BID PROPOSAL

AND

CONSTRUCTION SPECIFICATIONS

FOR

LANDON'S INCLUSIVE PLAYGROUND and PHASE II PARKING LOT POLY VISTA PARK Billings, Montana

December 8th, 2023

Prepared For:

Billings PARKS AND RECREATION

390 North 23rd Street
Billings, MT 59101

Bid Form Signed _____
Bid Guarantee Included _____
Addendum Acknowledged _____

Set # _____

PAGE LEFT INTENTIONALLY BLANK

Contract Plans and Specifications

for:

LANDON'S INCLUSIVE PLAYGROUND and PHASE II PARKING LOT POLY VISTA PARK

December 8th, 2023

Prepared For:

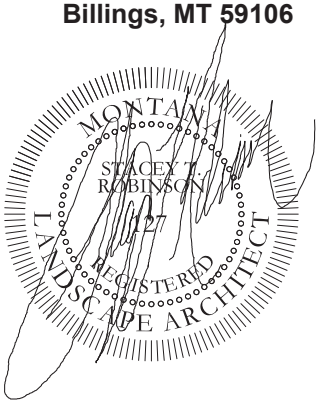
City of Billings Parks and Recreation
Mr. Cole McQuillan, Park Superintendent

390 North 23rd Street
Billings, MT 59101

Prepared By:

Land Design, Inc.
1670 S 48th Street West
Billings, MT 59106

Great West Engineering
6780 Trade Center Avenue
Billings, MT 59101



PAGE LEFT INTENTIONALLY BLANK

Contents

This Table of Contents includes only those sections that are printed in this Project Manual.

REFERENCED DOCUMENTS
INVITATION TO BID
INSTRUCTIONS TO BIDDERS
BID FORM
AGREEMENT FORM
BID BOND
PERFORMANCE BOND
PAYMENT BOND
PREVAILING WAGE RATES
SPECIAL PROVISIONS

TECHNICAL SPECIFICATIONS (CSI Format)

DIVISION 3 - CONCRETE
031000 Concrete Forming and Accessories
032000 Concrete Reinforcing
033000 Cast-In-Place Concrete

DIVISION 4 - MASONRY
044000 Stone Materials

DIVISION 5 - METALS
051213 Architecturally Exposed Structural Steel Framing

DIVISION 31 - EARTHWORK
312573 Detention Basin Soil
323113 Chainlink Fence and Gates
328400 Irrigation System
328410 Irrigation Trench & Backfill
329200 Turf & Grasses
329300 Landscaping
329413 Bed Edging

APPENDIX
Geotech Report

PAGE LEFT INTENTIONALLY BLANK

Drawings

L0.0 EXISTING CONDITIONS & LANDSCAPE DEMO
C1.0 GENERAL NOTES, SYMBOLS, AND ABBRV.
C2.0 OVERALL SITE PLAN-LLF
C3.0 PLAYGROUND DRAIN DETAILS-LLF
C4.0 OVERALL SITE PLAN-BPR
C5.0 PARKING LOT DETAILED SITE PLAN-BPR
C6.0 PARKING LOT STRIPING PLAN-BPR
C7.0 DETAILED SITE PLAN-BPR
C8.0 SEWER SERVICE P&P-BPR
L1.0 HARDSCAPE OVERALL
L1.1 HARDSCAPE PLAN BPR
L1.2 HARDSCAPE PLAN LLF
L1.3 HARDSCAPE PLAN BPR
L1.4 PLAYGROUND EQUIPMENT PLAN LLF
L1.5 PLAYGROUND LAYOUT PLAN LLF
L2.0 LANDSCAPE OVERALL
L2.1 PLANTING PLAN PLAYGROUND-LLF
L2.2 DETAIL PLANTING PLAN PLAYGROUND-LLF
L2.3 PLANTING PLAN PARKING LOT- BPR
L2.4 ADD ALTERNATE 1- BPR
L3.0 IRRIGATION NOTES-BPR
L3.1 IRRIGATION PLAN-BPR
L3.2 PARKING LOT IRRIGATION PLAN - BPR
L3.3 IRRIGATION ADD ALTERNATE 1 - BPR
L4.1 DETAILS-BPR
L4.2 DETAILS-BPR
L4.3 DETAILS-LLF
L4.4 DETAILS-LLF
L4.5 DETAILS-LLF
L4.6 DETAILS-LLF

PAGE LEFT INTENTIONALLY BLANK

REFERENCED DOCUMENTS

REFERENCED DOCUMENTS

The specifications for this project include by reference the following two documents. Although they are not printed in this Project Manual, they are still made part of these Contract Documents and the Contractor shall be required to comply with any and all such regulations, unless modified herein.

Document:
Montana Public Works Standard Specifications (MPWSS) Sixth Edition, April 2010
Available from:
Montana Contractors Association
1717 11th Avenue, P.O. Box 4519, Helena, MT 59604
(406)-442-4162

PAGE LEFT INTENTIONALLY BLANK

INVITATION TO BID

SECTION 00100
INVITATION TO BID

Separate sealed bids for the construction of LANDON'S INCLUSIVE PLAYGROUND AND PHASE II PARKING LOT POLY VISTA PARK will be received by the City of Billings City Clerk, 210 N. 27th Street, Billings, MT 59101 or P.O. Box 1178, Billings, MT 59103 until 2:00 p.m. local time on Tuesday, January 23rd 2024, and then publicly opened and read aloud via Facebook Live on the City's Facebook page: https://www.facebook.com/Billings-MT-City-Government-74352842013/. No hand delivered bids will be accepted. Bid tabulations will be posted for public viewing after the bids have been opened.

The project consists of a base bid and 1 additive alternates:

Base Bid scope includes: Site demo, Mass grading, Site utilities modification, Parking lot construction, Retaining wall construction, Sidewalks, Irrigation expansion, Planting and Seeding in Poly Vista Park in Billings Montana.

Additive Alternate 1 scope includes: Parking lot planting - trees, shrubs, perennials and associated irrigation.

The contract documents consisting of Drawings and Project Manual may be examined or obtained at the office of Land Design Inc., 1670 South 48th Street West, Billings, MT 59106 in accordance with Article 2.01 of Instructions To Bidders. Required deposit is $100.00 per set, which is not refundable. Per article 13.13 of the City of Billings Standard Modifications to the Montana Public Works Standard Specifications Sixth Edition - Instructions to Bidders, "Bidders must be on the official plan holders list and must purchase contract documents." Please call ahead to arrange a pickup time (406)-655-3550. Provide 2 hours advance notice minimum.

In addition, the Drawings and Project Manual may also be examined at the following locations: Billings Builders Exchange, 2050 Broadwater Avenue, Suite A, Billings, MT 59102.

There will be a Pre-Bid Conference on-site in the parking lot of Poly Vista Park in Billings, MT at 2 pm on January 10th, 2024. Interested CONTRACTORS are encouraged to attend.

CONTRACTOR and any of the CONTRACTOR'S subcontractors bidding or doing work on this project will be required to be registered with the Montana Department of Labor and Industry (DLI). Forms for registration are available from the Department of Labor and Industry, P.O. Box 8011, 1805 Prospect, Helena, Montana 59604-8011. Information on registration can be obtained by calling 1-406-444-7734. All laborers and mechanics employed by CONTRACTOR or subcontractors in performance of the construction work shall be paid wages at rates as may be required by the laws of Yellowstone (County) and the state of Montana. The CONTRACTOR must ensure that employees and applicants for employment are not discriminated against because of their race, color, religion, sex or national origin.

Each bid or proposal must be accompanied by a Certified Check, Cashier's Check, or Bid Bond payable to the CITY OF BILLINGS, MT, in an amount not less than ten percent (10%) of the

total amount of the bid. Successful BIDDERS shall furnish an approved Performance Bond and a Labor and Materials Payment Bond, each in the amount of one hundred percent (100%) of the contract amount. Insurance as required shall be provided by the successful BIDDER(s) and a certificate(s) of that insurance shall be provided.

No bid may be withdrawn after the scheduled time for the public opening of bids, which is 2 p.m. local time, Tuesday January 23rd, 2024.

The right is reserved to reject any or all proposals received, to waive informalities, to postpone the award of the contract for a period of not to exceed sixty (60) days, and to accept the lowest responsive and responsible bid which is in the best interest of the OWNER.

The City of Billings is an Equal Opportunity Employer.

Published at Billings, Montana, this December 8th, 2023.

Denise R. Bohlman
City Clerk
P.O. Box 1178
Billings, MT 59103

Dept: Billings Parks and Recreation Department

Published: December 8th 2023
December 15th 2023
December 22nd 2023

INSTRUCTIONS TO BIDDERS

SECTION 00200
INSTRUCTIONS TO BIDDERS

ARTICLE 1- DEFINED TERMS

1.1 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and the Supplementary Conditions. Additional terms used in these Instructions To Bidders have the meanings indicated below which are applicable to both the singular and plural thereof:

A. Bidder" - The individual or entity who submits a Bid directly to OWNER

B. Issuing Office" - The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

C. "Successful Bidder" - The lowest responsible Bidder submitting a responsive Bid to whom OWNER (on the basis of OWNER's evaluations as hereinafter provided) makes an award.

