing where required.

1.7 SUBMITTALS

A. Submit to the Project Architect. Submittals related to well construction, materials, and testing will be reviewed with the Hydrogeologist. The Project Architect and the Owner will review submittals within 10 business days. Except at the field hold points, no standby time (Bid Items A-29 and B-23) or additional cost will be accrued during review periods. At the field hold points of Articles 1.10.A.3 through 1.10.A.5, the Project Architect and the Hydrogeologist will respond within 3 working days, and Owner-directed rig standby beyond 3 working days will be paid under Bid Items A-29 and B-23. Documents prepared by the Hydrogeologist (well site evaluation, final well designs, test reports, well information (Article 2.10.D), well completion reports, and certifications) are design documents issued to the Contractor through the Project Architect and are not Contractor submittals.

B. Pre-Mobilization Submittals: Before mobilization, submit:

1. Copy of the driller's current Idaho well driller license (Idaho Code 42-238) and the driller's qualifications (Article 1.8).
2. Written confirmation that the Contractor has reviewed the well schematics on the Drawings with the Contractor's proposed equipment and methods to construct each well and any questions for the Hydrogeologist.
3. Copies of permits, registrations, and notifications required by agencies having jurisdiction, including the IDWR well drilling permits.
4. Manufacturer's certification that the casing and screen materials conform to this section.

5. Drilling Plan, sufficient to efficiently perform the Work as evaluated by the Owner and Project Architect, including as a minimum a complete description of:
    a. Proposed drilling methods (Article 3.2).
    b. The drill rig(s) and other major equipment to be provided, demonstrating capability to drill the Well 2 pilot borehole to the Well 2 pilot reference depth, to perform zone isolation and testing in the pilot borehole, and to ream and complete Well 2 at the casing and conductor diameters shown on the Drawings to the Well 2 reference depth (Article 1.9.A.1).
    c. Proposed methods for managing fluid (water, sealant, and other fluid) so that no damage results to surrounding property and turbid water does not enter streams or surface water bodies.
    d. Proposed methods for controlling spills of material of potential environmental concern.
    e. Proposed methods and materials to control loss of circulation during drilling.
6. Pumping test plan for each well, prepared by the Contractor to carry out the Hydrogeologist's test program, including test pump, temporary power, flow measurement, sounding tubes, discharge piping route and disposal location, and erosion control (Articles 2.7, 3.15, and 3.17).

C. Material Submittals Before Purchase: Before purchase and delivery of screen and filter pack, submit manufacturer-generated submittal sheets showing:
1. Grain-size and composition characteristics of the filter pack.
2. Open area of the planned screen, in square inches per vertical foot of screen, and the resulting entrance velocity (Article 2.3).
3. Screen strength (collapse and tensile) characteristics.
4. Conformance of the casing, screen, and fittings with this section, and NSF/ANSI/CAN 60 and 61 certifications where applicable.
5. Safety Data Sheets and NSF/ANSI/CAN 60 certification for any drilling fluid or additive proposed (Article 2.6).
6. No additional charges will be accrued by the Contractor while waiting for material delivery.

D. Daily Driller's Reports
1. Prepare and keep complete daily driller's reports during drilling, construction, development, and testing. Entries shall be made in sequence so that each can be correlated with the depth of the borehole at the time. Each report shall be complete at the end of each shift and open to inspection at all times.
2. For each week (Sunday through Saturday) of work, forward the daily driller's reports to the Project Architect by noon the following Monday.
3. When applicable, each daily driller's report shall describe:
    a. The reference point for all depth measurements; feet drilled, with borehole depths at the beginning and end of the shift; depths at which borehole diameters (bit sizes) change; and hours in the shift.
    b. Number of formation samples taken and associated depths; depth of each change of formation; and description and thickness of each formation.
    c. Depth(s) at which water was first encountered; water level at the beginning and end of each shift; water level at each change of formation; and any rapid change in water level.

d. Water losses, heaving, or other problems (water, color, odor, and similar).

e. Feet of casing set or extracted; sealing depths; total depth of the completed well; and depth, volume, and specification of filter pack or formation stabilizer.

f. Types and quantities of additives; drilling mud weight, sand content, and viscosity, when applicable.

g. Materials used; drilling and development water discharge estimates; well development progress and amount of material generated.

h. Depth or location of any lost drilling fluids, materials, or tools; shutdown times caused by equipment breakdown; cause of delays; and record of authorized hourly work.

i. Other pertinent data requested by the Owner or Project Architect.

E. Project Submittals

1. Geophysical, lithologic, and caliper logs, sieve analyses, and zone test data for the Well 2 pilot borehole, Well 1, and Well 2, for the Hydrogeologist's use in the final well designs and the Well 2 pilot/zone test report (Articles 3.4 through 3.6 and 3.15).

2. Alignment and plumbness test data and analysis of compliance, within 48 hours of test completion (Article 3.12).

3. Color video inspection recordings on USB flash drives (Article 3.13).

4. Development records, sand content tests, and pumping test data, for the Hydrogeologist's test report (Articles 3.11 and 3.15).

5. Water quality laboratory results and bacteriological results following disinfection (Articles 3.14 and 3.16).

6. Casing termination and temporary well cap details for each well, coordinated with the Top of Well (pitless adapter) depth and casing termination requirements in the final well design (Articles 2.9 and 2.10.D).

7. Narrative of debris and fluid disposal (Article 3.17).

8. IDWR Well Driller's Report for each well, and the construction data required for the Hydrogeologist's Technical Memorandum (Article 3.19).

9. The well driller's written attestation of construction for each well (Article 3.20.A.1).

10. As-constructed data (depths, diameters, materials, and quantities) for the Hydrogeologist's Technical Memorandum (Article 3.19).

1.8 QUALITY ASSURANCE

A. Drilling shall be directly supervised on site by an Idaho-licensed well driller. A driller and helper employed by the Contractor shall be assigned to field activities at all times during well drilling and construction.

B. The driller shall have completed a minimum of three (3) production wells of 24-inch casing diameter or larger within the last 10 years.

C. The Hydrogeologist, or a qualified representative under the Hydrogeologist's direct supervision, will be on site during geophysical logging, casing and screen installation, filter pack and surface seal placement, alignment testing, and the start and end of each pumping test. The Contractor shall schedule these activities with the Hydrogeologist and provide not less than 48 hours' notice (Article 1.10.B).

1.1 BASIS OF PAYMENT AND RISK

A. The Contract Price is the total of the extended amounts of the Bid Schedule in Article 1.9.D: each unit-price item's estimated quantity multiplied by its unit price, plus the lump sum items. Payment will be made at the bid unit prices for the quantities actually performed and measured in accordance with Article 1.9.E, including differences between the estimated quantities and the quantities in the Hydrogeologist's final well designs. Estimated quantities are based on the reference depths in Article 1.9.A.1 and the Drawings, are for comparison of bids only, and are not guaranteed. Award will be based on the total of Bid Schedules A and B, as stated in the Instructions to Bidders. Article 1.9 governs over any variation-in-quantities provisions of the General Conditions.

1. Reference Depths (Basis of Design and Pricing): The basis of design and the bid are the following reference depths below ground surface (bgs): Well 2 pilot borehole, 600 feet; Well 1 completed depth, 300 feet; Well 2 completed depth, 600 feet, with the casing, screen, filter pack, and surface seal shown on the Drawings. Zone testing, pilot sealing below the Well 2 final design depth (Article 3.4.A.5), and other items directed by the Hydrogeologist will be paid at the Bid Schedule unit prices only for the quantities actually performed. The reference depths do not represent the conditions that will be encountered; actual depths will be established in the Hydrogeologist's final well designs.

B. If a well constructed in accordance with the Hydrogeologist's final well design and this section cannot meet the certification criteria because of subsurface conditions, corrective work directed by the Hydrogeologist (deepening, redevelopment, rescreening, or replacement) will be paid at the unit prices in Article 1.9.D or by change order. Where the failure results from the Contractor's workmanship, materials, or equipment, or from its failure to follow the well design or this section, the Contractor shall correct the work, or decommission the well in accordance with IDAPA 37.03.09 and replace it at a location designated by the Hydrogeologist, at no additional cost to the Owner.

C. The following will be addressed by change order: contamination encountered (Article 1.6); a DEQ determination that the system is a public water system (Article 1.5.A); and a pump is selected by others that exceeds the pump envelope in Article 2.10.B after the final well design is issued, where it requires a larger casing or other change in well construction; and a Well 2 casing diameter larger than the 24-inch minimum required by the final well design (Article 2.2.C.3). Requirements of the State Fire Marshal for the wells and well testing contained in a written position furnished with the bid documents are the Contractor's responsibility. Requirements in a State Fire Marshal position first furnished after bid that change the scope of the wells, as described in Article 1.5.D.2, will be addressed by change order.

D. Bid Schedule: The bid shall be submitted on the following Bid Schedule, with a unit price or lump sum price for each item. Bid Schedule A (Well 2) and Bid Schedule B (Well 1) shall each be totaled. The unit prices also apply to corrective work under Article 1.9.B and to work the Owner directs beyond the requirements of this section. Estimated quantities and diameters are a design-team basis for bidding only, assuming a 24-inch pump chamber to 300 feet with telescoped casing and screen below in Well 2 (Article 2.2.C.4); final quantities and diameters will be set by the Hydrogeologist's final well designs and paid at the measured quantities.

1. Bid Schedule A – Well 2 (Fire Supply and Redundant Domestic Well, including the pilot borehole) (30 items):

Item	Description	Spec Article	Unit	Est. Qty.	Unit Price	Extended Amount
A-01	Mobilization and demobilization, including bonds and insurance; not more than 10 percent of the Schedule total	1.9.E.7	LS	1	$	$
A-02	Site access, drilling fluid containment, and erosion and sediment control	3.1	LS	1	$	$
A-03	Drilling, Well 2 nominal 8-inch pilot borehole (7-7/8" or 8-1/2" diameter)	3.4.A.1	LF	600	$	$
A-04	Geophysical logging, furnished by the Contractor through a qualified logging service, program per the Hydrogeologist (pilot geophysical suite; reamed-hole caliper), each run	3.4.A.2	EA	2	$	$
A-05	Zone isolation (packer or temporary casing set and removed), each interval, at the Hydrogeologist's option (Article 3.4.A.3)	3.4.A.3	EA	2	$	$
A-06	Zone test pumping, at the Hydrogeologist's option	3.4.A.3	HR	16	$	$
A-07	Permanent surface conductor casing, 30-inch O.D., 0 to 40 ft (depth determined in field by Hydrogeologist), furnished and installed in place.	2.2.B, 3.3	LF	40	$	$
A-08	Reaming to final borehole diameter, 24-inch, 0 to 300 ft (pump chamber)	3.7	LF	300	$	$
A-09	Reaming to final borehole diameter, 20-inch, 300 to 600 ft	3.7	LF	300	$	$
A-10	Permanent casing, 20-inch nominal minimum (pump chamber), 0 to 300 ft, furnished and installed	2.2.C.2, 3.8	LF	300	$	$
A-11	Permanent casing, 16-inch, below the pump chamber, furnished and installed	2.2.C.4, 3.8	LF	100	$	$
A-12	Well screen, 16-inch, Type 304 stainless steel, furnished and installed	2.3, 3.8	LF	180	$	$
A-13	Tailpipe below the screen	2.3, 3.8	LF	20	$	$
A-14	Bottom plate	2.3	EA	1	$	$
A-15	Filter pack furnished and installed	2.4, 3.9	CF	260	$	$
A-16	Surface seal to not less than 58 feet	2.5, 3.10	LF	58	$	$
A-17	Surface seal deeper than 58 feet, where required by the final well design	2.5, 3.10	LF	200	$	$
A-18	Sealing of the pilot borehole below the Well 2 final design depth	3.4.A.5	LF	0	$	$
A-19	Development	3.11	HR	48	$	$
A-20	Alignment, plumbness, and video inspection	3.12, 3.13	EA	1	$	$
A-21	Test pump, temporary power, flow measurement, and discharge piping, furnished, installed, and removed	2.7	LS	1	$	$
A-22	Step-rate test	3.15.B	HR	5	$	$
A-23	Constant-rate test, minimum duration (Article 3.15.D)	3.15.D	HR	8	$	$
A-24	Constant-rate test extension at the request of the Owner or the Hydrogeologist, including disposal of the extension volume	3.15.D	HR	12	$	$
A-25	Disposal of drilling, development, and test water (Article 3.17)	3.17	LS	1	$	$
A-26	Pre-test and final disinfection, bacteriological sampling, and water quality sampling and analysis (Articles 3.14 and 3.16)	3.14, 3.16	EA	1	$	$
A-27	Owner-requested additional water quality analyses	3.16	EA	0	$	$
A-28	Casing termination and temporary well cap	2.8, 2.9, 3.18	EA	1	$	$
A-29	Standby time at the Owner's direction	1.9.E.5	HR	8	$	$
A-30	Decommissioning of a borehole or well directed by the Hydrogeologist	3.22	EA	0	$	$

Item	Description	Spec Article	Unit	Est. Qty.	Unit Price	Extended Amount
	TOTAL, BID SCHEDULE A					**$**

2. Bid Schedule B – Well 1 (Domestic Supply Well) (24 items):

Item	Description	Spec Article	Unit	Est. Qty.	Unit Price	Extended Amount
B-01	Mobilization and demobilization, including bonds and insurance; not more than 10 percent of the Schedule total	1.9.E.7	LS	1	$	$
B-02	Site access, drilling fluid containment, and erosion and sediment control	3.1	LS	1	$	$
B-03	Geophysical logging (caliper), furnished by the Contractor through a qualified logging service, program per the Hydrogeologist, each run	3.4.B	EA	1	$	$
B-04	Permanent surface conductor casing, 14-inch O.D., 0 to 40 ft (depth determined in field by Hydrogeologist), furnished and installed in place	2.2.B, 3.3	LF	40	$	$
B-05	Drilling to final borehole diameter, 12-inch, 0 to 300 ft	3.4.B, 3.7	LF	300	$	$
B-06	Permanent casing, 6-inch nominal minimum, furnished and installed	2.2.C.1, 3.8	LF	250	$	$
B-07	Well screen, 6-inch, Type 304 stainless steel, furnished and installed	2.3, 3.8	LF	40	$	$
B-08	Tailpipe below the screen	2.3, 3.8	LF	10	$	$
B-09	Bottom plate	2.3	EA	1	$	$
B-10	Filter pack furnished and installed	2.4, 3.9	CF	50	$	$
B-11	Surface seal to not less than 58 feet	2.5, 3.10	LF	58	$	$
B-12	Surface seal deeper than 58 feet, where required by the final well design	2.5, 3.10	LF	0	$	$
B-13	Development	3.11	HR	24	$	$
B-14	Alignment, plumbness, and video inspection	3.12, 3.13	EA	1	$	$
B-15	Test pump, temporary power, flow measurement, and discharge piping, furnished, installed, and removed	2.7	LS	1	$	$
B-16	Step-rate test	3.15.B	HR	4	$	$
B-17	Constant-rate test, minimum duration (Article 3.15.C)	3.15.C	HR	4	$	$
B-18	Constant-rate test extension at the request of the Owner or the Hydrogeologist, including disposal of the extension volume	3.15.C	HR	12	$	$
B-19	Disposal of drilling, development, and test water (Article 3.17)	3.17	LS	1	$	$
B-20	Pre-test and final disinfection, bacteriological sampling, and water quality sampling and analysis (Articles 3.14 and 3.16)	3.14, 3.16	EA	1	$	$
B-21	Owner-requested additional water quality analyses	3.16	EA	0	$	$
B-22	Casing termination and temporary well cap	2.8, 2.9, 3.18	EA	1	$	$
B-23	Standby time at the Owner's direction	1.9.E.5	HR	8	$	$
B-24	Decommissioning of a borehole or well directed by the Hydrogeologist	3.22	EA	0	$	$
	TOTAL, BID SCHEDULE B					**$**

E. Measurement: Quantities will be measured as follows and recorded by the Hydrogeologist, with copies to the Project Architect:

1. Drilling and reaming: per vertical foot from ground surface to the bottom of the borehole, for each diameter and interval listed. Conductor casing is measured only to the depth required by the final well design; conductor installed deeper for

the Contractor's drilling method is not measured.