ARTICLE 2- COPIES OF BIDDING DOCUMENTS

2.1 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Invitation to Bid may be obtained from the Issuing Office. The deposit will not be refunded.

2.2 Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER nor ENGINEER assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 OWNER and ENGINEER in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

ARTICLE 3- QUALIFICATION OF BIDDERS

3.1 To demonstrate Bidder's qualifications to perform the Work, within 24-hours of Owners request, Bidder shall submit written evidence, such as financial data, previous experience in performing comparable work, present commitments and other such data as may be called for in the Special Provisions.

3.2 In determining the lowest responsible bid, the following elements will be considered: whether the BIDDER involved (a) maintains a permanent place of business; (b) has adequate plant and equipment to do the work properly and expeditiously; (c) has a suitable financial status to meet obligations incident to the work; and (d) has appropriate technical experience; and (e) attend the pre-bid conference (in case of mandatory pre bid).

3.3 Each BIDDER may be required to show that former work performed by him has been handled in such a manner that there are no just or proper claims pending against such work. No BIDDER will be acceptable if he is engaged on any other work which impairs his ability to finance his contract. The BIDDER shall demonstrate his ability by meeting all requirements herein stipulated, if asked for them.

3.4 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

3.5 Water and Wastewater Plant Facilities Only: Within five (5) days after the bid opening, the apparently successful Bidder may be required to submit the SAFETY PERFORMANCE AND PROGRAM SUMMARY form supplied by the Owner (a copy of this form is in the Standard Modifications to MPWSS section of this Project Manual). The information required on the form represents a summary of the bidder's safety history during the previous five (5) years. The information on the form may be used to determine whether a Bidder is responsible. The successful Bidder shall comply with the additional safety requirements found in 29CFR1910.119(h)(2) and (3).

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA AND SITE

4.1 Subsurface and Physical Conditions

A. The Special Provisions identify:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that ENGINEER has used in preparing the Bidding Documents.

2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Bidding Documents.

4.2 Copies of reports and drawings referenced in paragraph 4.02.A will be made available by OWNER to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in paragraph 4.02 of the General Conditions has been identified and established in paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.3 Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to OWNER and ENGINEER by owners of such Underground Facilities, including OWNER, or others. OWNER and ENGINEER do not assume responsibility for the accuracy or completeness thereof unless expressly provided otherwise elsewhere.

4.4 Hazardous Environmental Condition

A. The Special Provisions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that ENGINEER has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.03.A will be made available by OWNER to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in the Special Provisions has been identified and established in paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.5 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, Underground Facilities and other physical conditions, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in paragraph 4.06 of the General Conditions.

4.6 Upon request, OWNER will provide Bidder access to the site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill and compact all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

A. Reference is made to the Special Provisions for the identification of the general nature of other work that is to be performed at the Site by OWNER or others (such as utilities and other prime contractors) that relates to the Work for which a Bid is to be submitted. On request, OWNER will provide to each bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such work.

B. Paragraph 6.13.C of the General Conditions indicates that if an Owner safety program exists, it will be noted in the Special Provisions.

4.7 It is the responsibility of each Bidder before submitting a Bid to:

A. Examine and carefully study the Biding Documents including any Addenda and the other related data identified in the Bidding Documents;

B. Visit the site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work; including but not limited to those general and local conditions affecting transportation, disposal, handling and storage facilities, availability of labor, water, power, roads, climactic conditions and seasons, physical conditions at the work Sites and project area as a whole, job site topography and ground conditions, equipment and facilities needed preliminary to and during work prosecution,

C. Become familiar with and satisfy Bidder as to all Federal, State and Local Laws and Regulations that may affect cost, progress, or performance of the Work;

D. Carefully study all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except underground Facilities) which have been identified in the Special Provisions as provided in paragraph 4.02 of the General Conditions, and carefully study all reports and drawings of a Hazardous Environmental Condition, if any, at the Site which have been identified in the Special Provisions as provided in paragraph 4.06 of the General Conditions;

E. Obtain and carefully study (or assume responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. Agree at the time of submitting its bid that no further examinations, investigations, exploration, tests, studies or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. Become aware of the general nature of the work to be performed by OWNER and others at the Site that relates to the Work as indicted in the Bidding Documents;

H. Correlate the information know to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Promptly give ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by ENGINEER is acceptable to the Bidders; and

J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.8 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences or procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in Bidding Documents and the written resolutions thereof by ENGINEER are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – PRE-BID CONFERENCE

5.1 A pre-Bid conference will be held at the time and place listed in the Invitation To Bid. Representatives of OWNER and ENGINEER will be present to discuss the project. Bidders are encouraged to attend and participate in the conference. ENGINEER will transmit to all prospective bidders of record such Addenda as ENGINEER considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6- SITE AND OTHER AREAS

6.1 The Site is identified in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by CONTRACTOR Easement for permanent structures or permanent changes in existing facilities are to be obtained and paid for by OWNER unless otherwise provided in the Bidding Documents.

ARTICLE 7-INTERPRETATIONS AND ADDENDA

7.1 All questions about the meaning or intent of the Bidding Documents are to be submitted to ENGINEER in writing. Interpretations or clarifications considered necessary by ENGINEER in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by ENGINEER as having received the Bidding Documents. Questions received less than ten (10) days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.2 Addenda may be issued to clarify, correct or change the Bidding Documents as deemed advisable by OWNER or ENGINEER.

7.3 Any addenda issued during the time of bidding, or forming a part of the Contract Documents loaned to the Bidder for the preparation of his proposal, shall be covered in the Bid and shall be made a part of the Agreement. Receipt of each addendum shall be acknowledged in the Bid.

ARTICLE 8-BID SECURITY

8.1 A Bid must be accompanied by Bid Security made payable to the City of Billings and in accordance with BMCC 13-501.

ARTICLE 9- CONTRACT TIMES

9.1 The number of days within which, or the dates by which, the Work is to be (a) Substantially Completed and (b) also completed and ready for final payment are set forth in the Agreement.

ARTICLE 10- LIQUIDATED DAMAGES

10.1 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 11- SUBSTITUTE AND "OR-EQUAL" ITEMS

11.1 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is indicted in the Bidding Documents that a substitute or "or equal" item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, application for such acceptance will not be considered by ENGINEER until after the Effective Date of the Agreement. The procedure for submission of any such application by CONTRACTOR and consideration by ENGINEER is set forth in Paragraphs 6.05 of the General Conditions and may be supplemented in the General Requirements or Special Provisions.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS

12.1 If the Special Provisions require or the OWNER would request the identity of certain Subcontractors, Suppliers, individuals or entities to be submitted to OWNER in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall will within five (5) days after Bid opening submit to OWNER a list of all such Subcontractors, Suppliers, individuals or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by OWNER. If OWNER or ENGINEER alter due investigation has reasonable objection to any proposed Subcontractor, Supplier, individual or entity OWNER may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

12.2 If the apparent Successful Bidder declines to make any such substitution, the OWNER may determine such Bidder to be non-responsive and reject the Bid. Declining to make requested substitution will not constitute grounds for forfeiture of the Bid Security of any Bidder. Any Subcontractor, Supplier, individual or entity so listed and against which OWNER and ENGINEER makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to OWNER and ENGINEER subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

12.3 CONTRACTOR shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom CONTRACTOR has reasonable objection.

12.4 The use of subcontractors listed by the bidder and accepted by Owner prior to the Notice of Award will be required in the performance of the work.

ARTICLE 13- PREPARATION OF BID

13.1 The Bid Form is included with the Bidding Documents; additional copies may be obtained from the ENGINEER. Bids shall be strictly in accordance with the prescribed form. Any modifications thereof or deviations there from may be considered as sufficient cause for rejection. Bids carrying riders or qualifications to the Bid being submitted may be rejected as irregular.

13.2 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed. A Bid price shall be indicated for each Bid item listed therein, or the words "No Bid", "No Change", or "Not Applicable" entered. For the convenience of the Engineer, none of the Instruction to Bidders, Bid Form, Bond Forms, Agreement, Contract Specifications, or other specifications should be removed from the bound copy of Contract Documents prior to submission of the bid.

13.3 Bids by a corporation must be executed in the corporate name by the president or a vice president or other corporate officer who is authorized to bind the corporation, and the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature. The Bid of a corporation, which is signed by a person other than a corporate officer, must be accompanied by evidence of authority to sign. Bidders must be on the official plan holders list and must purchase contract documents.

13.4 A bid by a partnership shall be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

13.5 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The State of formation of the firm and the official address of the firm must be shown below the signature.

13.6 A Bid by an individual shall show the Bidder's name and official address.

13.7 A Bid by a Joint Venture shall be executed by each Joint Venturer in the manner indicated on the Bid form. The official address of the Joint Venture must be shown below the signature.

13.8 All signatures are to be in ink and names must be typed or printed below the signature. The title of the person(s) executing the Bid shall be clearly indicated beneath the signature.

13.9 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form). Bids in which all issued addenda are not acknowledged will be considered incomplete and will not be read.