2. Casing, liner, screen, and tailpipe: per linear foot installed in the well, as recorded on the as-constructed record (Article 3.19). Casing cut off or removed is not measured.
3. Filter pack: per cubic foot placed in the annulus, from delivery tickets, less material wasted or removed.
4. Surface seal: per linear foot of seal depth placed and accepted.
5. Development, test pumping, zone test pumping, test extension, and standby: per hour of actual operation or Owner-directed standby. Constant-rate test hours up to the minimum duration of Article 3.15 are measured under Items A-23 and B-17; hours beyond the minimum requested by the Owner or the Hydrogeologist are measured under Items A-24 and B-18. Recovery periods (Article 3.15.A.3), review periods (Article 1.7.A), repeated tests (Article 3.15.F), and time lost to the Contractor's equipment failure are not measured.
6. Each (EA) items: per item completed and accepted. Alignment, plumbness, and video inspection (Items A-20 and B-14) include rig time to remove and reinstall drilling tools; retests after a failed test are not measured.
7. Lump sum (LS) items: paid in proportion to completion. Mobilization will be paid 50 percent on mobilization and the balance at demobilization.
8. Work required by this section and not listed as a Bid Schedule item is incidental to the listed items and will not be paid separately.

1.2 SEQUENCING, NOTIFICATIONS, AND HOLD POINTS

A. Hold Points: Work shall not proceed past the following hold points without written release from the Project Architect:

1. Contractor's pre-mobilization submittals reviewed, IDWR drilling permits obtained, and the Owner's notice that water right permitting has been initiated – before drilling.
2. The Owner's written confirmation of the rated fire pump capacity (State Fire Marshal fire flow), issued to the Contractor through the Project Architect – before the final well designs are issued.
3. Well 2 pilot logs and any zone test results, and the Hydrogeologist's final well designs for both wells with the predicted Well 2 performance, issued to the Contractor through the Project Architect – before reaming Well 2 or drilling Well 1.
4. Alignment, plumbness, and video inspection results accepted – before pumping tests.
5. Pumping test and water quality results received – before final disinfection and installation of the temporary well caps.

B. Notifications: Provide not less than 48 hours' notice to the Owner and Project Architect before each of the following, so that the work can be observed: filter pack installation; surface seal installation; well development; alignment and plumbness testing; video camera inspection; and the start of each step-rate and constant-rate pumping test. Provide not less than 7 days' notice of the Well 2 constant-rate test to the State Fire Marshal (Article 1.5.D.3).

1.3 COORDINATION WITH WORK BY OTHERS

A. The pitless adapters, permanent well caps, and permanent pumps will be furnished and installed, and the standby generator, electrical service, and fire pump controller room will be provided by others after the wells are certified (Article 1.1.F). The Contractor shall leave each well with the casing terminated as required by Article 2.9 for the pitless adapters, disinfected, and closed with the temporary sanitary well cap (Article 2.8).

B. The Contractor shall provide all test data in electronic format (spreadsheet and transducer files) to the Hydrogeologist and the Project Architect (Article 3.15).

C. Coordination Information: The following are provided by others and are listed for the Contractor's information only: pitless adapters and permanent well caps; fire pump power supply and raceway per NFPA 70 Article 695; grading, vehicle protection (bollards), and finished surfacing at both wellheads; and the discharge piping connected to the pitless adapters. Both wellheads shall remain free of permanent structures, with clear overhead space and boom-truck access for pitless adapter and pump installation and removal. The Contractor has no responsibility for these items, except that its casing termination and temporary well caps shall not conflict with them.

1.4 GENERAL RESPONSIBILITIES OF THE CONTRACTOR

A. The Contractor shall provide all personnel, equipment, and materials appropriate for completing the Work and is solely responsible for the means, methods, sequences, and procedures of construction and for constructing the wells in accordance with the Hydrogeologist's well designs and this section. The Contractor shall coordinate with the Hydrogeologist throughout permitting, drilling, construction, development, and testing so that the wells meet the requirements of this section.

B. Work under this section shall meet IDAPA 37.03.09 and the project standards adopted in Article 1.5.A.4. This section is not intended to replace State of Idaho or local well construction standards. The Owner and Project Architect are not responsible for the Contractor's failure to construct the wells to State of Idaho minimum well construction standards or to the requirements of any approved waiver or variance. Correction of conditions not meeting those standards or requirements shall be completed by the Contractor at no expense to the Owner.

C. The Contractor is solely responsible for the safety of its personnel at the job site.

D. The Owner and Project Architect are not responsible for damage to or vandalism of the Contractor's equipment while at the work site. The Contractor is responsible for costs associated with damage to or loss of downhole equipment during drilling, construction, development, or testing.

PART 2 - PRODUCTS

2.1 GENERAL MATERIALS

A. All materials shall be new. Examine all materials for defects; do not install material that is known or thought to be defective.

B. The Owner reserves the right to inspect and reject defective material delivered to or stored on site. Failure of the Owner to detect defective material shall not relieve the Contractor of responsibility for the completed work.

C. As a project standard, because both wells will house domestic pumps, products with water contact surfaces in both wells shall conform to applicable AWWA standards and be certified to NSF/ANSI/CAN 61. Drilling and development additives shall be certified

to NSF/ANSI/CAN 60.

D. All water used in construction, alteration, repair, or decommissioning of any well shall be of drinking water quality.

E. Drilling rigs, tools, pipe, and other equipment inserted in the borehole shall be cleaned and disinfected before use in accordance with IDAPA 37.03.09 (IDWR).

2.2 WELL CASING

A. General

1. Casing shall be new steel pipe meeting IDAPA 37.03.09, free of dents, corrosion, and defects. Plastic casing is not permitted.

2. Wall thickness and diameter shall comply with IDAPA 37.03.09 Rule 25 and with the minimums below. Casing diameters specified are the minimum allowable diameters (inside or outside diameter as specified); casing shall not be less than the nominal diameter specified.

3. Casing shall be joined in accordance with IDAPA 37.03.09. Joints shall be at least equal in thickness and strength to the casing.

4. The lead section of each casing string shall be fitted with a welded casing shoe compatible with the casing diameter, expected subsurface conditions, and depths planned.

5. The Contractor shall verify that the strength and wall thickness of each casing string are sufficient to withstand installation, pullback, and grouting, and is fully responsible for breaks or failures of temporary and permanent casing strings during the Work.

6. Casing diameter and wall thickness shall be as required by IDAPA 37.03.09 Rule 25 for a casing table for the diameter selected in the Hydrogeologist's final well design.

B. Conductor Casing

1. Conductor casing shall be as required by the Hydrogeologist's final well design to construct the filter pack and surface seal in accordance with IDAPA 37.03.09 and Article 2.5.

2. Unless a permanent, grouted conductor is shown in the final well design, the conductor casing is a temporary surface conductor installed to not less than the surface seal depth, and deeper where required by the final well design. A conductor installed deeper for the Contractor's drilling method is at the Contractor's cost.

3. Treatment of the conductor casing shoe at final depth shall be as required by the Hydrogeologist's final well design. The Contractor is responsible for well damage, compromise of the seal, or inability to complete the well as specified resulting from its conductor installation and removal.

4. A reduction in well diameter will not be allowed as a consequence of the Contractor's inability to construct an adequate filter pack or surface seal around the permanent casing or screen.

5. Temporary conductor casing removed from the well remains the property of the Contractor and shall be removed from the site before completion of the Work.

C. Permanent Casing

1. Well 1 – Domestic Supply Well: 6-inch nominal minimum permanent casing, with

final casing selection by the Hydrogeologist, having a minimum clear inside diameter sufficient to house the domestic submersible pump and motor (including cable guard), drop pipe, power cable, and sounding tubes of the pump envelope (Article 2.10.B), with the clearances required by the pump manufacturer (Owner requirement). Diameter selected in the Hydrogeologist's final well design; wall thickness per the IDAPA 58.01.08.510.03.a casing table.

2. Well 2 – Fire Supply and Redundant Domestic Well: 24-inch nominal minimum pump chamber casing (24.000-inch outside diameter, 0.500-inch wall), with final casing selection by the Hydrogeologist, with a minimum clear inside diameter sufficient to house both pumps as required by Article 2.2.C.3 (Owner requirement), extending to the depth in the Hydrogeologist's final well design. Diameter selected in the Hydrogeologist's final well design; wall thickness per Article 2.2.A.6.

3. The Well 2 pump chamber shall house both the future fire pump and the future domestic pump, plus sounding tubes and a water level transducer. The domestic pump will be set above the fire pump bowl assembly, alongside the fire pump column. The Hydrogeologist shall establish the pump chamber diameter and depth in the Well 2 final well design and shall prepare a clearance layout, using the pump envelope (Article 2.10.B), based on the full assembly envelope of each pump: pump bowls, submersible motor, motor shroud or flow inducer sleeve, pump guides, cable guards, torque arrestor, column or drop pipe couplings, power cables, sounding tubes, and transducer. The clearance check shall be made, and the minimum clear space shown, at each of the following: (a) the fire pump bowl assembly and motor, including the flow inducer sleeve; (b) the domestic pump and motor elevation, beside the fire pump column; (c) the fire pump column couplings and the domestic drop pipe couplings at their largest combined section; and (d) any other elevation where the combined assembly is largest. The Hydrogeologist shall size the pump chamber so that both pumps can be housed with the manufacturers' required clearances; casing installed at the 24-inch minimum is measured under Bid Item A-10; a larger casing diameter required by the final well design will be addressed by change order (Article 1.9.C).

4. The bid basis assumes the 24-inch pump chamber to 300 feet, with telescoped casing and screen below (Article 1.9.D). Reduction of casing diameter below the pump chamber (telescoped screen or liner) and the final arrangement shall be as shown in the accepted final well design.

5. Permanent casing and screen assemblies shall be installed to the depths in the final well design and shall extend to the final casing height in Article 2.9.A.

6. Casing Centralizers: As required by the Hydrogeologist's final well design to keep the permanent casing centered in the borehole and to provide the annular seal thickness required by Article 2.5. Casing centralizers are part of this Contract. They are not pump guides; pump guides are furnished with the pumps by others.

2.3 WELL SCREEN ASSEMBLY

A. Screens shall be commercially manufactured well screens, certified to NSF/ANSI/CAN 61 and resistant to damage by chemical action of groundwater and cleaning operations. Screens shall be Type 304 stainless steel (Owner requirement), unless a higher grade is required by the final well design. Final selection of screen type, diameter, length, and slot size shall be made by the Hydrogeologist in the Hydrogeologist's final well design. Slot openings shall be based on sieve analysis of the formation, the filter pack, or both.

B. The screen assembly may include blank steel casing between screen sections and a blank steel tailpipe, depending on subsurface conditions. Blank sections and tailpipe shall be of a wall thickness and diameter compatible with the screen and shall not reduce the minimum diameter of the screen assembly.

C. The bottom of the screen assembly shall be sealed with a bottom plate as selected by the Hydrogeologist. Where the bottom plate is attached directly to the screen, it shall be of the same material as the screen; where a tailpipe is used below the screen, the bottom plate may be of a different material .

D. Screens, joints, and fittings shall be designed by the Hydrogeologist for the loads of the well design and installed as recommended by the screen manufacturer.

E. Screen length and open area, as determined by the Hydrogeologist in the Hydrogeologist's final well design, shall provide an aperture entrance velocity not exceeding 0.1 foot per second at the design capacity of the well (Well 2: 1,500 gpm), unless a deviation is approved in writing by the Owner (Article 3.23) (Owner requirement). For Well 2, also report the entrance velocity at 2,250 gpm.

F. Screens shall be set so that the pumping water level remains above the top of the screen under all operating conditions, including Well 2 operation at 2,250 gpm.

G. Telescoped screens shall be sealed to the casing as selected by the Hydrogeologist. In consolidated formations, an open-hole completion below the casing may be used in place of a screen where approved in the Hydrogeologist's final well design.

H. The Contractor is fully responsible for breaks or failures of the screen assembly or welds during the Work. If the screen assembly is not installed within 2 feet (vertically) of the design depth, the Owner may refuse to accept the well.

2.4 FILTER PACK

A. Filter pack shall be clean, hard, well-rounded material of the type and gradation selected by the Hydrogeologist in the Hydrogeologist's final well design, certified to NSF/ANSI/CAN 61.

B. Gradation and installation depths shall be as determined in the accepted final well design (Article 3.6).

C. Filter pack shall be disinfected and free of impurities, and shall be disinfected during placement with a solution of potable water having a free chlorine concentration of not less than 50 mg/L.

D. If the Owner requests, deliver samples of the proposed filter pack at least seven (7) days before placement for laboratory sieve analysis. Failure to meet the gradation is grounds for rejection.

E. Provide transition material between the filter pack and the surface seal as required by the Hydrogeologist's final well design to prevent sealant from infiltrating the filter pack.

2.5 SURFACE SEAL (ANNULAR SEAL) AND GROUT

A. The surface seal shall extend from the top of the filter pack transition material to the ground surface. Seal methods, materials, and minimum annular thickness shall comply with IDAPA 37.03.09 Rule 25.

B. Seal depth: Not less than 58 feet below land surface, or to the top of the first confining layer above the intake zone if deeper, as shown in the accepted final well design (Owner requirement, Article 1.5.A.4).

C. Permanent casing shall be surrounded by not less than 1-1/2 inches of grout over the

full required seal depth (Owner requirement).

D. Sealant Materials: Sealant materials, mixes, additives, and placement methods shall be as selected by the Hydrogeologist in the Hydrogeologist's final well design and shall comply with IDAPA 37.03.09.

E. All sealant materials in contact with the water supply shall conform to NSF/ANSI/CAN 61. Only clean, potable water shall be used to mix grout.

2.6 DRILLING FLUIDS AND ADDITIVES

A. The Contractor shall use potable water for drilling and well construction.

B. If drilling fluids or additives other than water (such as drilling mud, foam, or polymer) are required, submit a written request to the Owner for authorization of each specific fluid or additive, with Safety Data Sheets and documentation that it is not a risk to human health. Fluids and additives shall not be placed in a well until the Owner authorizes their use in writing.

C. Only drilling fluids acceptable for potable water supply wells shall be used. Drilling fluids and additives shall be certified to NSF/ANSI/CAN 60.

D. Where mud is approved, use excavated or portable steel pits with baffles or settling devices so that cuttings and fine sand do not recirculate into the hole, and pass returns across a shale shaker. Weighting materials and lost-circulation materials shall not be used without the Owner's approval. Polymer mud without some bentonite for wall-cake development is not recommended.

2.7 TEST PUMPS AND MEASUREMENT EQUIPMENT

A. The Contractor shall furnish all materials, equipment, fuel, temporary power, and labor for the pumping tests, and is responsible for the efficient and reliable operation of the pumping equipment, flow measuring devices, and water disposal facilities. Permanent pumps shall not be used for testing. The test pump and temporary power are temporary equipment for testing only; the permanent pumps, motors, and power are not part of this Contract.

B. The test pump and all related equipment shall be suitable for use in a potable water supply well, free of oils, dust, and foreign matter, and disinfected in accordance with ANSI/AWWA C654.

C. Test Pump Capacity

1. Well 1: capable of pumping not less than 150 percent of the domestic design flow (45 gpm), against a dynamic lift to be determined from the Well 2 pilot water levels, plus the friction loss of the discharge piping.
2. Well 2: capable of pumping at least 2,250 gpm continuously against a dynamic lift to be determined from the Well 2 pilot and zone test data, plus the friction loss of the discharge piping.
3. Well 2 pilot zone tests (where directed by the Hydrogeologist): inflatable packer(s) or temporary casing to isolate each interval selected by the Hydrogeologist, and an airlift system or test pump capable of the maximum rate practicable in the pilot borehole, with flow and water level measurement in accordance with Articles 2.7.D and 3.15.E.
4. Where the pump intake is set below the top of the screen, provide a pump shroud assembly to direct flow past the motor.

D. The pumping equipment shall include:

1. A centrifugal sand sampler capable of measuring sand content to a concentration of 5 ppm or less.
2. A gate valve in the discharge piping for controlling the pumping rate within 5 percent of the target rate.
3. Flow measurement consisting of a calibrated flow meter with totalizing and instantaneous capability, and a manometer tube and orifice plate, capable of measuring the full test range of each well (Well 1: 10 gpm to the maximum Well 1 test rate; Well 2 pilot zone tests: the range directed by the Hydrogeologist; Well 2: 500 to 2,500 gpm). Provide proof of factory calibration within one year before the completion of the pumping tests.
4. Two sounding tubes, minimum 1-inch inside diameter, installed in each well concurrent with the test pump and kept continuously accessible to the Hydrogeologist and the Project Architect during testing and recovery. The bottom 10 feet of each tube shall be perforated and capped, with the bottom within 5 feet of the top of the test pump assembly.
5. A sampling port in the discharge piping suitable for collection of water samples, continuously accessible to the Hydrogeologist and the Project Architect during testing.
6. A check valve within 20 feet of (or integral to) the pump.
7. Temporary power and all electrical and mechanical accessories for continuous operation for the full test periods, including standby provisions to prevent interruption.
8. Discharge piping to the disposal location secured by the Contractor (Article 3.17).

2.8 TEMPORARY WELL CAPS

A. After final disinfection, close each casing with a temporary sanitary, vermin-proof, watertight well cap, bolted or clamped to the casing (not welded) and lockable, with a screened vent, to protect the well until the pitless adapters, permanent well cap, and permanent pumps are installed by others (Article 1.1.F). The permanent well caps, meeting Water Systems Council PAS-97 and IDAPA 37.03.09, will be selected, sized, furnished, and installed by others.

B. Provide a capped access port, not less than 1 inch in diameter, in each well cap or casing, consistent with the access port requirements of IDAPA 37.03.09 Rule 25, so that the Owner can obtain water level measurements.

2.9 CASING TERMINATION

A. The Contractor shall terminate each casing at the final elevation shown on the Drawings, not less than 18 inches above finished grade, or higher if required by IDAPA 37.03.09, with the casing end prepared as shown in the final well design. With the pump discharges through pitless adapters below grade, a well house is not required over either well. The Contractor shall not cut or penetrate the casing for the pitless adapters.

B. Pitless Adapters: The pitless adapters or pitless units for all permanent pumps will be selected, sized, furnished, and installed by others, meeting Water Systems Council PAS-97 and IDAPA 37.03.09, NSF/ANSI/CAN 61 certified, installed below the frost depth, and providing a watertight sanitary connection between the casing and the buried discharge piping. The Hydrogeologist will provide only the Top of Well (pitless adapter) depth and the casing termination requirements (Article 2.10.D). The planned arrangement, for the Contractor's information, is:

1. Well 1: one pitless adapter for the domestic pump discharge.
2. Well 2: one pitless adapter or pitless unit for the fire pump discharge and one pitless adapter for the domestic pump discharge, arranged so that either pump can be installed, removed, or serviced without disturbing the other.

C. The pitless adapters, permanent well caps, wellhead pads or floors, and discharge piping will be provided by others; see Drawings. The casing termination shall be compatible with those components.

2.10 DESIGN FLOWS, PUMP ENVELOPE, AND WELL INFORMATION (PUMPS NOT IN CONTRACT)

A. The design flows in Article 1.1.C are the basis for the well design, testing, and certification. The permanent pumps, motors, controls, power supply, standby generator, pump controller room, pitless adapters, and permanent well caps will be selected, sized, designed, furnished, and installed by others. Neither the Contractor nor the Hydrogeologist has responsibility for them.

B. Pump Envelope: The Pump Envelope Table below establishes the maximum pump assembly dimensions to be used for casing sizing (Article 2.2.C) and alignment testing (Article 3.12.B). The pump schedule on Drawing W100 is for information. A pump furnished by others that exceeds the table will be addressed under Article 1.9.C. The envelope is the full pump assembly: largest outside diameter of the pump and motor, including the motor shroud or flow inducer sleeve, pump guides, cable guard, and torque arrestor, and the drop pipe or column size including couplings. The flow inducer sleeve (required where the annular velocity past the motor is below the motor manufacturer's minimum cooling velocity), pump guides, torque arrestors, and cable guards are furnished and installed with the pumps by others and are not part of this Contract.

Pump	Duty (for information)	Max. bowl OD	Max. motor OD	Max. shroud / flow inducer sleeve OD	Column or drop pipe; max. coupling OD	Pump guide and cable guard allowance
Fire pump (Well 2)	1,500 gpm at 100 psi at Top of Well; 2,250 gpm at not less than 65 psi; about 200 to 250 HP	12.0 in.	10.0 in.	14.0 in.	10-in. column; 11.5 in.	2.0 in. total
Domestic pump (Well 1 and Well 2)	30 gpm at 125 psi at Top of Well; about 5 to 7.5 HP	4.0 in.	4.0 in.	Not required in Well 1; in Well 2 per motor manufacturer, not over 5.0 in.	2-in. drop pipe; 2.75 in.	0.5 in. total

Pump Envelope Table: maximum outside dimensions of the pump assemblies furnished by others, for well design only. Clearance in the Well 2 pump chamber is checked per Article 2.2.C.3.

C. Domestic Pump Arrangement in Well 2: In Well 2, the domestic pump will be set above the fire pump bowl assembly on an independent drop pipe, with a low-water-level cutout that stops the domestic pump before its intake loses the manufacturer's minimum submergence during fire pump operation; the domestic pump will not be interlocked to stop or restrict the fire pump. The domestic pump, cutout, and controls will be provided under the Building Contract.

D. Well Information: With the Test Report (Article 3.15.H) the Hydrogeologist shall provide the following well information for use by the pump designers in selecting and sizing the pumps:

1. Static water level, and seasonal-low pumping water levels at 30 gpm, 1,500 gpm, and 2,250 gpm (Article 3.15).
2. Specific capacity and certified capacity of each well.

3. Recommended pump setting depth range in each well, including the domestic pump setting in Well 2 relative to the fire pump.
4. Minimum fire pump submergence: The minimum submergence shall be established by the Geotechnical Engineer in accordance with NFPA 20: the second impeller from the bottom of the bowl assembly shall be not less than 10 feet below the pumping water level at 2,250 gpm (150 percent of rated capacity), increased 1 foot for each 1,000 feet of site elevation above sea level (approximately 12.5 feet at the finished grade elevation of 2,529 feet shown on Drawing W500; the Geotechnical Engineer shall confirm the value using the surveyed wellhead elevation). The Hydrogeologist's recommended fire pump setting range shall provide not less than this minimum submergence. Pump and motor manufacturer submergence and cooling requirements will be addressed under the Building Contract.
5. As-constructed casing inside diameters, alignment and plumbness results (Article 3.12), and the clearance layout (Article 2.2.C.3), for pump designers' motor cooling velocity, flow inducer sleeve, and pump guide selection.
6. Top of Well (pitless adapter) depth and elevation, and the casing termination requirements for the pitless adapters.
7. Water quality results (Article 3.16).
8. Written notice to the Project Architect if the test results indicate that a well cannot supply its design flows in Article 1.1.C with the required submergence.

PART 3 - EXECUTION

3.1 SITE ACCESS AND MOBILIZATION

A. The Contractor shall be responsible for clearing, cutting, and disposal of material necessary to gain access and to transport all equipment and materials to each well site (Bid Items A-02 and B-02).

B. Disturbance shall be limited to that necessary to perform the work. Tree removal shall be approved by the Owner before removal.

C. Equipment used to drill, construct, develop, and test the wells shall be brought to the site clean and disinfected. Furnish all vehicles, equipment, supplies, labor, and incidentals to move rigs and related equipment and materials to and from the site (Bid Items A-01 and B-01).

D. At completion, clean up the drill sites and demobilize equipment and crews.

3.2 GENERAL CONSTRUCTION REQUIREMENTS

A. Drilling Methods: Drilling methods shall be as proposed in the accepted Drilling Plan (Article 1.7.B.5) and shall comply with IDAPA 37.03.09. Mud rotary drilling is permitted only where approved by IDWR and any applicable local jurisdiction; submit the approval with the Drilling Plan. Drilling fluids and additives shall meet Article 2.6.

B. Equipment shall be adequate to complete all phases of construction at the casing and conductor diameters and depths of the final well designs. If, in the Project Architect's opinion, the equipment is not capable of satisfactorily performing the work, the Contractor shall substitute satisfactory equipment at its own expense.

C. Production Zones: Consistent with IDAPA 37.03.09 Rule 25, each well's production zone shall be limited to zones of like pressure, temperature, and quality; water from zones of differing pressure, temperature, or quality shall not be commingled; water in

oxidized sediments shall not be commingled with water in reduced sediments; and a well shall not be screened or filter packed in more than one water-bearing unit or across a confining layer.

D. Contain drill cuttings and fluids produced during drilling in accordance with federal, state, and local requirements. Pits may be constructed for control of cuttings. Dispose of cuttings and drilling fluid adjacent to the drill site as mutually agreed with the Owner, using reasonable containment methods to control runoff from the site.

E. Project Architect Access: Provide the Project Architect access to each borehole to collect water level measurements, at a minimum at the beginning and end of each work shift and during each work break, including repositioning above-ground equipment at the wellhead as needed to safely lower an electronic water level meter. No additional payment will be made for providing this access.

F. Provide protection at the top of the casing to prevent surface contamination from entering the well during drilling and whenever the driller is not at the site.

G. All parts of the well water system shall be designed, located, constructed, installed, and tested in accordance with all applicable federal, state, and local regulations.

3.3 CONDUCTOR CASING INSTALLATION

A. Install the conductor casing to the depth required to construct the filter pack and surface seal in accordance with Article 2.2.B, maintaining a straight and plumb casing. Join sections by welding in accordance with Article 2.2.A.3.

B. Before beginning filter pack installation, pull back the temporary conductor casing approximately 1 foot to confirm that the casing shoe has been severed (if applicable) and that the conductor can be extracted during filter pack and surface seal installation.

C. Where a permanent conductor is shown in the accepted final well design, center it with steel guides and seal the annulus with grout pumped under pressure from the bottom of the reamed hole until grout returns to the ground surface around the entire perimeter.

3.4 WELL 2 PILOT BOREHOLE, ZONE TESTING, AND GEOPHYSICAL LOGGING

A. Well 2 Pilot Borehole: Drill the Well 2 pilot borehole first, at the Well 2 location shown on the Drawings, to the reference depth in Article 1.9.A.1 or the depth directed by the Hydrogeologist, before Well 1 is drilled.

1. Drill the pilot borehole to the diameter and depth established by the Hydrogeologist as sufficient to penetrate and characterize the water-bearing zones for both wells. Protect the upper portion of the borehole from caving or raveling. Measured under Bid Item A-03.

2. Log, sample (Article 3.5), and run the geophysical logging program selected by the Hydrogeologist in the pilot borehole, sufficient to design both wells. Record water levels and water production by zone during drilling. Logging support is paid under Bid Item A-04 (Bid Item B-03 for Well 1).

3. Zone Testing (at the Hydrogeologist's option): Where the Hydrogeologist determines that zone testing is needed to design Well 2, isolate each interval selected by the Hydrogeologist (the 300- to 600-foot interval being the primary target) with a packer or temporary casing, and test each interval at the maximum rate practicable for not less than 4 hours, or longer where directed. Record the pumping rate, water levels during pumping and recovery, and sand content, and collect a field water quality sample from each interval. Zone testing will be paid only where directed, under Bid Items A-05 (zone isolation, each interval) and A-

06 (zone test pumping, per hour).

4. The Hydrogeologist shall issue the final well designs for both wells (Article 3.6). Ream and complete Well 2 as the fire supply well in accordance with its final well design.

5. Where the pilot borehole extends below the Well 2 final design depth, or penetrates zones of differing pressure, temperature, or quality, the portion not used shall be sealed in accordance with IDAPA 37.03.09 so that zones are not commingled. Measured under Bid Item A-18.

B. Well 1: A pilot borehole is not required for Well 1. Drill Well 1 to the diameter and depth in its final well design. Well 1 shall be logged and sampled during drilling (Article 3.5), with a caliper log of the final borehole before casing installation, and the Hydrogeologist shall confirm the Well 1 final well design from those data, or submit any adjustment to the Project Architect for review, before casing installation.

C. Sequence: Complete Well 1 before the Well 2 pumping tests so that Well 1 can serve as an observation well during the Well 2 tests (Article 3.15.D.4).

D. Use a self-checking mechanical drift indicator in each borehole. Drift from vertical shall not exceed the plumbness tolerance of Article 3.12.B.1 for the permanent casing diameter of the well being drilled. Correct any deviation at the Contractor's expense.

E. Maintain permanent records of all drilling operations in accordance with state and local laws.

3.5 GEOLOGIC SAMPLING

A. Collect representative samples of the geologic units encountered in each borehole at the depth intervals established by the Hydrogeologist and at each change in strata, sufficient to design the screen and filter pack.

B. Minimize mixing of cuttings so that samples represent the materials at the base of the borehole at the time of sampling.

C. Place samples in containers that preserve their integrity through delivery. Mark each container with the abbreviated project name and well name or number, the sample depth interval, and the date and time of collection.