13.10 The address and telephone number for communications regarding the Bid must be shown.

13.11 Current Montana Contractor's registration number, if any, must be shown.

ARTICLE 14- BASIS OF BID; EVALUATION OF BIDS

14.1 Bids.

A. Bidders shall submit a Bid on a unit price and/or lump sum basis for each item of Work listed in the Bid schedule as provided in the Bid form. The Bid will not be considered unless the Bid Form contains prices for all unit price and/or lump sum items, and alternates, as shown on the Bid Form. Bids and totals shall be shown legibly in their proper locations. The total amount of the Bid shall be legibly written and numerically presented in the proper places and the Bid Form shall be manually signed.

B. The total of all estimated prices will be determined as the sum of the products of the estimated quantity of each item and the unit price bid for the item. The final quantities and Contract Price will be determined in accordance with paragraph 11.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit price will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

ARTICLE 15 - SUBMITTAL OF BID

15.1 Each prospective Bidder is to execute one copy of the Bidding Documents. The Bid form is to be completed and submitted with the Bid security along with additional documents, if any, as identified in the Special Provisions.

15.2 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Invitation to Bid and shall be enclosed in an opaque sealed envelope, plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the bid is submitted), the name and address of Bidder, and, shall be accompanied by the Bid Security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED". A mailed bid shall be addressed to the address shown in the Invitation To Bid.

15.3

A. The Bid will not be considered unless accompanied by proper Bid Security in accordance with Article 8 of these Instruction to Bidders.

B. Alternative Bids will not be considered unless called for.

C. Bids by telephone, telegraph, fax or other telecommunication systems will not be considered.

ARTICLE 16- MODIFICATION AND WITHDRAWAL OF BIDS

16.1 Bids may be modified or withdrawn by art appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids as called for in the Invitation to Bid. Requests for modification or withdrawal must be written and must be signed in the same manner and by the same person(s) who signed the Bid.

16.2 If, within twenty-four hours after Bids are opened any Bidder files a duly signed written notice with OWNER and promptly thereafter demonstrates to the reasonable satisfaction of OWNER that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid security will be returned. Thereafter, if the Work is rebid or negotiated, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17- OPENING OF BIDS

17.1 Bids will be opened at the time set for opening in the Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates (if any) will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.1 All bids will remain subject to acceptance for sixty (60) days after the day of the Bid opening, but OWNER may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19- AWARD OF CONTRACT

19.1 OWNER reserves the right to reject any and all Bids, including without limitation, nonconforming, non responsive, unbalanced or conditional Bids. OWNER further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. OWNER also reserves the right to waive all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Successful Bidder. OWNER reserves the right to reject the Bid of any Bidder if OWNER believes it would not be in the best interest of the Project to make an award to that Bidder whether because Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by OWNER.

19.2 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of the Bidder and the rejection of all Bids in which that bidder has an interest.

19.3 In evaluating Bids, OWNER will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

19.4 In evaluating Bidders, OWNER will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Special Provisions.

19.5 OWNER may conduct such investigations as OWNER deems necessary to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals or entities to perform the Work in accordance with the Contract Documents.

19.6 If the Contract is to be awarded, OWNER will award the Contract to the responsible bidder whose Bid, conforming with all material terms and conditions of the Bidding Documents, is lowest price, in the best interest of the Project, and other factors considered, The OWNER reserves the right to accept or reject the Bids, or portions of Bids if denoted in the Bid as separate schedules, and to award more than one Bid or schedule for the same Bid if any of the aforementioned combination of Bids or schedules will be in the best interest of the OWNER. The OWNER reserves the right to cancel the award of any Agreement at any time before the complete execution of said Agreement by all parties without any liability against the OWNER.

ARTICLE 20 – CONTRACT SECURITY

20.1 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth OWNER's requirements as to Performance Bond, Payment Bond, and certificates of insurance. When the Successful Bidder delivers the executed Agreement to OWNER, it must be accompanied by such Bonds and insurance.

ARTICLE 21- SIGNING OF AGREEMENT

21. 1 When OWNER gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within fifteen (15) days thereafter, Successful Bidder shall sign and deliver at least six (6) counterparts of the Agreement and attached documents to OWNER. Within fifteen (15) days thereafter OWNER shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings and Specifications.

ARTICLE 22- STATE LAWS AND REGULATIONS

22.1 All applicable laws, ordinances and the rules and regulations of authorities having jurisdiction over construction of the project shall apply to the Contract throughout. State laws and ordinances which the CONTRACTOR must comply with, include but are not limited to, those involving workmen's compensation insurance, contractor registration, employment preference to Montana contractors and Montana residents, and gross receipts tax.1

22.2 On all projects and contracts with the Owner, Contractor and all subcontractors shall pay the standard prevailing rate of wages for all labor employed. The standard prevailing rate of wages, as used herein, means that standard prevailing rate of wages in the locality where the work is to be performed as determined under the Montana Statewide Prevailing Wage Rates and as bound herein. The Contractor and subcontractors are directed to the City Engineer's Office for information on the standard prevailing rate of wages applicable to this contract within this area.

22.3 Contractor shall post in a prominent and accessible place on the site of the work a legible statement of all wages to be paid to the employees.

22.4 In accordance with Title 15, Chapter 50, MCA, the Owner shall withhold, in addition to other amounts withheld as provided by law or specified herein, one percent (1%) of all payments due the Contractor and shall transmit such monies to the Montana Department of Revenue.

END OF SECTION 00200

PAGE LEFT INTENTIONALLY BLANK

BID FORM

SECTION 00300
BID FORM

PROJECT IDENTIFICATION:
LANDON'S INCLUSIVE PLAYGROUND AND PHASE II PARKING LOT POLY VISTA PARK
Billings, MT

CONTRACT IDENTIFICATION AND NUMBER:
N/A

THIS BID SUBMITTED TO:
City of Billings Montana
City Clerk
210 North 27th Street
Billings, Montana 59101

1.01 The undersigned Bidder proposes and agrees if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents, to perform and furnish all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

2.01 Bidder accepts all of the terms and conditions of the Advertisement or Invitation to Bid, and Instructions to Bidders, including without limitations those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for sixty (60) days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of all which is hereby acknowledged:

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Special Provisions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of a Hazard Environmental Condition, if any, which has been identified in the Special Provisions as provided in paragraph 4.06 of the General Conditions.

E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of the Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies and data with the Bidding Documents.

I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder .

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

4.01 Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner. The Bidder certifies that no official of the Owner, Engineer or any member of such official's immediate family, has direct or indirect interest in the pecuniary profits or Contracts of the Bidder.

5.01 The Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

A. Unit prices have been computed in accordance with paragraph 11.03.B of the General conditions.

B. The Owner reserves the right to reject any or all Bids

C. The Project is separated into a Base Bid and Additive Alternates. Bidders must bid on Base bid and all Alternates to be considered responsive. Owner will award, to the same contractor, the Base Bid and combination of Additive Alternates which will be in the best interest of the Owner, to be awarded as a single contract. Bid form line items are inclusive of all incidentals, labor, and materials not specifically listed to complete the work according to the Construction Documents.

D. Bidder is responsible for calculating bid quantities based on the drawings. Provided quantities in are given for bidding reference only.

LANDON'S INCLUSIVE PLAYGROUND AND PHASE II PARKING LOT POLY VISTA PARK

BASE BID

Item #	Description	Bid Qty.	Unit	Total price
101	General Conditions	1	LS	_____

PARKING LOT – BPR Scope

Item #	Description	Bid Qty.	Unit	Total price
102	Gravel Demo	1	LS	_____
103	Earthwork & Site Prep	1	LS	_____
104	Curbing	1	LS	_____
105	Asphalt Paving	1	LS	_____
106	Irrigation	1	LS	_____
107	Landscaping	1	LS	_____
108	Seeding	1	LS	_____

Total – Parking Lot Bid - $

Figures

PLAYGROUND – BPR Scope

Item #	Description	Bid Qty.	Unit	Total price
109	General Tree Removal & Site Demo	1	LS	_____
110	Earthwork & Site Prep	1	LS	_____
111	Sanitary Sewer Extension	1	LS	_____
112	Site Drainage	1	LS	_____
113	Concrete Paving	1	LS	_____
114	Retaining Wall	1	LS	_____
115	Landscaping	1	LS	_____
116	Irrigation	1	LS	_____
117	Turf- Sod Installation	1	LS	_____
118	Turf- Seeding	1	LS	_____

Total – Playground Bid - $

Figures

Total – Base Bid - $

Figures

ADD ALTERNATE # 1 - Parking lot landscaping

Item #	Description	Bid Qty.	Unit	Total price
201	Landscaping – Parking lot	1	LS	_____
202	Irrigation – Parking lot	1	LS	_____

Total – Add Alternate 1 - $

Figures

6.01 Bidder agrees that the Work will be substantially completed and ready for final payment in accordance with 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified above, which shall be stated in the Agreement.

7.01 The following documents are attached to and made a condition of the Bid:

A. Required Bid security in the amount of 10% of the maximum Bid price including alternates, if any, and in the form of a Bid Bond identified in the Instructions To Bidders.

B. The Owner may request evidence of the CONTRACTOR'S qualifications. Within 5 Days of OWNER'S request the BIDDER shall submit written evidence, such as financial data, previous experience of CONTRACTOR or subcontractor in performing comparable work, and present commitments.