D. Make samples available to the Hydrogeologist when the drilling crew is on site; samples will be picked up by or delivered to the Hydrogeologist during site visits. Protect samples from loss or damage until delivery.

E. Perform sieve analyses on samples from each potential screen interval for use in the filter pack and screen design.

F. Costs for sampling are incidental to the Work; no separate payment will be made for geologic sampling.

3.6 FILTER PACK AND WELL SCREEN DESIGN (FINAL WELL DESIGNS)

A. Both Wells: After the Well 2 pilot drilling, logging, and any zone testing, the Hydrogeologist shall prepare and issue sealed final well designs for Well 1 and Well 2.

B. Well 2 Performance: The Well 2 final well design shall include a written prediction of Well 2 performance at 1,500 and 2,250 gpm (drawdown, pumping water level, and available submergence), based on the pilot logs and any zone test results, and the pump chamber clearance layout required by Article 2.2.

C. Each final well design shall include: total well depth; borehole and conductor diameters; depths of the cased and screened portions of the well; filter pack product, size, and

installation depths; screen slot size(s), required minimum open area, and installation depths; tailpipe depth, if applicable; surface seal depth and material; anticipated pumping water levels; recommended pump setting ranges; and the Top of Well (pitless adapter) depth and casing termination requirements.

D. Each final well design will be issued to the Contractor through the Project Architect. Reaming and casing installation for a well shall not proceed until its final well design has been issued (Article 1.10.A).

3.7 REAMING

A. Ream the Well 2 pilot borehole, and drill or ream the Well 1 borehole, to the diameters in the final well designs. The reamed borehole shall provide the annular space required for the filter pack and the surface seal.

B. Record variations in water and additives during reaming, and the depths at which changes are observed, in the daily driller's reports.

3.8 CASING AND SCREEN INSTALLATION

A. Install blank casing, screen, and tailpipe at the lengths and intervals in the accepted final well design, centered in the borehole. Bar holes in the casing are prohibited.

B. The bottom of the casing shall be set far enough above the bottom of the borehole that the casing is not supported by the bottom of the boring.

C. If the casing cannot be landed in the correct position or at the depth in the final well design, remove the casing and correct the problem at the Contractor's expense. If the casing collapses before well completion, withdraw and replace it at the Contractor's expense.

D. Work required to be repeated because of the Contractor's workmanship, materials, or equipment, including replacement of a well that cannot be completed for those reasons, shall be furnished at the Contractor's expense (Article 1.9.B).

3.9 FILTER PACK INSTALLATION

A. Provide 48 hours' notice before filter pack installation (Article 1.10.B).

B. Install filter pack by tremie in the annular space between the screen assembly and the borehole so that it completely fills the annular space around the screen assembly and the pertinent portion of the permanent casing, from the bottom of the borehole to the bottom of the transition material.

C. Disinfect filter pack during placement as specified in Article 2.4.

D. Filter pack shall not extend into any confining layer above the screen. The height of filter pack above the top of the screen shall be as shown in the Hydrogeologist's final well design.

E. Where a temporary conductor extends into the filter pack interval, withdraw it as the filter pack is placed, keeping the bottom of the conductor below the top of the filter pack. Add filter pack as it settles until no further measurable settlement occurs.

F. The volume of filter pack placed shall be not less than the calculated annular volume based on the caliper log. Provide devices to measure the filter pack placed.

G. Where approved in the final design for Well 2, install a filter pack refill tube terminating above grade, sealed in place, with a watertight cap. After development, refill the annulus with filter pack.

H. Place transition material on top of the filter pack as required by the Hydrogeologist's

final well design before the surface seal is placed.

3.10 SURFACE SEAL PLACEMENT

A. Provide 48 hours' notice before surface seal installation (Article 1.10.B).

B. Place the surface seal in one continuous operation from the top of the transition material to the ground surface, by positive displacement from the bottom up, using the method in the Hydrogeologist's final well design.

C. Extract the temporary conductor casing concurrently with sealant placement. Keep the annular space full of sealant meeting IDAPA 37.03.09 Rule 25 while withdrawing the conductor. Place sealant at no greater rate than recommended by the manufacturer or supplier. Sealant shall not be allowed to infiltrate the filter pack.

D. Allow cement grout to set for not less than 24 hours, or longer as required by the sealant manufacturer and the Hydrogeologist, before further operations.

E. Record sealant volumes placed and compare to the calculated annular volume. Report any shortfall to the Project Architect and Hydrogeologist; corrective action will be as directed by the Hydrogeologist.

3.11 WELL DEVELOPMENT

A. General

1. Develop each well using open-ended airlifting, swabbing, surging, pumping, and other methods directed or accepted by the Hydrogeologist. Development shall remove drilling fluids, filter cake, sediment, and other materials introduced into the well or surrounding formation during drilling and construction.

2. Develop each screened interval individually before final pump development. Perform development progressively from the uppermost screened interval to the lowermost screened interval unless otherwise directed by the Hydrogeologist.

3. Development methods shall not damage the casing, screen, sounding tube, gravel-fill pipe, filter pack, annular seals, or other components of the completed well.

4. Do not use explosives, dry ice, acids, or other chemical development agents unless specifically authorized in writing by the Hydrogeologist. Development additives, if authorized, shall comply with NSF/ANSI/CAN 60 and shall be used in accordance with the manufacturer's recommendations.

5. Measure the filter-pack level periodically during development. Do not add filter-pack material without prior authorization from the Hydrogeologist.

6. Continue development until the requirements of Paragraph G are satisfied. Completion of a minimum development duration does not relieve the Contractor of the obligation to satisfy the specified acceptance criteria.

B. Development Equipment

1. Provide air compressors, eductor pipe, swabbing tools, pumps, discharge piping, valves, flow-measurement devices, water-level measurement equipment, sand-testing equipment, and other equipment required to properly develop each well.

2. The swabbing tool shall be sized to operate safely within the well casing and screen and shall be capable of producing an effective surging action without damaging the well.

3. Provide airlift equipment of sufficient capacity to remove drilling fluids and sediment from the full depth of the well and to develop each screened interval

individually.

4. Provide a test pump capable of operating over the range of discharge rates required for final development. The test pump for Well 2 shall be capable of progressively developing the well through its anticipated domestic and fire-suppression operating ranges and up to 2,250 gpm, unless otherwise directed by the Hydrogeologist.
5. Provide a calibrated instantaneous and totalizing flow meter. Arrange the discharge piping, valves, and meter in accordance with the meter manufacturer's installation requirements.
6. Measure water levels using an electric water-level meter, pressure transducer, or other equipment accepted by the Hydrogeologist. Water-level measurements shall be referenced to a fixed and documented measuring point.
7. Measure sand production using a Rossum centrifugal sand sampler or another method accepted by the Hydrogeologist.

C. Initial Airlift Development

1. Begin initial development as soon as practicable after completion and curing of the annular seals.
2. Initially airlift from near the bottom of the well using open-ended pipe to remove accumulated sediment and displace drilling fluid from the casing and filter pack.
3. Continue open-ended airlifting until the discharge is substantially free of drilling fluid, accumulated sediment, and other construction debris. Unless otherwise directed by the Hydrogeologist, perform open-ended airlifting for not less than:
    a. Well 1: Two hours.
    b. Well 2: Four hours.
4. The minimum durations do not limit the additional development required to remove drilling fluids and accumulated materials.

D. Swab-and-Airlift Development

1. Following initial open-ended airlifting, develop each screened interval using a combination of swabbing and airlift pumping.
2. Perform swabbing and airlifting over successive portions of the screen. The length of screen developed at one time shall not exceed one standard joint of drill pipe or the effective length of the development tool.
3. Continuously move the development tool vertically within the interval being developed to produce surging through the screen and filter pack.
4. Unless otherwise directed by the Hydrogeologist, perform initial swab-and-airlift development for not less than five minutes per foot of screen. Continue development beyond this minimum where the discharge contains visible drilling fluid, sediment, or other material that indicates incomplete development.
5. If the Hydrogeologist directs the use of a dispersing agent:
    a. Mix and apply the agent in accordance with the manufacturer's recommendations.
    b. Distribute the agent uniformly across each screened interval.
    c. Allow the well to remain idle for the period recommended by the manufacturer or directed by the Hydrogeologist.
    d. Repeat swabbing and airlifting until the agent, loosened filter cake, sediment,

and drilling-fluid residues have been removed.

e. Clean the sounding tube and gravel-fill pipe of solids and drilling-fluid residue during development.

E. Final Pump Development

1. After completion of airlift and swab development, install the test pump and begin final pump development at the lowest practical discharge rate.
2. Develop the well by alternating pumping and surging. Surging may be accomplished by stopping and restarting the pump, rapidly varying the pumping rate, operating a surge valve, or using another method accepted by the Hydrogeologist.
3. Increase the pumping rate in increments directed by the Hydrogeologist. At each rate, continue pumping and surging until:
   a. The discharge is substantially free of sediment and drilling-fluid residue.
   b. Sand production is decreasing or satisfies the requirements of Paragraph G.
   c. The specific capacity is stable or no longer materially increasing.
4. Well 1: Progressively develop Well 1 through its anticipated domestic operating range and to not less than 150 percent of the domestic design flow, unless otherwise directed by the Hydrogeologist.
5. Well 2: Progressively develop Well 2 through the anticipated operating ranges of both permanent pumps, including:
   a. The anticipated backup domestic-supply pump operating range.
   b. The rated fire-pump capacity of 1,500 gpm.
   c. The NFPA 20 test rate of 2,250 gpm, equal to 150 percent of the rated fire-pump capacity.
6. The Hydrogeologist may modify the development rates or progression based on observed drawdown, sand production, turbidity, specific capacity, equipment limitations, or indications that continued operation could damage the well.
7. Final pump development shall be conducted for not less than:
   a. Well 1: The time required to satisfy Paragraph G.
   b. Well 2: Twenty-four cumulative pumping hours.
8. Development time shall not include periods when the pump is shut down for equipment repair, adjustment, maintenance, or other interruptions that do not contribute to development.
9. Meeting the minimum development duration does not constitute acceptance. Continue development as necessary until all applicable requirements of Paragraph G are satisfied.

F. F. Development Monitoring and Records

1. During final pump development, measure and record the following at intervals not exceeding 30 minutes and immediately before and after each change in pumping rate or surging cycle:
   a. Date and time.
   b. Elapsed pumping time.
   c. Pumping rate and totalized discharge.
   d. Static water level, where applicable.

e. Pumping water level.

f. Drawdown.

g. Specific capacity.

h. Sand content.

i. Turbidity or visual discharge characteristics.

j. Development method and surging activity.

k. Filter-pack level, when measured.

l. Equipment adjustments, shutdowns, and other pertinent observations.

2. Record the beginning and ending depths of each interval developed by swabbing or airlifting, the development method used, and the approximate duration of development within each interval.

3. Submit development records to the Hydrogeologist before beginning the formal step-rate or constant-rate pumping tests.

G. Development Acceptance Criteria

1. Continue development until the Hydrogeologist determines that the well is adequately developed and the following criteria have been satisfied:

a. The discharge is visibly clear and substantially free of drilling fluid, sediment, and other construction-related material.

b. Sand content does not exceed 5 parts per million when measured at the applicable design or maximum development rate.

c. Specific capacity is essentially stable and does not exhibit a continuing material increase during the final development period.

d. The pumping water level and specific capacity indicate that the well can be operated at the applicable design and test rates without unacceptable well loss or unstable drawdown.

2. For Well 1, demonstrate compliance with the sand-content requirement at the domestic design flow and at the maximum development rate directed by the Hydrogeologist.

3. For Well 2, demonstrate compliance with the sand-content requirement at:

a. The anticipated backup domestic-supply pumping rate.

b. The rated fire-pump capacity of 1,500 gpm.

c. 2,250 gpm, unless the Hydrogeologist determines that testing at that rate should be deferred to the formal fire-suppression pumping test.

4. Conduct the final sand-content evaluation after a surging cycle while pumping at the applicable evaluation rate. Measure sand content at intervals directed by the Hydrogeologist for not less than 30 minutes.

5. If the well does not satisfy the acceptance criteria, continue or repeat development at no additional cost to the Owner, except where the Contract Documents expressly provide payment for Hydrogeologist-directed additional development.

H. Transition to Pumping Tests

1. Do not begin the formal step-rate or constant-rate pumping tests until:

a. Development has been completed.

b. The applicable acceptance criteria have been satisfied.

c. Development records have been submitted.

d. The Hydrogeologist has authorized testing.

2. Development pumping shall not be counted as formal pumping-test time unless specifically authorized in writing by the Hydrogeologist.

3. Following completion of development, allow the well to recover to the static-water-level condition required by the pumping-test provisions before beginning a formal test.

3.12 ALIGNMENT AND PLUMBNESS

A. Test Timing and Procedure

1. Take every precaution to drill each well to the required depth and install the permanent casing plumb and in true alignment.

2. Perform a plumbness and alignment test in each well after the permanent casing, screen assembly, filter pack, and surface seal have been installed and the well has been drilled to final depth, and before pumping tests.

3. Perform and evaluate the test in accordance with Appendix D of ANSI/AWWA A100 (plummet method). Other methods, such as gyroscopic or laser methods, may be used only if pre-approved by the Project Architect; no standby time will be accrued while the Project Architect considers an alternative method.

4. Provide 48 hours' notice (Article 1.10.B). The test shall be performed under the Hydrogeologist's supervision and may be observed by the Project Architect. Deliver the test data and the Hydrogeologist's analysis of compliance to the Project Architect within 48 hours of test completion.

5. The required test, including rig time to remove and reinstall drilling tools, is paid under Bid Items A-20 and B-14; no other payment will be made. Retests after a failed test, and additional tests the Contractor elects to perform, are at the Contractor's expense.

B. Evaluation Criteria: Testing shall be conducted to the bottom of the permanent casing.

1. Plumbness: If, per equivalent 100 feet of depth, the permanent casing varies from vertical in any horizontal direction by more than two-thirds of the inside diameter of the permanent casing, the well fails the plumbness test.

2. Alignment – Well 1: The effective well diameter shall be demonstrated to be not less than the largest outside diameter of the domestic pump and motor assembly of the pump envelope (Article 2.10.B), including cable guard, so that the pump can be set at any depth within the permanently cased portion of the well without binding or bending.

3. Alignment – Well 2: The effective well diameter shall be demonstrated to be not less than the larger of (a) the largest outside diameter of the fire pump bowl assembly and motor of the pump envelope (Article 2.10.B), and not less than 12 inches, over the full pump chamber to not less than 20 feet below the deepest recommended pump setting; and (b) the combined cross-section of the fire pump column, the domestic pump and motor, the domestic drop pipe, and the power cables, from the recommended domestic pump setting to the top of the casing, as shown on the clearance layout of Article 2.2.C.3; so that both pumps can be set at their recommended depths without binding or bending.

4. Demonstrate compliance with the alignment criteria using the graphical method in Appendix D of ANSI/AWWA A100.

C. Correction: If a well fails the plumbness or alignment criteria, correct it at no additional expense to the Owner. If faulty alignment or plumbness is not corrected within 30 days of failing the criteria, the Owner may refuse to accept the well. In that case, the Contractor shall, at its sole expense, decommission the well in accordance with state and local regulations and begin drilling a new well within 2 weeks at a location reviewed by the Owner, at no additional cost to the Owner.

3.13 VIDEO CAMERA INSPECTIONS

A. Perform a dual-view (downhole and side-view) color video camera inspection of each well after permanent casing and screen installation and development are complete, and again after disinfection if requested by the Hydrogeologist. Provide 48 hours' notice so that the inspection can be observed (Article 1.10.B).

B. The water column shall be clear before the inspection. The inspection shall extend from the ground surface to the well bottom, using a camera capable of both downhole and side viewing, with quality sufficient in both modes for the Hydrogeologist to fully evaluate casing and screen integrity and weld penetration.

C. Provide the Owner, Project Architect, and Hydrogeologist with USB flash drives containing color footage of the entire inspection, with continuous display of camera depth relative to ground surface, and a written log of observations.

3.14 DISINFECTION

A. Thoroughly clean the drill rigs and equipment before beginning the Work. Water used for drilling, construction, development, or testing shall be from a potable source (IDAPA 37.03.09). As an Owner requirement, chlorinate in accordance with ANSI/AWWA C654 to not less than the following free chlorine levels (ANSI/AWWA C654-13), or the levels of the edition in effect on the bid date where higher:

1. Drilling fluid and water in the well before filter pack placement: chlorinate the drilling fluid before the filter pack is added; after drilling fluid is displaced, add chlorinated water to produce a free chlorine residual of not less than 50 mg/L in the entire volume of fluid within the well, fed down the filter pack tremie or chute until it will take no more water or until not less than twice the calculated annular volume has been placed (ANSI/AWWA C654, Sec. 4.3.1.2). Measure the residual periodically during placement and adjust the feed as needed.
2. Filter pack: calcium hypochlorite mixed uniformly with the filter pack at 1/4 to 1/2 pound per ton of filter pack (ANSI/AWWA C654, Sec. 4.3.1.1), or chlorination in accordance with item 1. Filter pack shall be free of organic material.
3. Tools, drill pipe, casing, screen, test pump, and equipment inserted in the well: spray exposed surfaces with a solution having a free chlorine residual of not less than 200 mg/L immediately before installation (ANSI/AWWA C654, Sec. 4.4;).
4. Well water column (pre-test and final disinfection): not less than 50 mg/L throughout the water column, surged not less than three times, with a contact time of not less than 12 hours (ANSI/AWWA C654, Sec. 4.5.1; Article 3.14.C).

B. Pre-Test Disinfection: After development and before test pumping, disinfect each well, the test pump, and the pump discharge system in accordance with ANSI/AWWA C654.

C. Final Disinfection: After pumping tests and before installing the temporary well caps, clean each well of all foreign substances, removing oil, grease, and joint compound by swabbing with an alkaline solution if necessary, and disinfect in accordance with ANSI/AWWA C654 using an NSF/ANSI/CAN 60 hypochlorite compound. Apply so that

a free chlorine concentration of not less than 50 mg/L is present throughout the water column, the casing above the water level, and the filter pack, and surge to distribute. Allow the solution to stand not less than 12 hours, then pump to waste until the chlorine residual is not greater than the background level.

D. Collect bacteriological samples after final disinfection. Two consecutive samples, collected not less than 24 hours apart, shall be absent of total coliform. If coliform is present, re-disinfect and resample at the Contractor's expense.

E. Dispose of chlorinated water in accordance with federal, state, and local requirements, dechlorinating in accordance with ANSI/AWWA C655. At the conclusion of the Work, leave each well in a disinfected condition.

3.15 PUMPING TESTS

A. Anticipated Testing Program

1. After development, pre-test disinfection, and acceptance of the alignment and video results, conduct pumping tests in each well to estimate well yield and aquifer properties and to demonstrate the certification criteria of Article 3.20. The Hydrogeologist shall direct the rate and duration of each step and the constant-rate pumping rate based on the step-rate results, within the minimum requirements of this Article.

2. Measure background water levels in the test well and in each available observation well for not less than 24 hours before each test, and record barometric pressure. There shall be no chlorine residual in the discharge at the start of any test.

3. Before each step-rate and constant-rate test, and before the test pump is removed after the constant-rate test, the water level shall recover to at least 95 percent of the pre-test static water level. No additional payment will be made during recovery periods.

B. Step-Rate Tests

1. Well 1: approximately 4 hours, with not less than four steps of equal duration, the highest step at not less than 150 percent of the domestic design flow.

2. Well 2: approximately 4 to 5 hours, with steps of not less than 60 minutes each at approximately 750, 1,500, 1,875, and 2,250 gpm.

C. Well 1 Constant-Rate Test

1. Pump at a constant rate selected by the Hydrogeologist, not less than the domestic design flow, for not less than 24 consecutive hours after the drawdown trend has stabilized (Owner requirement). The Hydrogeologist shall determine the rate and the duration needed beyond this minimum, expected to be 24 to 48 hours, to verify the domestic yield. Pumping hours to meet the minimum are measured under Bid Item B-17; hours beyond the minimum requested by the Owner or the Hydrogeologist are measured under Bid Item B-18.

2. Monitor accessible nearby wells as observation wells where available.

D. Well 2 Constant-Rate Test

1. Pump at 2,250 gpm (150 percent of the rated fire pump capacity) for the duration required by the State Fire Marshal's written position (Article 1.5.D.2). If that position does not state a duration, pump for a continuous period of not less than 8 hours, and for not less than 6 hours after the drawdown trend has stabilized, whichever is longer. The Hydrogeologist may extend the test, up to 24 hours, only

if the drawdown trend has not stabilized. Extensions beyond the minimum durations of this paragraph will be measured under Bid Item A-24; hours to meet the minimum are measured under Bid Item A-23.

2. The fire suppression pumping test is intended to satisfy the NFPA 20 well test at the duration required by the State Fire Marshall.
3. Report the static water level and the pumping water levels at 100 percent (from the step-rate test) and 150 percent of rated fire pump capacity.
4. Monitor Well 1 as an observation well throughout the Well 2 step-rate and constant-rate tests.
5. The Hydrogeologist shall evaluate the effect of other wells in the vicinity and seasonal variation of the water table, and shall recommend the seasonal-low pumping water level to be used for the fire pump setting.

E. Test Maintenance and Data Collection

1. The pumping equipment and measuring devices shall be continuously attended by the Contractor during testing. Maintain the discharge rate within 5 percent of the target rate during step-rate and constant-rate tests.
2. Check and record the discharge rate every 10 minutes during the first hour and at 30-minute intervals thereafter (15-minute intervals for the Well 2 constant-rate test), noting the time of each measurement and any adjustment.
3. The Hydrogeologist shall install and operate a pressure transducer and data logger in one sounding tube and shall collect manual water level data with an electronic water level meter in the other during step-rate testing and the first 2 hours of each constant-rate test and recovery period. From 2 hours to the end of pumping or recovery, the Contractor shall measure and record water levels in the pumping well and the observation well at 30-minute intervals. The Project Architect may take independent measurements.
4. Water levels in the pumping well and the observation well shall be recorded at not less than the frequency in Table 1 during pumping and recovery, by transducer or manual measurement.

Table 1 – Minimum Time Intervals for Water Level Measurements

Time into Test	Measurement Interval
0 to 5 minutes	Every 1/2 minute
5 to 15 minutes	Every 1 minute
15 to 60 minutes	Every 5 minutes
60 to 120 minutes	Every 10 minutes
120 minutes to end of test	Every 30 minutes

5. Record all discharge and water level measurements and times legibly on forms and submit them, with the electronic transducer data, to the Project Architect within 48 hours of the conclusion of testing.

F. Test Interruptions: Step-rate and constant-rate tests shall be run uninterrupted. If a shutdown occurs and the Owner determines that the results are nullified, allow the water level to recover as specified and repeat the test at the Contractor's expense. The Contractor may interrupt a test to avert damage to surrounding property or prevent discharge water from entering surface water (Article 3.17); such an interruption will not result in expense to the Contractor.

G. Well 2 Pilot/Zone Test Report: Before Well 2 is reamed or Well 1 is drilled, the

Hydrogeologist shall issue the pilot log and any zone test analysis, aquifer properties, and predicted Well 2 performance with the final well designs (Article 3.6).

H. Test Report: The Hydrogeologist shall prepare and issue the test analysis and report from the Contractor's data, including as-constructed details, the geophysical logs and samples, development and sand content results, alignment and video results, water quality and bacteriological results, the pumping test analysis, specific capacity, interference between wells, recommended pump settings, and the certified capacity of each well.

I. If a well does not meet the certification criteria of Article 3.20, the Contractor shall notify the Project Architect and perform the corrective work recommended by the Hydrogeologist in accordance with Article 1.9.B.

3.16 WATER QUALITY SAMPLING

A. The Contractor shall collect water quality samples from each well near the end of its constant-rate test, after field parameters have stabilized, from the discharge sampling port, under the direction of the Hydrogeologist, and shall deliver them to a laboratory certified by the State of Idaho. Laboratory costs are included in the Contract Price.

B. Both wells (domestic): Although the system is not a public water system, the Owner has elected to test both wells for the source parameters including total coliform (with E. coli if positive), inorganic chemical contaminants including nitrate, nitrite, and arsenic, volatile and synthetic organic chemicals, and radionuclides (gross alpha, combined radium-226/228, and uranium), plus iron, manganese, and corrosivity indicators (pH, alkalinity, hardness, temperature, total dissolved solids).

C. Well 2 (fire): Also analyze for chloride and sulfate to support fire pump material selection.

D. The Hydrogeologist shall compare the results for both wells with the primary and secondary maximum contaminant levels of IDAPA 58.01.08 and report any exceedance to the Owner.

E. Submit results to the Project Architect.

3.17 DISPOSAL OF FLUIDS AND DRILLING WASTES

A. The Contractor is responsible for proper disposal of fluid (water, sealant, and other fluid) from drilling, development, and pumping tests so that no damage results to surrounding property and turbid water does not enter streams or surface water bodies.

B. Water produced during pumping tests shall be piped by the Contractor to the disposal location shown in the bid documents or, where none is shown, to a disposal location secured by the Contractor, subject to review by the Project Architect, far enough from the wells to prevent recharge during testing. The Well 2 constant-rate test is expected to discharge on the order of 1.1 to 1.6 million gallons for an 8- to 12-hour test, and up to about 3.2 million gallons if extended to 24 hours. The Contractor shall provide piping, erosion control, the receiving property owner's written consent, and any IPDES coverage or other discharge authorization required for that volume.

C. The DEQ guidance document Guidance for Public Water System Disposal of Water from Construction, Maintenance, and Operations provides information on disposal of water from drilling and testing operations. Because permitting authority for construction stormwater transitioned from EPA to DEQ on July 1, 2021, portions of that guidance may be out of date; contact the DEQ Idaho Pollutant Discharge Elimination System (IPDES) program for current requirements.

D. Upon completion and acceptance of the pumping tests, remove all materials, equipment, and supplies used for disposal of water from the site. Submit a narrative of debris and fluid disposal. Disposal is paid under Bid Items A-25 and B-19.

3.18 CASING TERMINATION AND TEMPORARY WELL CAPS

A. Terminate each casing as specified in Article 2.9. After final disinfection and acceptable bacteriological results, install the temporary well cap as specified in Article 2.8 (Bid Items A-28 and B-22).

B. The temporary well cap shall remain in place, and the well shall be left in a disinfected condition, until the pitless adapters, permanent well cap, and permanent pumps are installed under the Building Contract.

3.19 TECHNICAL MEMORANDUM

A. Upon completion of testing of both wells, the Hydrogeologist shall issue one Test Report (Article 3.15.H), sealed by an Idaho-licensed PE or PG, as the record of the construction and testing of each well. The Contractor shall file the IDWR Well Driller's Report for each well within 30 days of completing the well and furnish a copy to the Owner.

3.20 WELL CERTIFICATION

A. The Hydrogeologist will certify each well when all of the following have been met and documented:

1. The well has been constructed in accordance with the final well design, IDAPA 37.03.09, and this section, as attested in writing by the Contractor's Idaho-licensed well driller.
2. Alignment and plumbness (Article 3.12) and video inspection (Article 3.13) are acceptable, and the Well 2 pump chamber clearance layout (Article 2.2) shows that both pumps can be housed.
3. Sand content does not exceed 5 ppm (Article 3.11).
4. Well 1 has sustained not less than the domestic design flow of 30 gpm in the constant-rate test of Article 3.15, with stabilized drawdown and the domestic pump submergence recommended by the Hydrogeologist.
5. Well 2 has sustained 2,250 gpm (150 percent of the rated fire pump capacity) for the duration required by Article 3.15.B, with the pumping water level remaining above the top of the screen and leaving not less than the minimum fire pump submergence established by the Geotechnical Engineer under Article 2.10.D.4 at the recommended pump setting, and the Hydrogeologist has confirmed that the domestic pump in Well 2 can be set with its required submergence during fire pump operation or will be protected by its low-water-level cutout.
6. Bacteriological results after final disinfection are acceptable (Article 3.14) and water quality results have been submitted (Article 3.16). Water quality results are for the Owner's information; exceedances of IDAPA 58.01.08 maximum contaminant levels are not a certification criterion under this section, except bacteriological results.
7. The IDWR Well Driller's Report has been filed (Article 3.19.B).
8. The casing has been terminated and the temporary well cap installed (Articles 2.8 and 2.9).

B. The Hydrogeologist will issue a sealed certification of each well's tested capacity, which will be reviewed by the Project Architect and accepted by the Owner. Final acceptance

and final payment will be made after the Work of this section is complete and each well has been certified by the Hydrogeologist or otherwise accepted by the Owner in writing. A well that cannot meet the certification criteria will be addressed under Article 1.9.B.

3.21 WELL SCHEMATIC AND RECORD DRAWINGS

A. Preliminary well schematics are included on the Drawings. Final dimensions will be established in the Hydrogeologist's final well designs.

B. Record well schematics are not required. The as-constructed details, static and pumping water levels at the design flows (and at 1,500 and 2,250 gpm for Well 2), recommended pump settings, and lithology for each well shall be included in the Test Report (Article 3.15.H).

C. The owner of each well shall retain all records pertaining to each well until the well has been properly decommissioned (IDAPA 58.01.08.510.03.f).

3.22 WELL ABANDONMENT

A. All boreholes and wells requiring abandonment shall be decommissioned in accordance with IDAPA 37.03.09.

B. Decommissioning shall include:

1. Concrete, cement grout, bentonite, or sealing clay as primary sealing materials, placed from the bottom upward by methods that avoid segregation or dilution.

2. Complete, accurate records of the entire decommissioning procedure, including the depth of each layer of sealing and backfill material, the quantity of sealing material, and any changes made to the well during sealing, such as perforating casing.

3.23 EXCEPTIONS

A. Exceptions to this section regarding materials, installation, well design, development, or testing require the Hydrogeologist's written approval and review by the Project Architect. Exceptions to requirements of IDAPA 37.03.09 or NFPA 20 also require the written approval of IDWR or the State Fire Marshal, as applicable. Deviations from the Owner requirements require the Owner's written approval.