8.01 The terms used in this Bid with the initial capital letters have the meanings indicated in the Instructions To Bidders, General Conditions, and the Supplementary Conditions.

SUBMITTED on , . _____

Montana Contractor's Registration # (if any) _____

Employer's Tax ID No. _____

If BIDDER is:

An Individual:

_____
(Name typed or printed)

By:

_____
(Individual's Signature)

Doing business as:

_____

Business Address:

_____

Phone No.:_____FAX No:_____

A Partnership:

_____
(Partnership Name)

By:

_____
(Signature)

_____
(Name, typed or printed)

Business Address:

_____

Phone No.:_____FAX No:_____

A Corporation:

_____
(Corporation Name)

State of Incorporation:

_____

Type:

_____
(General Business, Professional, Service, Limited Liability)

By:

_____
(Signature of authorized personnel)

Title:

_____

Attest:

_____
(Signature)

Business Address:

_____

Phone No.:_____FAX No:_____

Date of Qualification To Do Business Is:

_____

_____
(Corporate Seal)

A Joint Venture: Each Joint Venture Must Sign

Joint Venturer Name:

_____
(Name)

By:

_____
(Signature of Joint Venture Partner)

Name:

_____
(Name, printed or typed)

Business Address:

_____

Phone No.:_____FAX No:_____

Address of Joint Venture for Receipt of Official Communication:
Address:

_____

_____

Phone No.:_____FAX No:_____

(Each Joint Venture must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above.)

END OF SECTION

AGREEMENT FORM

SECTION 00500

AGREEMENT FORM

This Agreement is dated as of the _____day of ___in the year _____, by and between "City of Billings", hereinafter called "Owner" and _____hereinafter called Contractor. Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Base Bid scope includes: Site demo, Mass grading, Site utilities modification, Parking lot construction, Retaining wall construction, Sidewalks, Irrigation expansion, Planting and Seeding in Poly Vista Park in Billings Montana.

Additive Alternate 1 scope includes: Parking lot planting - trees, shrubs, perennials and associated irrigation.

Article 2. THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows: LANDON'S INCLUSIVE PLAYGROUND and PHASE II PARKING LOT POLY VISTA PARK.

Article 3. ENGINEER

3.01 The Project has been designed by: Land Design, Inc., & Great West Engineering, who is hereinafter called Engineer and who is to act as Owner's representative, assume all duties and responsibilities and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

Article 4. CONTRACT TIME

4.01 Time of the Essence.

A. All the time limits for milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Days to Achieve Substantial and Final Completion.

A. The Work will be substantially complete within 150 days after the date when the Contract Time commences to run as provided in paragraph 2.03 of the General Conditions.

B. Final completion of the Work shall be within 30 days after the date of Substantial Completion.

4.03 Liquidated damages.

A. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner Seven Hundred Fifty dollars ($750.00) for each day that expires after the time specified in paragraph 4.02 for Substantial Completion until the Work is substantially complete and Three Hundred Fifty dollars ($350.00) for each day that expires after the time specified in paragraph 4.02 for Final completion. The liquidated damages specified herein includes unscheduled employment.

Article 5. CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Section 6 below:

A. For all Work other than Unit Price Work, a lump sum of: ----------

All specific cash allowances are included in the above price in accordance with Paragraph 11.02 of the General Conditions.

Article 6. PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments:

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the Contract Documents.

6.02 Progress Payments; Retainage:

A. Owner shall make progress payments in accordance with Article 14 of the General Conditions on account of the Contract Price on the basis of Contractor's Applications for Payment as recommended by Engineer, once each month during construction as provided below. All progress payments will be on the basis of the progress of the Work measured by the number of units of each bid item completed times the bid unit price in the Unit Price Schedule of the Bid Form for that item.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the sum of the unit price items less the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, in accordance with paragraph 14.02 of the General Conditions.

a) The Owner shall retain five percent (5%) of the amount of each payment until final completion and acceptance of all Work covered by the Contract Documents.

b) Retainage will be five percent (5%) of materials and equipment not incorporated in the Work (but delivered, suitably stored and accompanied by documentation satisfactory to Owner as provided in paragraph 14.02 of the General Conditions).

2. Upon Substantial Completion and at the Owner's discretion, the amount of retainage may be further reduced if requested by the Contractor.

6.03 Final Payment:

A. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said paragraph 14.07.

Article 7. INTEREST:

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at a rate of up to 1% per month.

Article 8. CONTRACTOR'S REPRESENTATION:

8.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents (including all Addenda) listed in paragraph 9 and the other related data identified in the Bidding Documents

B. Contractor has visited the site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, performance or furnishing of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance and furnishing of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) which have been identified in the Special Provisions as provided in paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Special Provisions as provided in paragraph 4.06 of the General Conditions. Contractor acknowledges that such reports and drawings are not Contract Documents and may not be complete for Contractor's purposes. Contractor acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the site.

E. Contractor has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise, which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor including applying the specific means, methods, techniques, sequences and procedures of construction, if any, expressly required by the Contract Documents to be employed by the Contractor, and safety precautions and programs incident thereto.

F. Contractor does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities or discrepancies that Contractor has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

Article 9. CONTRACT DOCUMENTS:

9.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement (Pages 1 to 8 , inclusive);
2. Performance Bond (pages 1 to 3 , inclusive);
3. Payment Bond (pages 1 to 3 , inclusive);
4. Other Bonds
   a) Bid Bond (pages 1 to 2 , inclusive);
5. General Conditions (as referenced);
6. Supplementary Conditions (as referenced);
7. Special Provisions (pages 1 to 3 , inclusive);
8. Specifications as listed in the table of contents of the Project Manual;
9. Drawings consisting of a cover sheet and sheets numbered through with each sheet bearing the following general title: LANDON'S INCLUSIVE PLAYGROUND and PHASE II PARKING LOT POLY VISTA PARK;
10. Addenda (Numbers 1 to , inclusive);
11. Exhibits to this Agreement (enumerated as follows):
    a) Notice To Proceed (pages 1 to 1, inclusive);
    b) Contractor's Bid (pages 1 to 8, inclusive);
    c) Notice of Award
12. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
    a) Written Amendments;
    b) Work Change Directives;
    c) Change Order(s).
    d) Any Notice of Partial Utilization
    e) Notice of Substantial Completion
    f) Lien Waivers
    g) Notice of Final Completion and Acceptance
13. Certificates of Insurance
14. Wage Rates
15. Special Provisions (Section 00900 of Std Mods and project specific)

16. Montana Public Works Standard Specifications, Sixth Edition, dated April 2010,including the City of Billings Standard Modifications thereof.

B. The documents listed in paragraph 9.01.A. are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified or supplemented as provided in paragraphs 3.04 of the General Conditions.

Article 10. MISCELLANEOUS:

10.01 Terms.

A. Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.

10.02 Assignment of Contract.

A. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically, but without limitation, moneys that may come due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision of part of the Contract Documents held to be void or unenforceable under and Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WEREOF, Owner and Contractor have signed 4 copies of Agreement. Two counterparts have been delivered to Owner, one to Contractor and one to Engineer (number of signed copies may be reduced to 3 without Consultant Engineer).

This Agreement will be effective on _____, 2021 (which is the effective date of the Agreement).This Agreement shall not be effective unless and until concurred by Funding Agency's (if any) designated representative.

Owner _____ Contractor_____

By _____ By_____
(Signature) (Signature)

Attest _____ Attest_____
(Signature) (Signature)

Address for giving notices:
Phone No.
FAX No.

Address for giving notices:
Phone No.
FAX No.

(CORPORATE SEAL)

(If OWNER is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner-Contractor Agreement)

(SEAL)

Contractor Registration No.

Agent for service process:

_____

_____(If CONTRACTOR is a corporation or a partnership, attach evidence of authority to sign.)

Owner's Designated Representative:	Contractor's Designated Representative:
Name: _____	Name: _____
Title: _____	Title: _____
Address: _____	Address: _____
_____	_____
Phone No.: _____	Phone No.: _____
FAX No.: _____	FAX No.: _____

Agency Concurrence:

As a lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

By: _____

(Agency Official's Signature)

Title:_____

Date:_____

END OF SECTION

BID BOND

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:
City of Billings
210 North 27th Street
Billings, Montana 59101

BID

Bid Due Date:

Description *(Project Name and Include Location)*:
LANDON'S INCLUSIVE PLAYGROUND and PHASE II PARKING LOT POLY VISTA PARK, BILLINGS, MT

BOND

Bond Number:

Date *(Not earlier than Bid due date)*:

Penal sum _____ $ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

PERFORMANCE BOND

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):
City of Billings
210 North 27th Street
Billings, Montana 59101

CONTRACT

Effective Date of Agreement:
Amount:
Description (*Name and Location*):
LANDON'S INCLUSIVE PLAYGROUND and PHASE II PARKING LOT POLY VISTA PARK, BILLINGS, MT

BOND

Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ (Seal)
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature (Attach Power of Attorney)

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.

2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
   2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
   2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
   2.3 Owner has agreed to pay the Balance of the Contract Price to:
      1. Surety in accordance with the terms of the Contract; or
      2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

   3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
   3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
   3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
   3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
      1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
      2. Deny liability in whole or in part and notify Owner citing reasons therefor.

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

6. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

7. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

8. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located, and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

10. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

11. Definitions.

11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address and Telephone*)
Surety Agency or Broker:
Owner's Representative (*Engineer or other party*):

PAGE LEFT INTENTIONALLY BLANK

PAYMENT BOND

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):
City of Billings 210 North 27th Street
Billings, Montana 59101

CONTRACT
Effective Date of Agreement:
Amount:
Description *(Name and Location)*:
LANDON'S INCLUSIVE PLAYGROUND and PHASE II PARKING LOT POLY VISTA PARK, BILLINGS, MT

BOND
Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ (Seal)
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature (Attach Power of Attorney)

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2 Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

6.1 Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2 Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions

15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address, and Telephone*) Surety Agency or Broker: Owner's Representative (*Engineer or other*):

PAGE LEFT INTENTIONALLY BLANK

PREVAILING WAGE RATES

MONTANA
PREVAILING WAGE RATES FOR HEAVY CONSTRUCTION SERVICES 2023

Effective: January 14, 2023

Greg Gianforte, Governor
State of Montana

Laurie Esau, Commissioner
Department of Labor & Industry

To obtain copies of prevailing wage rate schedules, or for information relating to public works projects and payment of prevailing wage rates, visit ERD at erd.dli.mt.gov/labor-standards or contact:

Employment Standards Division
Montana Department of Labor and Industry
P. O. Box 8011
Helena, MT 59601
Phone 406-444-6543

The department welcomes questions, comments, and suggestions from the public. In addition, we'll do our best to provide information in an accessible format, upon request, in compliance with the Americans with Disabilities Act.

MONTANA PREVAILING WAGE REQUIREMENTS

The Commissioner of the Department of Labor and Industry, in accordance with Sections 18-2-401 and 18-2-402 of the Montana Code Annotated (MCA), has determined the standard prevailing rate of wages for the occupations listed in this publication.

The wages specified herein control the prevailing rate of wages for the purposes of Section 18-2-401, et seq., MCA. It is required each employer pay (as a minimum) the rate of wages, including fringe benefits, travel allowance, zone pay and per diem applicable to the district in which the work is being performed as provided in the attached wage determinations.

All Montana Prevailing Wage Rates are available on the internet at erd.dli.mt.gov/labor-standards or by contacting the department at (406) 444-6543.

In addition, this publication provides general information concerning compliance with Montana's Prevailing Wage Law and the payment of prevailing wages. For detailed compliance information relating to public works contracts and payment of prevailing wage rates, please consult the regulations on the internet at erd.dli.mt.gov/labor-standards or contact the department at (406) 444-6543.

LAURIE ESAU
Commissioner
Department of Labor and Industry
State of Montana

TABLE OF CONTENTS

MONTANA PREVAILING WAGE REQUIREMENTS:

A. Date of Publication 3
B. Definition of Heavy Construction 3
C. Definition of Public Works Contract 3
D. Prevailing Wage Schedule 3
E. Rates to Use for Projects 3
F. Wage Rate Adjustments for Multiyear Contracts 3
G. Fringe Benefits 4
H. Dispatch City 4
I. Zone Pay 4
J. Computing Travel Benefits 4
K. Per Diem 4
L. Apprentices 4
M. Posting Notice of Prevailing Wages 5
N. Employment Preference 5
O. Projects of a Mixed Nature 5
P. Occupations Definitions Website 5
Q. Welder Rates 5
R. Foreman Rates 5
S Proper Classification for Pipefitter and Laborer/Pipelayer Work on Water and Waste Water Treatment Plants 5

WAGE RATES:

BOILERMAKERS 6
BRICK, BLOCK, AND STONE MASONS 6
CARPENTERS 6
CEMENT MASONS AND CONCRETE FINISHERS 6
CONSTRUCTION EQUIPMENT OPERATORS
- OPERATORS GROUP 1 7
- OPERATORS GROUP 2 7
- OPERATORS GROUP 3 8
- OPERATORS GROUP 4 8
- OPERATORS GROUP 5 8
- OPERATORS GROUP 6 8
- OPERATORS GROUP 7 9

CONSTRUCTION LABORERS
- LABORERS GROUP 1 9
- LABORERS GROUP 2 9
- LABORERS GROUP 3 10
- LABORERS GROUP 4 10

DIVER TENDERS 10
DIVERS 11
ELECTRICIANS 11
INSULATION WORKERS - MECHANICAL (HEAT AND FROST) 11
IRONWORKERS - REINFORCING IRON AND REBAR WORKERS 12
IRONWORKERS - STRUCTURAL IRON AND STEEL WORKERS 12
LINE CONSTRUCTION
- EQUIPMENT OPERATORS 12
- GROUNDMAN 12
- LINEMAN 13

MILLWRIGHTS 13
PAINTERS 13
PILE BUCKS 13
PILOT CAR DRIVERS 13
PLUMBERS, PIPEFITTERS, AND STEAMFITTERS 14
SPRINKLERFITTERS 14
TRUCK DRIVERS 15

A. Date of January 14, 2023

B. Definition of Heavy Construction

The Administrative Rules of Montana (ARM), 24.17.501(4) – (4)(a), states *"Heavy construction projects include, but are not limited to, those projects that are not properly classified as either 'building construction', or 'highway construction.'*

Heavy construction projects include, but are not limited to, antenna towers, bridges (major bridges designed for commercial navigation), breakwaters, caissons (other than building or highway), canals, channels, channel cut-offs, chemical complexes or facilities (other than buildings), cofferdams, coke ovens, dams, demolition (not incidental to construction), dikes, docks, drainage projects, dredging projects, electrification projects (outdoor), fish hatcheries, flood control projects, industrial incinerators (other than building), irrigation projects, jetties, kilns, land drainage (not incidental to other construction), land leveling (not incidental to other construction), land reclamation, levees, locks and waterways, oil refineries (other than buildings), pipe lines, ponds, pumping stations (prefabricated drop-in units – not buildings), railroad construction, reservoirs, revetments, sewage collection and disposal lines, sewers (sanitary, storm, etc.), shoreline maintenance, ski tows, storage tanks, swimming pools (outdoor), subways (other than buildings), tipples, tunnels, unsheltered piers and wharves, viaducts (other than highway), water mains, waterway construction, water supply lines (not incidental to building), water and sewage treatment plants (other than buildings) and wells."

C. Definition of Public Works Contract

Section 18-2-401(11)(a), MCA defines "public works contract" as *"…a contract for construction services let by the state, county, municipality, school district, or political subdivision or for nonconstruction services let by the state, county, municipality, or political subdivision in which the total cost of the contract is in excess of $25,000…"*.

D. Prevailing Wage Schedule

This publication covers only Heavy Construction occupations and rates in the specific localities mentioned herein. These rates will remain in effect until superseded by a more current publication. Current prevailing wage rate schedules for Building Construction, Highway Construction and Nonconstruction Services occupations can be found on the internet at www.mtwagehourbopa.com or by contacting the department at (406) 444-6543.

E. Rates to Use for Projects

ARM, 24.17.127(1)(c), states *"The wage rates applicable to a particular public works project are those in effect at the time the bid specifications are advertised."*

F. Wage Rate Adjustments for Multiyear Contracts

Section 18-2-417, MCA states:

"(1) Any public works contract that by the terms of the original contract calls for more than 30 months to fully perform must include a provision to adjust, as provided in subsection (2), the standard prevailing rate of wages to be paid to the workers performing the contract.

(2) The standard prevailing rate of wages paid to workers under a contract subject to this section must be adjusted 12 months after the date of the award of the public works contract. The amount of the adjustment must be a 3% increase. The adjustment must be made and applied every 12 months for the term of the contract.

(3) Any increase in the standard rate of prevailing wages for workers under this section is the sole responsibility of the contractor and any subcontractors and not the contracting agency."

G. Fringe Benefits

Section 18-2-412, MCA states:

"(1) To fulfill the obligation…a contractor or subcontractor may:

(a) pay the amount of fringe benefits and the basic hourly rate of pay that is part of the standard prevailing rate of wages directly to the worker or employee in cash;

(b) make an irrevocable contribution to a trustee or a third person pursuant to a fringe benefit fund, plan, or program that meets the requirements of the Employee Retirement Income Security Act of 1974 or that is a bona fide program approved by the U. S. department of labor; or

(c) make payments using any combination of methods set forth in subsections (1)(a) and (1)(b) so that the aggregate of payments and contributions is not less than the standard prevailing rate of wages, including fringe benefits and travel allowances, applicable to the district for the particular type of work being performed.

(2) The fringe benefit fund, plan, or program described in subsection (1)(b) must provide benefits to workers or employees for health care, pensions on retirement or death, life insurance, disability and sickness insurance, or bona fide programs that meet the requirements of the Employee Retirement Income Security Act of 1974 or that are approved by the U. S. department of labor."

Fringe benefits are paid for all hours worked (straight time and overtime hours). However, fringe benefits are not to be considered a part of the hourly rate of pay for calculating overtime, unless there is a collectively bargained agreement in effect that specifies otherwise.