3.24 SAFETY DURING CONSTRUCTION

A. Maintain all equipment in a safe manner during construction. Keep the work area neat and free from hazards at all times (see also Article 1.12.C).

END OF SECTION

Geotechnical Investigation



GEOTECHNICAL INVESTIGATION

ITD D3 HIGHWAY 16 MAINTENANCE YARD

Southwest Corner of Highway 16 and Chinden Boulevard

Meridian, ID

PREPARED FOR:

Travis Frei
Idaho Transportation Department
8150 Chinden Boulevard
Garden City, ID 83713

PREPARED BY:

Atlas Technical Consultants, LLC
2791 South Victory View Way
Boise, ID 83709

August 11, 2026
25864

2791 South Victory View Way
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August 11, 2026

Atlas No. 25864

Travis Frei
Idaho Transportation Department
8150 Chinden Boulevard
Garden City, ID 83713

Subject: Geotechnical Investigation
ITD D3 Highway 16 Maintenance Yard
Southwest Corner of Highway 16 and Chinden Boulevard
Meridian, ID

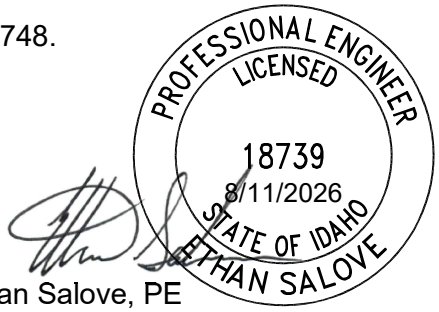
Dear Travis Frei:

In compliance with your instructions, Atlas has conducted a soils exploration and foundation evaluation for the above referenced development. Fieldwork for this investigation was conducted on July 16, 2026. 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. Atlas would be pleased to continue our role as geotechnical engineers during project implementation.

If you have any questions, please call us at (208) 376-4748.

Respectfully submitted,



Colby Meyer, PG
Staff Geologist

Ethan Salove, PE
Senior Geotechnical Engineer

Clinton Wyllie, PG
Senior Geologist

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Appendix IV Geotechnical Investigation Test Pit Log
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Appendix VI Important Information About This Geotechnical Engineering Report

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1. INTRODUCTION

This report presents results of a geotechnical investigation and analysis in support of data utilized in design of structures as defined in the 2018 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 development 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.

1.1 Project Description

The proposed development is in the City of Meridian, Ada County, ID, and occupies a portion of the NE¼NE¼ of Section 29, Township 4 North, Range 1 West, Boise Meridian. The site to be developed is approximately 15.06 acres. Site maps included in the **Appendix** show the project location.

This project will consist of an ITD maintenance yard with maintenance structures, salt sheds, parking areas, and other miscellaneous construction material storage areas. Retaining walls are not anticipated. Drainage is expected to be directed to onsite infiltration facilities. Location of the infiltration facilities are unknown at this time. Atlas has been provided the proposed grading plan.

1.2 Scope of Investigation

Our scope of work was completed in general accordance with our proposal dated June 22, 2026 and authorized on June 30, 2026. Said authorization is subject to terms, conditions, and limitations described in the Professional Services Contract entered into between Idaho Transportation Department and Atlas.

Atlas' scope of services included the following:

- Subsurface exploration via test pits.
- Infiltration testing for stormwater management planning.
- Field and laboratory testing of materials encountered and collected.
- Preparation of this report, which includes project description, site conditions, and our engineering analysis and evaluation for the project.

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2. SITE DESCRIPTION

2.1 Regional Geology

The project site is located within the western Snake River Plain of southwestern Idaho. The plain is a northwest trending rift basin, about 45 miles wide and 200 miles long, that developed about 14 million years ago (Ma) and has since been occupied sporadically by large inland lakes. Geologic materials found within and along the plain's margins reflect volcanic and fluvial/lacustrine sedimentary processes that have led to an accumulation of approximately 1 to 2 km of interbedded volcanic and sedimentary deposits within the plain. Along the margins of the plain, streams that drained the highlands to the north and south provided coarse to fine-grained sediments eroded from granitic and volcanic rocks, respectively. About 2 million years ago the last of the lakes was drained and since that time fluvial erosion and deposition has dominated the evolution of the landscape. The project site is underlain by the "Gravel of Whitney Terrace" as mapped by Othberg and Stanford (1993). Sediments of the Whitney terrace consist of sandy pebble and cobble gravel. The Whitney terrace is the second terrace above modern Boise River floodplain, is thickest toward its eastern extent, and is mantled with 2-6 feet of loess.

2.2 General Site Characteristics

The following details regarding site conditions are based on visual observations and review of available geologic and topographic maps and imagery:

- **Current Site Conditions:** The site currently consists of an ITD staging yard and material storage area for the nearby Highway 16 construction project. The western portion of the property consists of miscellaneous construction materials and trailer storage. The eastern portion of the property contains large gravel stockpiles and a concrete mixing plant. The majority of the site is surfaced with gravel with various access roads throughout the site. Chinden Boulevard borders the northern boundary of the site and the future Highway 16 borers the eastern boundary. Agricultural fields are present to the west and south.
- **Vegetation:** Vegetation on the site consists of native weeds around the edges of the property and adjacent to the equipment storage areas in the western portion of the site. Gravel surfaced areas are relatively free of vegetation.
- **Topography:** The site is relatively flat and level.
- **Drainage:** 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 drainage from off-site sources.

3. SEISMIC SITE EVALUATION

3.1 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 7-16. Structures constructed on this site should be designed per IBC requirements for such a seismic classification. Our investigation revealed low hazard potential resulting from potential earthquake motions including: slope instability, liquefaction, and surface rupture caused by faulting or lateral spreading.

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3.2 Seismic Design Parameter Values

The ASCE 7-16 seismic design parameter values have been provided below.

Table 1 – Seismic Design Values

Seismic Design Parameter	Design Value
Site Class	D "Default"
Site Modified Peak Ground Acceleration, PGA_M	0.199
S_s	0.291 (g)
S_1	0.106 (g)
F_a	1.567
F_v	2.387
S_{MS}	0.457
S_{M1}	0.254
S_{DS}	0.304
S_{D1}	0.169

4. SOILS EXPLORATION

4.1 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. A site map with test pit locations was provided to Atlas by Ross Erickson of Erickson Civil, Inc. Test pit sites were located in the field by means of a Global Positioning System (GPS) device and are reportedly accurate to within twenty 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.

Samples obtained have been visually classified in the field, 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**. Atlas recommends that these logs **not** be used to estimate fill material quantities.

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4.2 Laboratory Testing Program

Along with our field investigation, a supplemental laboratory testing program was conducted to determine additional pertinent engineering characteristics of subsurface materials. Laboratory tests were conducted in accordance with current specifications. The laboratory testing program for this report included:

- Atterberg Limits Testing – ASTM D4318
- Grain Size Analysis – ASTM D6913

4.3 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.

Table 2 – Typical Soil Profiles

Soil Horizons	Approximate Depths	Soil Types	Consistency/Relative Density
Fill Materials[1]	0 to 2 feet	Lean Clay with Sand Fill, Poorly Graded Gravel with Sand Fill	Very Stiff to Hard/Medium Dense
Surficial Soils	0 to 9 feet	Silt with Sand[2], Sandy Lean Clay	Stiff to Hard
Intermediate Soils	7 to 13 feet	Silty Sand, Silty Gravel with Sand	Medium Dense to Very Dense
Deeper Soils	9.5 to 15 feet	Poorly Graded Gravel with Sand	Medium Dense

[1]Fills were not encountered in test pit 2.
[2]Calcium carbonate cementation/induration was noted within portions of this soil type.

During excavation, sloughing of test pit sidewalls was observed. In general, fine-grained soils remained stable while more granular sediments readily sloughed. However, moisture contents will also affect wall competency with saturated soils having a tendency to readily slough when under load and unsupported.

5. 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.

5.1 Groundwater

During this field investigation groundwater was not encountered in test pits advanced to a maximum depth of 14.8 feet bgs. Atlas has previously performed 6 geotechnical investigations within 0.50 mile of the project site. Information from these investigations has been provided in the table below.

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Table 3 – Groundwater Data

Date	Approximate Distance from Site (mile)	Direction from Site	Groundwater Depth (feet bgs)
June 2016	0.11	North	Not Encountered to 15.9
September 2022	0.20	Northwest	Not Encountered to 15.4
August 2016	0.35	Northeast	15.2
October 2025	0.40	Northeast	Not Encountered to 15.6
December 2024	0.50	Northeast	Not Encountered to 14.1
April 2026	0.50	Northeast	Not Encountered to 14.0
February 2025	0.50	South	14.1

Additionally, Atlas conducted groundwater monitoring on a project site approximately ½-mile to the south from February 2025 to June 2026. Groundwater depths ranged from 7.63 to 13.30 feet bgs, with the shallowest water depths occurring during early September.

Seasonal high groundwater depths should be confirmed through long-term groundwater monitoring. Atlas has been contracted to perform monthly monitoring on the project site following the initial investigation.

5.2 Soil Infiltration Rates

Soil permeability, which is a measure of the ability of a soil to transmit a fluid, was tested in the field. For this report, an estimation of infiltration is also presented using generally recognized values. Typical infiltration rates comprising the generalized soil profile for this study have been provided in the table below.

Table 4 – Generalized Soil Infiltration Rates

Soil Type	Typical Infiltration Rate (inches per hour)
Lean Clay with Sand	<2*
Silt with Sand	
Silty Sand	4 to 8
Silty Gravel with Sand	
Poorly Graded Gravel with Sand	>12

***The presence of cementation/induration may reduce infiltration rates to near zero.**

5.3 Infiltration Testing

Infiltration testing was conducted using an open test pit method. Test locations were presoaked prior to testing. Pre-soaking increases soil moistures, which allows the tested soils to reach a saturated condition more readily during testing. Saturation of the tested soils is desirable in order to isolate the vertical component of infiltration by inhibiting horizontal seepage during testing.

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Testing was conducted on July 16, 2026. Details and results of testing are as follows:

Table 5 – Infiltration Test Results

Test Location	Test Depth (feet bgs)	Soil Type	Stabilized Infiltration Rate (inches/hour)
TP-2	12.0	Poorly Graded Gravel with Sand	>12
TP-3	11.0	Poorly Graded Gravel with Sand	>12

Appropriate factors of safety have been applied to the stabilized infiltration rates achieved during testing to obtain the design infiltration rates listed below.

Table 6 – Design Infiltration Rates

Test Location	Test Depth (feet bgs)	Soil Type	Design Infiltration Rate (inches/hour)
TP-2	12.0	Poorly Graded Gravel with Sand	8
TP-3	11.0	Poorly Graded Gravel with Sand	8

The reason for the decreased infiltration rate is to account for long term saturation of the soils and the potential for less permeable soils to settle into the bottom of the infiltration facilities. Atlas recommends that all infiltration facilities be constructed in accordance with the local municipality requirements.

6. 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.

6.1 Foundation Loading Information

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. Total settlement should be limited to approximately 1 inch and differential settlement should be limited to approximately ½ inch, provided the following design and construction recommendations are observed.

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6.2 Foundation Design Recommendations

Considering subsurface conditions and the proposed construction, it is recommended that the structures be founded upon conventional spread footings and continuous wall footings. Based on data obtained from the site and test results from various laboratory tests performed, Atlas recommends the following guidelines for the net allowable soil bearing capacity:

Table 7 – Soil Bearing Capacity

Footing Depth	ASTM D1557 Subgrade Compaction	Net Allowable Soil Bearing Capacity
Footings must bear on competent, undisturbed, native sandy lean clay soils, silt with sand soils, or compacted granular structural fill. Existing organics and fill materials must be completely removed from below foundation elements.[1] Excavation depths ranging from roughly 0.5 to 1.7 feet bgs should be anticipated to expose proper bearing soils.[2]	Not Required for Native Soil 95% for Granular Structural Fill	1,500 lbs/ft^2 A ⅓ increase is allowable if the alternative basic load combinations of Section 1605.3.2 of the 2018 IBC are used in design.

[1]It will be required for Atlas personnel to verify the bearing soil suitability for each structure at the time of construction.
[2]Depending on the time of year construction takes place, the subgrade soils may be unstable because of high moisture contents. If unstable conditions are encountered, over-excavation and replacement with granular structural fill and/or use of geotextiles may be required.

Appropriate sliding frictional coefficient and passive lateral earth pressure values for the relevant soils can be found in the following table:

Table 8 – General Soil Properties for Foundation Design

Soil Type	Sliding Frictional Coefficient	Passive Lateral Earth Pressure (psf/ft)
Sandy Lean Clay	0.35	310
Silt with Sand		320
Granular Structural Fill	0.45	496

Footings should be proportioned to meet either the stated soil bearing capacity or the 2018 IBC minimum requirements. Foundation over-excavation must be replaced with granular structural fill. Excessively loose or soft areas that are encountered in the footings subgrade will require over-excavation and backfilling with granular 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, Atlas recommends continuous footings be suitably reinforced to make them as rigid as possible. For frost protection, the bottom of external footings should be 24 inches below finished grade. Foundations must be backfilled in accordance with the **Backfill of Walls** section.

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6.3 Floor Slab-on-Grade

Uncontrolled fill, which contained debris, was encountered in portions of the site. Atlas recommends that these fill materials be removed to a depth of at least 1 foot below existing grade. If fill materials remain after excavation, the exposed subgrade must be compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557. The excavated fill materials can be replaced in accordance with the **Fill Placement and Compaction** section provided that all organic material and debris is completely removed. Once final grades have been determined, Atlas is available to provide additional recommendations.

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 granular structural fill or suitable structural fill. Fill used to increase the elevation of the floor slab should consist of granular structural fill and suitable structural fill meeting the 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 should be provided below slabs-on-grade to provide drainage and a uniform and stable bearing surface. This should be a minimum of 4 inches in thickness and compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557. The mat must consist of aggregate base material as specified in the **Structural Fill** section. 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, Atlas can provide further consultation regarding installation.

7. PAVEMENT DISCUSSION AND RECOMMENDATIONS

7.1 Pavement Design Parameters

Project specific traffic loading information has not been provided. However, Atlas was informed that the site will see significant heavy equipment and truck traffic daily. Based on the character of the proposed construction, Atlas has used a traffic loading of 45,000 equivalent single axle loads (ESALs) for light duty pavement areas and 600,000 ESALs for heavy duty pavement areas. Light duty pavement should be used for parking lots and heavy duty pavement is to be used for access routes and loading/unloading areas. Atlas can provide a project specific pavement design upon request. Based on experience with soils in the region, a subgrade California Bearing Ratio (CBR) value of 4 has been assumed for near-surface sandy lean clay and silt with sand soils on site.

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The following are minimum thickness requirements for assured pavement function. Depending on site conditions, additional work, e.g. soil preparation, may be required to support construction equipment. These have been listed within the **Soft Subgrade Soils** section.

7.2 Flexible Pavement Sections

The recommended pavement sections provided below are based on a 20-year design life. To achieve this design life a routine maintenance program that includes crack sealing on a regular basis and possible seal coating will be required. The American Association of State Highway and Transportation Officials (AASHTO) design method has been used to calculate the following pavement sections. Atlas recommends that materials used in the construction of asphaltic concrete pavements meet requirements of the Idaho Standards for Public Works Construction (ISPWC). Construction of the pavement section should be in accordance with these specifications.

Table 9 – AASHTO Flexible Pavement Specifications

Pavement Section Component	Light Duty	Heavy Duty
Asphaltic Concrete	2.5 Inches	3.5 Inches
Aggregate Base	4.0 Inches	8.0 Inches
Structural Subbase	8.0 Inches	12.0 Inches
Compacted Subgrade[1]	See **Pavement Subgrade Preparation** Section	See **Pavement Subgrade Preparation** Section

[1]It will be required for Atlas personnel to verify subgrade competency at the time of construction.
[2]Alternative sections can be analyzed upon request. Additionally, the use of geotextiles could be used to potentially reduce section thicknesses.

- Asphaltic Concrete: Asphalt mix design shall meet the requirements of ISPWC Section 810. Materials shall be placed in accordance with ISPWC.
- Aggregate Base: Material complying with ISPWC for Type 1 Crushed Aggregate Materials.
- Structural Subbase: Material complying with ISPWC Section 801 for 3-inch or 6-inch Uncrushed Aggregate Materials. The maximum material diameter cannot exceed 2/3 the component thickness.

7.3 Rigid Pavement Section

The recommended pavement sections provided below are based on a 20-year design life. The AASHTO pavement design method was used to develop the following rigid concrete pavement section. This design method assumes the use of dowels at transverse joints. Concrete pavement shall be batched and constructed in accordance with the most current American Concrete Institute Standards and in accordance with ISPWC Standard Drawings SD-714, SD-714A, and SD-714B. Native subgrade soils on the site are frost susceptible, and therefore, require joint sealers or under-drains.

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Table 10 – AASHTO Rigid Pavement Specifications

Pavement Section Component	Heavy Duty
Portland Cement Concrete	6.0 Inches
Aggregate Base	8.0 Inches
Structural Subbase	Not Required
Compacted Subgrade[1]	See **Pavement Subgrade Preparation** Section

[1]It will be required for Atlas personnel to verify subgrade competency at the time of construction.

- Portland Cement Concrete: 4,000 psi concrete with a modulus of rupture greater than 650 psi generally complying with ISPWC requirement for Portland Cement Concrete per Section 705.
- Aggregate Base: Material complying with ISPWC for Type 1 Crushed Aggregate Materials.
- Structural Subbase: Material complying with ISPWC Section 801 for 3-inch or 6-inch Uncrushed Aggregate Materials. The maximum material diameter cannot exceed $^2/_3$ the component thickness.

7.4 Gravel Pavement Section

The recommended pavement sections provided below are based on a 10-year design life with a level of reliability of 90. The American Association of State Highway and Transportation Officials (AASHTO) design method has been used to calculate the following pavement section. Atlas recommends that materials used in the construction of gravel pavements meet requirements of the ISPWC Standard Specification for Highway Construction. Construction of the pavement section should be in accordance with these specifications and should adhere to guidelines recommended in the section on **Construction Considerations**.

Note that gravel pavement sections are typically for low-volume roadways (ESALs of less than 100,000), and are not intended to support large amounts of regular traffic. Regular maintenance in the form of grading will be required to maintain a flat and passable condition. Soft or unstable areas will develop if water is allowed to pond or collect on the surface. Therefore, grading is required to ensure that water is directed off the pavement surface. During and shortly after storm events, tracking of surface materials can be expected. Traffic during wet periods should be avoided to limit damage to the structural section. Damage to the pavement will be in the form of rutting and/or pumping of pavement section materials. Reconstruction of the exposed gravel base should be expected at least every 5 years.

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Table 11 – AASHTO Gravel Pavement Specifications

Pavement Section Component	Light Duty	Heavy Duty
Crushed Aggregate Base[1]	6.0 inches	8.0 inches
Structural Subbase	12.0 inches	12.0 inches
Geotextile Fabric	Mirafi 180N	Mirafi RS380i
Compacted Subgrade[2]	See **Pavement Subgrade Preparation** Section	See **Pavement Subgrade Preparation** Section

[1]Recycled Asphalt Base (RAB) can be used in lieu of Crushed Aggregate Base. RAB materials must be in general accordance with ITD Standard Specifications for Highway Construction, Section 304.
[2]It will be required for Atlas personnel to verify subgrade competency at the time of construction.

- Aggregate Base: Material complying with ISPWC Standards for Type 1 Crushed Aggregate Materials.
- Structural Subbase: Material complying with ISPWC Section 801 for 3-inch or 6-inch Uncrushed Aggregate Materials. The maximum material diameter cannot exceed 2/3 the component thickness.

7.5 Pavement Subgrade Preparation

Uncontrolled fill, which contained debris, was encountered in portions of the site. Atlas recommends that these fill materials be removed to a depth of at least 1 foot below existing grade. If fill materials remain after excavation, the exposed subgrade must be compacted to at least 95 percent of the maximum dry density as determined by ASTM D698 for flexible pavements and ASTM D1557 for rigid pavements. The excavated fill materials can be replaced in accordance with the **Fill Placement and Compaction** section provided that all organic material and debris is completely removed. Once final grades have been determined, Atlas is available to provide additional recommendations.

7.6 Common Pavement Section Construction Issues

The subgrade upon which above pavement sections are to be constructed must be properly stripped, compacted (if indicated), inspected, and proof-rolled. Proof rolling of subgrade soils should be accomplished using a heavy rubber-tired, fully loaded, tandem-axle dump truck or equivalent. Verification of subgrade competence by Atlas personnel at the time of construction is required. Fill materials on the site must demonstrate the indicated compaction prior to placing material in support of the pavement section. Atlas anticipated that pavement areas will be subjected to moderate traffic. Subgrade clayey and silty soils near and above optimum moisture contents may pump during compaction. Pumping or soft areas must be removed and replaced with granular structural fill.

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Fill material and aggregates in support of the pavement section must be compacted to no less than 95 percent of the maximum dry density as determined by ASTM D698 for flexible pavements and by ASTM D1557 for rigid pavements. If a material placed as a pavement section component cannot be tested by usual compaction testing methods, then compaction of that material must be approved by observed proof rolling. Minor deflections from proof rolling for flexible pavements are allowable. Deflections from proof rolling of rigid pavement support courses should not be visually detectable.

8. CONSTRUCTION CONSIDERATIONS

8.1 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. Native weeds 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 0.5 foot (minimum), and wasted or stockpiled for later use. 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 fill materials. Exact removal depths should be determined during grading operations by Atlas 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 fill materials as defined in the **Structural Fill** section.

Atlas 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.

8.2 Grading

Positive grades must be maintained surrounding structures and pavements, including exterior slabs. The interface of plant bedding materials and underlying soils should be graded to provide drainage away from site elements. Otherwise, bedding materials may direct water to underlying fine-grained soils, which increases the potential for localized heave. Excessive watering of landscaping should be avoided. If structures are to be tightly clustered, limiting space between two adjacent foundation systems, subsurface drains may be required to alleviate water ponding during short, intense storm events.

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8.3 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. Solutions to problems associated with soft subgrade soils are outlined in the **Soft Subgrade Soils** section. Problems may also arise because of lack of moisture in native soils and fill materials 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.

8.4 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.

8.5 Soft Subgrade Soils

Shallow fine-grained subgrade soils that are high in moisture content should be expected to pump and rut under construction traffic. During periods of wet weather, construction may become very difficult if not impossible. The following recommendations and options have been included for dealing with soft subgrade conditions:

- Track-mounted vehicles should be used to strip the subgrade of root matter and other deleterious debris. Heavy rubber-tired equipment should be prohibited from operating directly on the native subgrade and areas in which fill materials have been placed. Construction traffic should be restricted to designated roadways that do not cross, or cross on a limited basis, proposed roadway or parking areas.
- Soft areas can be over-excavated and replaced with granular structural fill.
- Construction roadways on soft subgrade soils should consist of a minimum 2-foot thickness of large cobbles of 4 to 6 inches in diameter with sufficient sand and fines to fill voids. Construction entrances should consist of a 6-inch thickness of clean, 2-inch minimum, angular drain-rock and must be a minimum of 10 feet wide and 30 to 50 feet long. During the construction process, top dressing of the entrance may be required for maintenance.
- Scarification and aeration of subgrade soils can be employed to reduce the moisture content of wet subgrade soils. After stripping is complete, the exposed subgrade should be ripped or disked to a depth of 1½ feet and allowed to air dry for 2 to 4 weeks. Further disking should be performed on a weekly basis to aid the aeration process.
- Alternative soil stabilization methods include use of geotextiles, lime, and cement stabilization. Atlas is available to provide recommendations and guidelines at your request.

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8.6 Frozen Subgrade Soils

Prior to placement of 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 fill.

The onsite shallow clayey and silty soils are susceptible to frost heave during freezing temperatures. For exterior flatwork and other structural elements, adequate drainage away from subgrades is critical. Compaction and use of granular structural fill will also help to mitigate the potential for frost heave. Complete removal of frost susceptible soils for the full frost depth, followed by replacement with a non-frost susceptible granular structural fill, can also be used to mitigate the potential for frost heave. Atlas is available to provide further guidance/assistance upon request.

8.7 Structural Fill

The following table defines the types of fill material that is suitable for use on the project. Refer to the **Fill Placement and Compaction** section for recommended placement locations for each fill type listed below.

Table 12 – Fill Material Criteria

Fill Type	Material	Maximum Lift Thickness*
Granular Structural Fill	ISPWC Section 801 for 1-inch, 3-inch, or 6-inch Uncrushed Aggregate and ISPWC Section 802 Aggregate Base	12 inches
Aggregate Base	ISPWC Section 802 for Type 1 Crushed Aggregate Base	12 inches
Structural Subbase	ISPWC Section 801 for 3-inch or 6-inch Uncrushed Aggregate	12 inches
Suitable Structural Fill**	Onsite/imported ML, SM, and GM soils that are free of organics and debris	6 inches
Recycled Asphalt Base	ITD Standard Specifications for Highway Construction, Section 304	6 inches

***Initial loose thickness, prior to compaction.**
****Onsite CL soils are unsuitable for use as fill material.**

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8.8 Fill Placement and Compaction

Requirements for fill material type and compaction effort are dependent on the planned use of the material. The following table specifies material type and compaction requirements based on the placement location of the fill material.

Table 13 – Fill Placement and Compaction Requirements

Fill Location	Material Type	Compaction
Foundations	Granular Structural Fill	95% of ASTM D1557
Interior Slab-on-Grade and Below Rigid Pavement Subgrade	Granular Structural Fill or Suitable Structural Fill	95% of ASTM D1557
Top 4 Inches of Interior and Exterior Slab-on-Grade	Aggregate Base Material	95% of ASTM D1557
Below Flexible/Gravel Pavement Subgrade and Exterior Flatwork Areas	Granular Structural Fill or Suitable Structural Fill	95% of ASTM D698 or 92% of ASTM D1557
Foundation Wall Backfill*	Granular Structural Fill or Suitable Structural Fill	95% of ASTM D1557
Utility Trench Backfill	Granular Structural Fill or Suitable Structural Fill	Per ISPWC Section 306

***Wall backfill material cannot exceed a maximum particle size of 4-inches.**

Prior to placement of fill materials, surfaces must be prepared as outlined in the **Earthwork** section. Fill material must be placed in horizontal lifts not exceeding 6-inches in thickness for fine-grained soils and 12-inches in thickness for granular structural fill, aggregate base material, and subbase material. All fill material must be moisture-conditioned to achieve optimum moisture content prior to compaction. During placement all fill materials must be monitored and tested to confirm compaction requirements have been achieved, as specified above, prior to placement of subsequent lifts. In addition, compacted surfaces must be in a firm and unyielding condition. Atlas personnel should be onsite to verify suitability of subgrade soil conditions, identify whether further work is necessary, and perform in-place moisture density testing.

Sufficient density tests should be performed to properly monitor compaction. At a minimum, Atlas recommends one test per lift as follows:

- Structures – 1 test every 5,000 square feet
- Pavement and Exterior Flatwork Areas – 1 test every 10,000 square feet
- Foundation Wall Backfill – 1 test every 500 square feet
- Utility Trench Backfill – 1 test every 100 linear feet

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Silty soils require very high moisture contents for compaction, 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 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, the exposed surface must be protected from degradation resulting from construction traffic or subsequent construction. It is anticipated that fine-grained soils will not be suitable for reuse during the wet season.

Use of silty soils (GM, SM, and ML) as structural fill below footings is prohibited. 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.

If material contains more than 40 percent but less than 50 percent oversize (greater than ¾-inch) particles, compaction of fill must be confirmed per ISPWC Section 202.3.8.C.3. Material should contain sufficient fines to fill void spaces and must not contain more than 50 percent oversize particles.

8.9 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 in the **Fill Placement and Compaction** section, 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. Atlas recommends in these areas that the top 12 inches must consist of a low permeability (clay or silt) soil to limit surface water infiltration.

Proper grading away from structures is critical. The surface must be graded away from the structure. In addition, Atlas recommends that roof drains carry stormwater at least 10 feet away from the structure.

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8.10 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, test pit sidewalls generally exhibited little indication of collapse; however, 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.

8.11 Groundwater Control

Groundwater was not encountered during the investigation and is anticipated to be below the depth of most construction. Should the scope of the proposed project change, Atlas should be contacted to provide more detailed groundwater control measures.

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 and clayey 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.

9. 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 Atlas must be arranged as supplementary recommendations may be required. Suitability of subgrade soils and compaction of fill materials must be verified by Atlas personnel prior to placement of structural elements. Additionally, monitoring and testing should be performed to verify that suitable materials are used for fill and that proper placement and compaction techniques are utilized.

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APPENDIX I WARRANTY AND LIMITING CONDITIONS

Atlas 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.

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 Atlas Technical Consultants ("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 nor 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, Atlas 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 Atlas should be retained to observe actual subsurface conditions during earthwork construction activities to provide additional construction recommendations as needed.

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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 Atlas 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, Atlas can provide, via a separate contract, those personnel who are trained to investigate and delineate soil and water contamination.