H. Dispatch City

ARM, 24.17.103(11), defines dispatch city as *"…the courthouse in the city from the following list which is closest to the center of the job: Billings, Bozeman, Butte, Great Falls, Helena, Kalispell, Miles City, Missoula and Sidney."*

I. Zone Pay

Zone pay is not travel pay. ARM, 24.17.103(25), defines zone pay as *"…an amount added to the base pay; the combined sum then becomes the new base wage rate to be paid for all hours worked on the project. Zone pay must be determined by measuring the road miles one way over the shortest practical maintained route from the dispatch city to the center of the job."* See section H above for a list of dispatch cities.

J. Computing Travel Benefits

ARM, 24.17.103(23), states *" 'Travel pay,' also referred to as 'travel allowance,' is and must be paid for travel both to and from the job site, except those with special provisions listed under the classification. The rate is determined by measuring the road miles one direction over the shortest practical maintained route from the dispatch city or the employee's home, whichever is closer, to the center of the job."* See section H above for a list of dispatch cities.

K. Per Diem

ARM, 24.17.103(19), states *" 'Per diem' typically covers costs associated with board and lodging expenses. Per diem is paid when an employee is required to work at a location outside the daily commuting distance and is required to stay at that location overnight or longer."*

L. Apprentices

Wage rates for apprentices registered in approved federal or state apprenticeship programs are contained in those programs. Additionally, Section 18-2-416(2), MCA states, *"…The full amount of any applicable fringe benefits must be paid to the apprentice while the apprentice is working on the public works contract."* Apprentices not registered in approved federal or state apprenticeship programs will be paid the appropriate journey level prevailing wage rate when working on a public works contract.

M. Posting Notice of Prevailing Wages

Section 18-2-406, MCA, provides that contractors, subcontractors, and employers who are *"...performing work or providing construction services under public works contracts, as provided in this part, shall post in a prominent and accessible site on the project or staging area, not later than the first day of work and continuing for the entire duration of the project, a legible statement of all wages and fringe benefits to be paid to the employees."*

N. Employment Preference

Sections 18-2-403 and 18-2-409, MCA require contractors to give preference to the employment of bona fide Montana residents in the performance of work on public works contracts.

O. Projects of a Mixed Nature

Section 18-2-408, MCA states:

"(1) The contracting agency shall determine, based on the preponderance of labor hours to be worked, whether the public works construction services project is classified as a highway construction project, a heavy construction project, or a building construction project.

(2) Once the project has been classified, employees in each trade classification who are working on that project must be paid at the rate for that project classification"

P. Occupations Definitions

You can find definitions for these occupations on the following Bureau of Labor Statistics website: http://www.bls.gov/oes/current/oes_stru.htm

Q. Welder Rates

Welders receive the rate prescribed for the craft performing an operation to which welding is incidental.

R. Foreman Rates

Rates are no longer set for foremen. However, if a foreman performs journey level work, the foreman must be paid at least the journey level rate.

S. Proper Classification for Pipefitter and Laborer/Pipelayer Work on Water and Waste Water Treatment Plants The proper classification for the following work is Pipefitter, when it is performed inside a building structure or performed at a location which will later be inside of a building: Joining steel pipe larger than 12 inches in diameter with bolted flange connections that has been pre-fabricated off site and does not require any modification such as cutting, grinding, welding, or other fabrication in order to be installed. All other work previously classified as pipefitter remains in that classification. The proper classification for that work when it is at a location that will always be outside a building is Pipelayer, which is under the Laborer Group 3 classification.

WAGE RATES

BOILERMAKERS

Wage	Benefit
$34.12	$31.68

Duties Include:
Construct, assemble, maintain, and repair stationary steam boilers, boiler house auxiliaries, process vessels, pressure vessels and penstocks. Bulk storage tanks and bolted steel tanks.

Travel:
All Districts
0-120 mi. free zone
>120 mi. federal mileage rate/mi.

Special Provision:
Travel is paid only at the beginning and end of the job.

Per Diem:
All Districts
0-70 mi. free zone
>70-120 mi. $65.00/day
>120 mi. $80.00/day

↑ Back to Table of Contents

BRICK, BLOCK, AND STONE MASONS

Wage	Benefit
$32.32	$16.78

Travel:
0-70 mi. free zone
>70-90 mi. $60.00/day
>90 mi. $80.00/day

↑ Back to Table of Contents

CARPENTERS

Wage	Benefit
$33.50	$14.07

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

↑ Back to Table of Contents

CEMENT MASONS AND CONCRETE FINISHERS

No Rate Established

Duties Include:
Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, or curbs. Align forms for sidewalks, curbs, or gutters.

Zone Pay:
No zone pay established.

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 1

Wage	Benefit
$29.11	$13.80

This group includes but is not limited to:
Air Compressor; Auto Fine Grader; Belt Finishing; Boring Machine (Small); Cement Silo; Crane, A-Frame Truck Crane; Crusher Conveyor; DW-10, 15, and 20 Tractor Roller; Farm Tractor; Forklift; Form Grader; Front-End Loader, under 1 cu. yd; Oiler, Herman Nelson Heater; Mucking Machine; Oiler, All Except Cranes/Shovels; Pumpman.

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 2

Wage	Benefit
$29.70	$13.80

This group includes but is not limited to:
Air Doctor; Backhoe\Excavator\Shovel, up to and incl. 3 cu. yds; Bit Grinder; Bitunimous Paving Travel Plant; Boring Machine, Large; Broom, Self-Propelled; Concrete Travel Batcher; Concrete Float & Spreader; Concrete Bucket Dispatcher; Concrete Finish Machine; Concrete Conveyor; Distributor; Dozer, Rubber-Tired, Push, & Side Boom; Elevating Grader\Gradall; Field Equipment Serviceman; Front-End Loader, 1 cu. yd up to and incl. 5 cu. yds; Grade Setter; Heavy Duty Drills, All Types; Hoist\Tugger, All; Hydralift Forklifts & Similar; Industrial Locomotive; Motor Patrol (except finish); Mountain Skidder; Oiler, Cranes\Shovels; Pavement Breaker, EMSCO; Power Saw, Self-Propelled; Pugmill; Pumpcrete\Grout Machine; Punch Truck; Roller, other than Asphalt; Roller, Sheepsfoot (Self-Propelled); Roller, 25 tons and over; Ross Carrier; Rotomill, under 6 ft; Trenching Machine; Washing /Screening Plant

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 3

Wage	Benefit
$30.65	$13.80

This group includes but is not limited to:
Asphalt Paving Machine; Asphalt Screed; Backhoe\Excavator\Shovel, over 3 cu. yds; Cableway Highline; Concrete Batch Plant; Concrete Curing Machine; Concrete Pump; Cranes, Creter; Cranes, Electric Overhead; Cranes, 24 tons and under; Curb Machine\Slip Form Paver; Finish Dozer; Front-End Loader, over 5 cu. yds; Mechanic\Welder; Pioneer Dozer; Roller Asphalt (Breakdown & Finish); Rotomill, over 6 ft; Scraper, Single, Twin, or Pulling Belly-Dump; YO-YO Cat.

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 4

Wage	Benefit
$31.65	$13.80

This group includes but is not limited to:
Asphalt\Hot Plant Operator; Cranes, 25 tons up to and incl. 44 tons; Crusher Operator; Finish Motor Patrol; Finish Scraper.

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 5

Wage	Benefit
$31.75	$13.80

This group includes but is not limited to:
Cranes, 45 tons up to and incl. 74 tons.

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 6

Wage	Benefit
$32.75	$13.80

This group includes but is not limited to:
Cranes, 75 tons up to and incl. 149 tons; Cranes, Whirley (All).

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 7

Wage	Benefit
$33.75	$13.80

This group includes but is not limited to:
Cranes, 150 tons up to and incl. 250 tons; Cranes, over 250 tons—add $1.00 for every 100 tons over 250 tons; Crane, Tower (All); Crane Stiff-Leg or Derrick; Helicopter Hoist.

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.50/hr.
>60 mi. base pay + $5.50/hr.

↑ Back to Table of Contents

CONSTRUCTION LABORERS GROUP 1/FLAG PERSON FOR TRAFFIC CONTROL

Wage	Benefit
$23.08	$11.82

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.05/hr.
>60 mi. base pay + $4.85/hr.

↑ Back to Table of Contents

CONSTRUCTION LABORERS GROUP 2

Wage	Benefit
$26.40	$11.82

This group includes but is not limited to:
General Labor; Asbestos Removal; Burning Bar; Bucket Man; Carpenter Tender; Caisson Worker; Cement Mason Tender; Cement Handler (dry); Chuck Tender; Choker Setter; Concrete Worker; Curb Machine-lay Down; Crusher and Batch Worker; Heater Tender; Fence Erector; Landscape Laborer; Landscaper; Lawn Sprinkler Installer; Pipe Wrapper; Pot Tender; Powderman Tender; Rail and Truck Loaders and Unloaders; Riprapper; Sign Erection; Guardrail and Jersey Rail; Spike Driver; Stake Jumper; Signalman; Tail Hoseman; Tool Checker and Houseman and Traffic Control Worker.

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.05/hr.
>60 mi. base pay + $4.85/hr.

↑ Back to Table of Contents

CONSTRUCTION LABORERS GROUP 3

Wage	Benefit
$26.07	$12.44

This group includes but is not limited to:
Concrete Vibrator; Dumpman (Grademan); Equipment Handler; Geotextile and Liners; High-Pressure Nozzleman; Jackhammer (Pavement Breaker) Non-Riding Rollers; Pipelayer; Posthole Digger (Power); Power Driven Wheelbarrow; Rigger; Sandblaster; Sod Cutter-Power and Tamper.

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.05/hr.
>60 mi. base pay + $4.85/hr.

↑ Back to Table of Contents

CONSTRUCTION LABORERS GROUP 4

Wage	Benefit
$26.76	$11.82

This group includes but is not limited to:
Hod Carrier***; Water Well Laborer; Blaster; Wagon Driller; Asphalt Raker; Cutting Torch; Grade Setter; High-Scaler; Power Saws (Faller & Concrete);
Powderman; Rock & Core Drill; Track or Truck Mounted Wagon Drill and Welder incl. Air Arc

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $3.05/hr.
>60 mi. base pay + $4.85/hr.

***Hod Carriers will receive the same amount of travel and/or subsistence pay as bricklayers when requested to travel.

↑ Back to Table of Contents

DIVER TENDERS

Wage	Benefit
$43.98	$17.84

The tender shall receive 2 hours at the straight time pay rate per shift for dressing and/or undressing a Diver when work is done under hyperbaric conditions.

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

↑ Back to Table of Contents

DIVERS

	Wage	Benefit
Stand-By	$44.98	$17.84
Diving	$89.96	$17.84

Depth Pay (Surface Diving)

0-20 ft.	free zone
>20-100 ft.	$2.00 per ft.
>100-150 ft.	$3.00 per ft.
>150-220 ft.	$4.00 per ft.
>220 ft.	$5.00 per ft.

Diving In Enclosures

0-25 ft.	free zone
>25-300 ft.	$1.00 per ft.

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

↑ Back to Table of Contents

ELECTRICIANS

Wage	Benefit
$36.69	$16.93

Travel:
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

0-18 mi. free zone
>18-60 mi. federal mileage rate/mi.
>60 mi. $75.00/day

↑ Back to Table of Contents

INSULATION WORKERS - MECHANICAL (HEAT AND FROST)

Wage	Benefit
$41.07	$19.87

Duties Include:
Insulate pipes, ductwork or other mechanical systems.

Travel:
All Districts
0-30 mi. free zone
>30-40 mi. $25.00/day
>40-50 mi. $35.00/day
>50-60 mi. $50.00/day
>60 mi. $60.00/day plus
- $0.56/mi. if transportation is not provided.
- $0.20/mi. if in company vehicle.

>60 mi. $105.00/day on jobs requiring an overnight stay plus
- $0.56/mi. if transportation is not provided.
- $0.20/mi. if in company vehicle.

↑ Back to Table of Contents

IRONWORKERS – REINFORCING IRON AND REBAR WORKERS

Wage	Benefit
$30.53	$27.91

Duties Include:
Cut, bend, tie, and place rebar.

Travel:
0-45 mi. free zone
>45-60 mi. $50.00/day
>60-100 mi. $75.00/day
>100 mi. $95.00/day

Special Provision:
When the employer provides transportation, travel will not be paid. However, when an employee is required to travel over 70 miles one way, the employee may elect to receive the travel pay in lieu of the transportation.

↑ Back to Table of Contents

IRONWORKERS – STRUCTURAL IRON AND STEEL WORKERS

Wage	Benefit
$30.53	$27.91

Duties Include:
Structural steel erection; assemble prefabricated metal buildings; energy producing windmill type towers; metal bleacher seating; handrail fabrication and ornamental steel.

Travel:
0-45 mi. free zone
>45-60 mi. $50.00/day
>60-100 mi. $75.00/day
>100 mi. $95.00/day

Special Provision:
When the employer provides transportation, travel will not be paid. However, when an employee is required to travel over 70 miles one way, the employee may elect to receive the travel pay in lieu of the transportation.

↑ Back to Table of Contents

LINE CONSTRUCTION – EQUIPMENT OPERATORS

Wage	Benefit
$37.26	$17.93

Duties Include:
All work on substations

Travel:
No Free Zone
$60.00/day

↑ Back to Table of Contents

LINE CONSTRUCTION – GROUNDMAN

Wage	Benefit
$29.09	$17.24

Duties Include:
All work on substations

Travel:
No Free Zone
$60.00/day

↑ Back to Table of Contents

LINE CONSTRUCTION – LINEMAN

Wage	Benefit
$48.65	$19.06

Duties Include:
All work on substations

Travel:
No Free Zone
$60.00/day

↑ Back to Table of Contents

MILLWRIGHTS

Wage	Benefit
$42.58	$14.57

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

↑ Back to Table of Contents

PAINTERS

Wage	Benefit
$25.00	$0.00

Travel:
No travel or per diem established.

↑ Back to Table of Contents

PILE BUCKS

Wage	Benefit
$33.50	$14.07

Duties Include:
Set up crane; set up hammer; weld tips on piles; set leads; insure piles are driven straight with the use of level or plum bob. Give direction to crane operator as to speed, and direction of swing. Cut piles to grade.

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + $4.00/hr.
>60 mi. base pay + $6.00/hr.

↑ Back to Table of Contents

PILOT CAR DRIVERS

No Rate Established

Zone Pay:
No zone pay established.

↑ Back to Table of Contents

PLUMBERS, PIPEFITTERS, AND STEAMFITTERS

Wage	Benefit
$38.56	$20.61

Duties Include:
Assemble, install, alter, and repair pipe-lines or pipe systems that carry water, steam, air, other liquids or gases. Testing of piping systems, commissioning and retro-commissioning. Workers in this occupation may also install heating and cooling equipment and mechanical control systems.

Travel:
0-70 free zone
>70 mi.

- On jobs when employees do not work consecutive days: $0.55/mi. if employer doesn't provide transportation. Not to exceed two trips.
- On jobs when employees work any number of consecutive days: $110.00/day.
-

↑ Back to Table of Contents

SPRINKLER FITTERS

Wage	Benefit
$35.66	$24.29

Duties Include:
Duties Include but not limited to any and all fire protection systems: Installation, dismantling, inspection, testing, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems, including both overhead and underground water mains, all piping, fire hydrants, standpipes, air lines, tanks, and pumps used in connection with sprinkler and alarm systems.

Travel
All Districts
The following travel allowance is applicable when traveling in employee's vehicle.

0-60 mi. free zone
>60-80 mi. $21.00/day
>80-100 mi. $31.00/day
>100 mi. $115.00/day + the IRS rate per mile and $8.92 for every 15 miles traveled for one trip out and one trip back

No travel allowance required when in employer's vehicle.

Per Diem
No per diem is applicable when traveling in employer's vehicle

The following per diem is applicable when traveling in employee's vehicle.

0-100 mi. free zone
>100 mi. $105.00/day + the IRS rate per mile and $8.92 for every 15 miles traveled for one trip out and one trip back.
>100 mi. $115.00/day

↑ Back to Table of Contents

TRUCK DRIVERS

	Wage	Benefit
Truck Driver	$31.28	$11.96

Truck drivers include but are not limited to:
Combination Truck and Concrete Mixer and Transit Mixer; Dry Batch Trucks; Distributor Driver; Dumpman; Dump Trucks and similar equipment; Dumpster; Flat Trucks; Lumber Carriers; Lowboys; Pickup; Powder Truck Driver; Power Boom; Serviceman; Service Truck/Fuel Truck/Tireperson; Truck Mechanic; Trucks with Power Equipment; Warehouseman, Partsman, Cardex and Warehouse Expeditor; Water Trucks.

Zone Pay:
All Districts
0-30 mi. free zone
>30-60 mi. base pay + $3.05/hr.
>60 mi. base pay + .$4.85/hr.

↑ Back to Table of Contents

PAGE LEFT INTENTIONALLY BLANK

SPECIAL PROVISIONS

SECTION 01030
SPECIAL PROVISIONS

SP-1 BID SUBMITTAL AND BASIS OF AWARD

1.A Description: The LANDON'S INCLUSIVE PLAYGROUND and PHASE II PARKING LOT POLY VISTA PARK project is broken into 2 separate contracts, one Public, and one Private. The Public portion of work is open to competitive bidding as a part of these documents and is designated as "BPR" items in the documents. The Private contract has been negotiated in advance and is designated as "LLF" items in the documents. Information related to the Private contract is provided for informational & coordination purposes.

1.A.1 The general scope for the Public Bid includes the following.

1.A.1.1 Base Bid scope includes: Site demo, Mass grading, Site utilities modification, Parking lot construction, Retaining wall construction, Sidewalks, Irrigation expansion, Planting and Seeding in Poly Vista Park in Billings Montana.

1.A.1.2 Additive Alternate 1 scope includes: Parking lot planting - trees, shrubs, perennials and associated irrigation.

1.A.2 The general scope for the Private Contract includes the following.

1.A.2.1 Playground equipment erection, Play surfacing installation including base rock, Shade Sail & Picnic Shelter construction including associated concrete pads, Custom site specialties, Site furnishings.

1.A.3 Schedule

1.A.3.1 Construction sequencing & coordination with Private Contractor is paramount.