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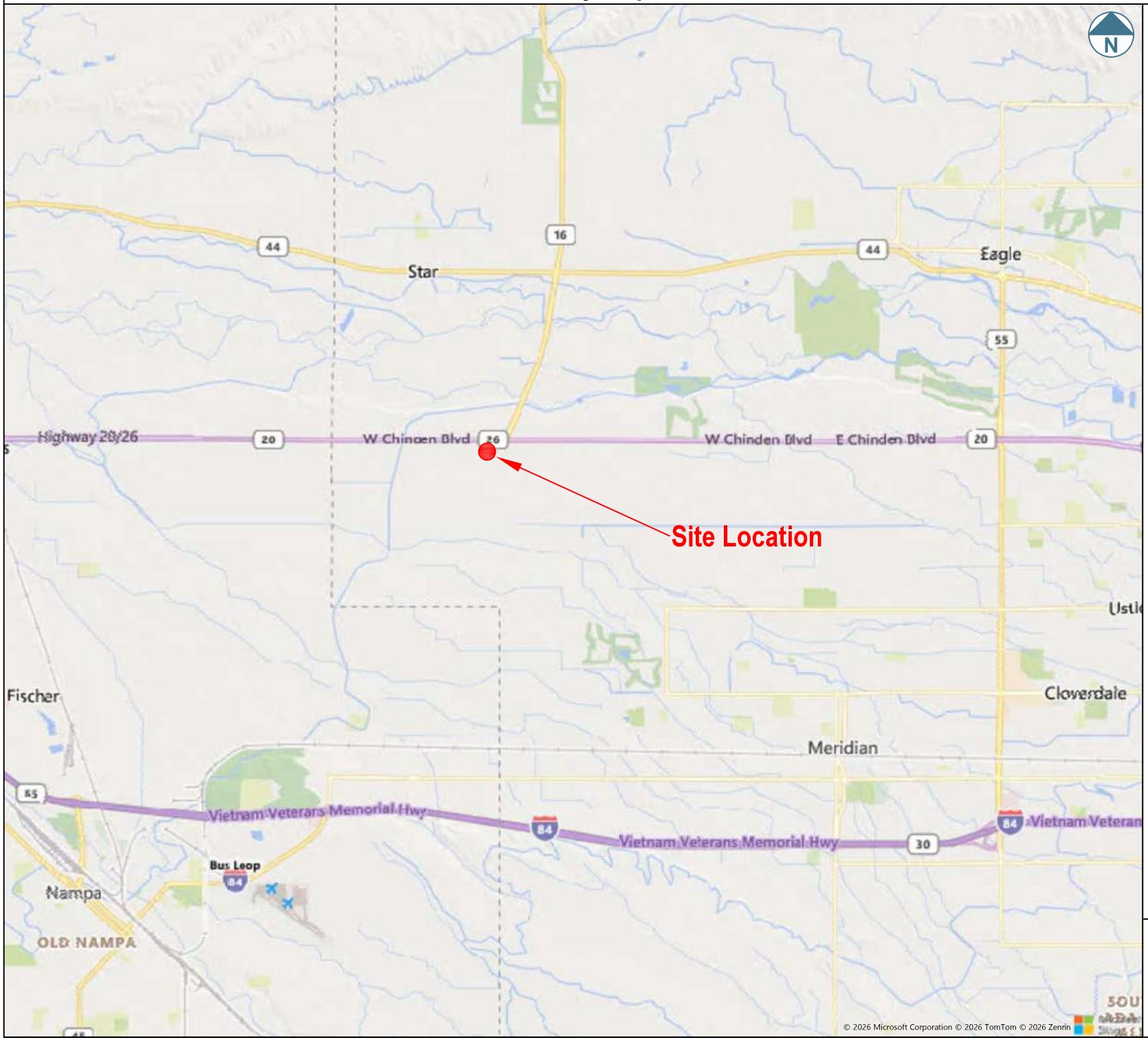
Vicinity Map

Figure 1



MAP NOTES:

- Not to Scale

LEGEND

Approximate Site Location

ITD D3 Highway 16 Maintenance Yard

SW Corner of Highway 16 and Chinden Boulevard
Meridian, ID

Modified by: DB
August 3, 2026
Drawing: 25864

ATLAS

2791 S. Victory View Way
Boise, ID 83709

Phone: (208) 376-4748
Fax: (208) 322-6515
Web: oneatlas.com

Site Map

Figure 2



NOTES:

- Not to Scale

LEGEND

Approximate Site Boundary

Approximate Atlas Test Pit Location with Piezometer

ITD D3 Highway 16 Maintenance Yard
SW Corner of Highway 16 and Chinden Boulevard
Meridian, ID

Modified by: DB
August 3, 2026
Drawing: 25864

ATLAS
2791 S. Victory View Way
Boise, ID 83709
Phone: (208) 376-4748
Fax: (208) 322-6515
Web: oneatlas.com

ATLAS TECHNICAL CONSULTANTS

REPORT OF TESTPIT: TP-1

CLIENT: Idaho Transportation Department (ITD)	LATITUDE: 43.66223	SHEET: 1 OF 1
PROJECT: ITD D3 Highway 16 Maintenance Yard	LONGITUDE: -116.47809	DRILLING COMPANY: Turn of the Century Homes
PROJECT NO: 25864	SURFACE ELEVATION: 2520.08(Ft)	EQUIPMENT: Excavator
LOCATION: SWC Highway 16 & Chinden Boulevard, Meridian, ID	HOLE DEPTH: 14.8Ft	LOGGED: Dalton Bjorum, EI DATE: 07/16/2026
OFFICE: 2791 S. Victory View Way Boise, ID 83709	GROUNDWATER LEVEL: Not Encountered Ft	CHECKED: Colby Meyer, PG DATE: 08/03/2026

DEPTH (ft)	SOIL TYPE	DESCRIPTION	Pocket Pentrometer (tsf)
		SANDY LEAN CLAY FILL (CL-FILL): Brown, dry, very stiff to hard, with fine to coarse-grained sand, --Organic material encountered to 0.8 foot bgs. --Wood and plastic debris encountered throughout.	3.0-4.5
1.7			
		SILT WITH SAND (ML): Light brown, dry, hard, with fine to coarse-grained sand --Moderate calcium carbonate cementation encountered from 1.7 to 6.0 feet bgs. --Strong calcium carbonate cementation encountered from 6.0 to 7.3 feet bgs.	4.5
5.0			
7.3			
		SILTY SAND (SM): Brown, slightly moist, medium dense, with fine to medium-grained sand.	
9.8			
10.0		SILTY GRAVEL WITH SAND (GM): Brown, slightly moist, medium dense, with fine to coarse-grained sand, fine to coarse gravel.	
12			
		POORLY GRADED GRAVEL WITH SAND (GP): Light brown, slightly moist, medium dense, with fine to coarse-grained sand, fine to coarse gravel, --Sidewall sloughing noted throughout. --Piezometer installed to a depth of 14.8 feet bgs.	
		TP-1 Terminated at 14.8 Ft	

ATLAS TECHNICAL CONSULTANTS

REPORT OF TESTPIT: TP-2

CLIENT: Idaho Transportation Department (ITD)
PROJECT: ITD D3 Highway 16 Maintenance Yard
PROJECT NO: 25864
LOCATION: SWC Highway 16 & Chinden Boulevard, Meridian, ID
OFFICE: 2791 S. Victory View Way Boise, ID 83709

LATITUDE: 43.66168
LONGITUDE: -116.47692
SURFACE ELEVATION: 2520.31(Ft)
HOLE DEPTH: 13.5Ft
GROUNDWATER LEVEL: Not Encountered Ft

SHEET: 1 OF 1
DRILLING COMPANY: Turn of the Century Homes
EQUIPMENT: Excavator
LOGGED: Dalton Bjorum, EI DATE: 07/16/2026
CHECKED: Colby Meyer, PG DATE: 08/03/2026

DEPTH (ft)	SOIL TYPE	DESCRIPTION	Pocket Pentrometer (tsf)	MOISTURE	Sieve Analysis		Atterberg Limits		Samples
					%<No. 4	%<No. 200	Liquid Limit	Plasticity Index	
		SANDY LEAN CLAY (CL): Brown, dry, very stiff to hard, with fine to coarse-grained sand, --Organic material encountered to 0.5 foot bgs.							
				18.9	98	67.8	35	10	Grab Sample
3.5		SILT WITH SAND (ML): Light brown, dry, hard, with fine to coarse-grained sand --Moderate calcium carbonate cementation encountered throughout.							
5.0									
7.6		SILTY GRAVEL WITH SAND (GM): Brown, slightly moist, medium dense, with fine to coarse-grained sand, fine to coarse gravel.							
9.5		POORLY GRADED GRAVEL WITH SAND (GP): Brown, slightly moist, medium dense, with fine to coarse-grained sand, fine to coarse gravel, --Infiltration testing conducted at a depth of 12.0 feet bgs. --Piezometer installed to a depth of 13.5 feet bgs.							
10.0		TP-2 Terminated at 13.5 Ft							

ATLAS TECHNICAL CONSULTANTS

REPORT OF TESTPIT: TP-3

CLIENT: Idaho Transportation Department (ITD)
PROJECT: ITD D3 Highway 16 Maintenance Yard
PROJECT NO: 25864
LOCATION: SWC Highway 16 & Chinden Boulevard, Meridian, ID
OFFICE: 2791 S. Victory View Way Boise, ID 83709

LATITUDE: 43.66246
LONGITUDE: -116.47500
SURFACE ELEVATION: 2524.7(Ft)
HOLE DEPTH: 14.5Ft
GROUNDWATER LEVEL: Not Encountered Ft

SHEET: 1 OF 1
DRILLING COMPANY: Turn of the Century Homes
EQUIPMENT: Excavator
LOGGED: Dalton Bjorum, EI DATE: 07/16/2026
CHECKED: Colby Meyer, PG DATE: 08/03/2026

DEPTH (ft)	SOIL TYPE	DESCRIPTION	Pocket Pentrometer (tsf)	MOISTURE	Sieve Analysis		Atterberg Limits		Samples
					%<No. 4	%<No. 200	Liquid Limit	Plasticity Index	
		POORLY GRADED GRAVEL WITH SAND FILL (GP-FILL): Light brown, dry, medium dense, with fine to coarse-grained sand, fine to coarse gravel.							
1.5		SILT WITH SAND (ML): Dark brown to light brown, dry to slightly moist, stiff to hard, with fine to coarse-grained sand --Organic odor noted at 1.5 feet bgs. --Moderate calcium carbonate cementation encountered from 4.9 to 7.1 feet bgs.		20.8	100	79.9	31	6	Grab Sample
5.0									
7.1		SILTY GRAVEL WITH SAND (GM): Brown, slightly moist, medium dense, with fine to coarse-grained sand, fine to coarse gravel.							
10.0									
10.5		POORLY GRADED GRAVEL WITH SAND (GP): Light brown, slightly moist, medium dense, with fine to coarse-grained sand, fine to coarse gravel, --Infiltration testing conducted at a depth of 11.0 feet bgs. --Piezometer installed to a depth of 14.5 feet bgs.							
		TP-3 Terminated at 14.5 Ft							

ATLAS TECHNICAL CONSULTANTS

REPORT OF TESTPIT: TP-4

CLIENT: Idaho Transportation Department (ITD)	LATITUDE: 43.66161	SHEET: 1 OF 1	
PROJECT: ITD D3 Highway 16 Maintenance Yard	LONGITUDE: -116.47484	DRILLING COMPANY: Turn of the Century Homes	
PROJECT NO: 25864	SURFACE ELEVATION: 2524.61(Ft)	EQUIPMENT: Excavator	
LOCATION: SWC Highway 16 & Chinden Boulevard, Meridian, ID	HOLE DEPTH: 14.6Ft	LOGGED: Dalton Bjorum, EI	DATE: 07/16/2026
OFFICE: 2791 S. Victory View Way Boise, ID 83709	GROUNDWATER LEVEL: Not Encountered Ft	CHECKED: Colby Meyer, PG	DATE: 08/03/2026

DEPTH (ft)	SOIL TYPE	DESCRIPTION	Pocket Pentrometer (tsf)
		POORLY GRADED GRAVEL WITH SAND FILL (GP-FILL): Light brown, dry, medium dense, with fine to coarse-grained sand, fine to coarse gravel.	
1.7			
		SANDY LEAN CLAY (CL): Brown to black, slightly moist, stiff to very stiff, with fine to coarse-grained sand.	1.5-3.0
5.0			
6.2			
		SILT WITH SAND (ML): Light brown to brown, dry to slightly moist, hard, with fine to coarse-grained sand --Moderate calcium carbonate cementation encountered throughout.	
9.2			
		SILTY SAND (SM): Brown, slightly moist, medium dense, with fine to coarse-grained sand.	
10.0			
11.2			
		SILTY GRAVEL WITH SAND (GM): Brown, slightly moist, dense to very dense, with fine to coarse-grained sand, fine to coarse gravel.	
13			
		POORLY GRADED GRAVEL WITH SAND (GP): Light brown, slightly moist, medium dense, with fine to coarse-grained sand, fine to coarse gravel, --Piezometer installed at 14.6 feet bgs.	
		TP-4 Terminated at 14.6 Ft	

APPENDIX V GEOTECHNICAL GENERAL NOTES

Unified Soil Classification System			
Major Divisions		**Symbol**	**Soil Descriptions**
Coarse-Grained Soils < 50% passes No.200 sieve	Gravel & Gravelly Soils < 50% coarse	GW	Well-graded gravels; gravel/sand mixtures with little or no fines
		GP	Poorly-graded gravels; gravel/sand mixtures with little or no fines
		GM	Silty gravels; poorly-graded gravel/sand/silt mixtures
		GC	Clayey gravels; poorly-graded gravel/sand/clay mixtures
	Sand & Sandy Soils > 50% coarse fraction	SW	Well-graded sands; gravelly sands with little or no fines
		SP	Poorly-graded sands; gravelly sands with little or no fines
		SM	Silty sands; poorly-graded sand/gravel/silt mixtures
		SC	Clayey sands; poorly-graded sand/gravel/clay mixtures
Fine-Grained Soils > 50% passes No.200 sieve	Silts & Clays LL < 50	ML	Inorganic silts; sandy, gravelly or clayey silts
		CL	Lean clays; inorganic, gravelly, sandy, or silty, low to medium-plasticity clays
		OL	Organic, low-plasticity clays and silts
	Silts & Clays LL > 50	MH	Inorganic, elastic silts; sandy, gravelly or clayey elastic silts
		CH	Fat clays; high-plasticity, inorganic clays
		OH	Organic, medium to high-plasticity clays and silts
Highly Organic Soils		PT	Peat, humus, hydric soils with high organic content

Relative Density and Consistency Classification	
Coarse-Grained Soils	**SPT Blow Counts (N)**
Very Loose:	< 4
Loose:	4-10
Medium Dense:	10-30
Dense:	30-50
Very Dense:	> 50
Fine-Grained Soils	**SPT Blow Counts (N)**
Very Soft:	< 2
Soft:	2-4
Medium Stiff:	4-8
Stiff:	8-15
Very Stiff:	15-30
Hard:	> 30

Moisture Content and Cementation Classification	
Description	**Field Test**
Dry	Absence of moisture, dry to touch
Slightly Moist	Damp, but no visible moisture
Moist	Visible moisture
Wet	Visible free water
Saturated	Soil is usually below water table
Description	**Field Test**
Weak	Crumbles or breaks with handling or slight finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

Particle Size	
Boulders:	> 12 in.
Cobbles:	12 to 3 in.
Gravel:	3 in. to 5 mm
Coarse-Grained Sand:	5 to 0.6 mm
Medium-Grained Sand:	0.6 to 0.2 mm
Fine-Grained Sand:	0.2 to 0.075 mm
Silts:	0.075 to 0.005 mm
Clays:	< 0.005 mm

Acronym List	
GS	grab sample
LL	Liquid Limit
M	moisture content
NP	non-plastic
PI	Plasticity Index
Q_p	penetrometer value, unconfined compressive strength, tsf
V	vane value, ultimate shearing strength, tsf

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

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