1.A.3.2 It is expected that construction of the Public contract will be split or otherwise coordinated to allow construction of the Private contract in sequence with the Public contract workflow to minimize conflicts.

1.A.4 Private Contractor contact information

1.A.4.1 Bauer Construction is the General Contractor for the Private contract.

1.A.4.2 Contact: Houston Bauer – (406) 252 - 8319

1.B Basis of Award

1.B.1 Bidders are required to bid on the base bid and additive alternates to be considered responsive. Owner will award to the same contractor the base bid, and any additive alternates which will be in the best interest of the City.

SP-2 PROJECT COORDINATION

2.A The requirements of this special provision shall supplement section 01041 of MPWSS

2.B A construction coordination meeting between public and private contractor is required to develop a schedule and identify project handoffs & access points.

2.B.1 Handoff of construction site between Public and Private Contractor shall be coordinated at an on-site meeting with both contractors and Owner's Representative in attendance. All parties will agree to the site conditions upon transfer in writing. Contract time will be stopped or amended

2.B.2 A second handoff of the construction site will occur as necessary in the same fashion as described above to transfer control of the Private Contractor's site work back to Public Contractor.

2.C Public contractor shall submit a construction schedule to the Owner in coordination with the private contractor prior to beginning construction. The schedule will show the order, timing, and progress in which the contractor proposes to complete the work. This schedule shall be in the format of a bar graph or cpm diagram. The schedule shall be updated and resubmitted with each application for payment.

2.D The public contractor shall coordinate all construction activities through all phases of project with the intent to complete the proposed construction in a neat and orderly fashion, in a timely manner, and with a minimum of disturbance to adjacent property and the public.

2.E The contractor and any critical subcontractors performing work shall attend or be represented at construction coordination meetings scheduled by the Owner throughout the duration of the project.

2.F The contractor shall coordinate all construction activities with local utilities.

SP-3 PROTECTION PRESERVATION & REPAIR

3.A Existing structures

3.A.1 The contractor shall document the preconstruction condition of potentially impacted structures and pavement and provide a copy of all such documentation to the owner upon request.

3.A.2 Where construction will be required adjacent to existing structures, the contractor shall be solely responsible to maintain the structural integrity of the existing structures. The contractor shall take whatever means necessary to ensure that the existing structure is not damaged and, if necessary, shall install shoring, or other means of supporting the utility or structure, or change the size or type of construction equipment. The contractor shall protect, and in the case of any damage, repair the existing structures at the contractor's expense.

3.A.3 The contractor is responsible for the protection of and the cost to repair and replace to the satisfaction of the owner, any and all asphalt damaged due to any construction or travel (hauling, storage, unloading. etc.) Operations. The contractor shall familiarize themselves with the existing surfacing sections in the project area and consider self-imposed load restrictions conforming to those sections. The contractor shall use equipment sized and equipped to protect the asphalt. The contractor shall make their own assessment of the conditions and adjust their bid accordingly.

SP-4 BID ITEM DESCRIPTION

4.A Item 101 – General Conditions: This item consists of coordination and scheduling, field engineering, submittals, quality control plan; quality control testing and surveying; construction of temporary facilities; site safety; product shipment, handling, storage, and protection; manufacturer's services and operation and maintenance manuals; mobilization; record drawings; final cleanup; demobilization; and contract closeout. All required taxes, bonds, and insurance, permit license applications, notices, renewals and terminations, including all associated fees are included in this bid item.

PARKING LOT – BPR SCOPE

4.B Item 102 - Gravel Demo of existing parking lot gravel per drawings.
4.C Item 103 - Earthwork & Site Prep. All areas of new work within the parking lot boundary including gravel area reclamation per drawings.
4.D Item 104 – Curbing. Concrete parking lot curb per drawings.
4.E Item 106 – Irrigation. All areas of new work within the parking lot boundary per drawings. Irrigation includes irrigation stub out for future tie in with add alt 1 irrigation.
4.F Item 107 – Landscaping. Install weed barrier, mulch, tree and shrub planting for all areas of new work within the parking lot boundary per drawings.
4.G Item 108 – Seeding. All areas of new work within the parking lot boundary per drawings.

PLAYGROUND – BPR SCOPE

4.H Item 109 - General Tree Removal & Site Demo. This work shall include the removal of miscellaneous items that are located within the construction limits of the proposed project. These items may include removal and disposal of fencing, trees, and construction debris.
4.I Item 111 - Sanitary Sewer Extension. Install and connect new sanitary sewer line to existing piping per drawings.
4.J Item 112 - Site Drainage. Install playground drainage system and drain to daylight at detention basin per drawings.

4.K Item 113 - Concrete Paving. Install new sidewalks and fundraiser brick concrete edge per drawings.
4.L Item 114 - Retaining Wall. Install 22" block rock retaining walls per drawings.
4.M Item 115 – Landscaping. Install weed barrier, mulch, tree and shrub planting for all areas of new work within the playground boundary per drawings.
4.N Item 116 – Irrigation. Install irrigation system for all areas of new work within the playground boundary per drawings.
4.O Item 117 - Turf - Sod. Install sod for all areas of new work within the playground boundary per drawings.
4.P Item 118 - Turf - Seeding. Install seed for all areas of new work within the playground boundary per drawings.

ADD ALTERNATE – 1

4.Q Item 201 - Landscaping. Install trees and shrubs in the parking lot area per drawings.
4.R Item 202 – Irrigation. Install drip irrigation for parking lot planting beds from irrigation stub out provided in base bid per drawings.

END OF SECTION

TECHNICAL SPECIFICATIONS (CSI Format)

DIVISION 3 - CONCRETE
031000 Concrete Forming and Accessories
032000 Concrete Reinforcing
033000 Cast-In-Place Concrete

DIVISION 4 - MASONRY
044000 Stone Materials

DIVISION 5 - METALS
051213 Architecturally Exposed Structural Steel Framing

DIVISION 31 - EARTHWORK
312573 Detention Basin Soil
323113 Chainlink Fence and Gates
328400 Irrigation System
328410 Irrigation Trench & Backfill
329200 Turf & Grasses
329300 Landscaping
329413 Bed Edging

APPENDIX
Geotech Report

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Form-facing material for cast-in-place concrete.
2. Shoring, bracing, and anchoring.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1.3 ACTION SUBMITTALS

A. Product Data: For each of the following:

1. Exposed surface form-facing material.
2. Concealed surface form-facing material.
3. Exposed surface form-facing material for watertight concrete.
4. Form-release agent.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Minutes of preinstallation conference.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:

a. Plywood, metal, or other approved panel materials.
b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

1) APA HDO (high-density overlay).
2) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
3) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
4) APA Plyform Class I, B-B or better; mill oiled and edge sealed.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 RELATED MATERIALS

A. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

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

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
2. Form release agent for form liners shall be acceptable to form liner manufacturer.

D. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301 (ACI 301M).

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M) and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.

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

1. Minimize joints.
2. Exposed Concrete: Symmetrically align joints in forms.

D. Construct removable forms for easy removal without hammering or prying against concrete surfaces.

1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, reglets, recesses, and other accessories, for easy removal.

E. Do not use rust-stained, steel, form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips.
2. Use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.

1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.

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

I. At construction joints, overlap forms onto previously placed concrete not less than 12 inches (305 mm).

J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.

K. Construction and Movement Joints:

1. Construct joints true to line with faces perpendicular to surface plane of concrete.

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

L. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

M. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

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

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

3.2 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
4. Clean embedded items immediately prior to concrete placement.
5. Work.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a **special inspector and qualified testing and inspecting agency** to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.

END OF SECTION 031000

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of the Architect.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, **Grade 60** **(Grade 420)**, deformed.

B. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed.

C. Headed-Steel Reinforcing Bars: ASTM A970/A970M.

D. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

E. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

2.2 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

b. Rebar supports shall be capable of supporting weight of reinforcement as well as weight of workers and worker's equipment.

B. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch (1.2908 mm) in diameter.

1. Finish: **Plain**.

2.3 FABRICATING REINFORCEMENT

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

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

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

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

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch (25 mm), not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318 (ACI 318M).

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

F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 40 bar diameters at splices, or 24 inches (610 mm), whichever is greater.
2. Stagger splices in accordance with ACI 318 (ACI 318M).

G. Install welded-wire reinforcement in longest practicable lengths.

1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."

a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed 12 inches (305 mm).

2. Lap edges and ends of adjoining sheets at least 12 inches.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

3.3 JOINTS

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

1. Place joints perpendicular to main reinforcement.
2. Continue reinforcement across construction joints unless otherwise indicated.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117 (ACI 117M).

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a **qualified testing and inspecting agency** to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel-reinforcement placement.

END OF SECTION 032000

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:
1. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, and other pozzolans materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.
3. Aggregates.
4. Admixtures:

    a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.

5. Vapor retarders.
6. Curing materials.
7. Joint fillers.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.

4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
10. Intended placement method.
11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:

1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.
7. Floor treatment if any.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Vapor retarders.
5. Joint-filler strips.

B. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Aggregates.
3. Admixtures:

C. Research Reports: For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.

D. Preconstruction Test Reports: For each mix design.

E. Field quality-control reports.

F. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.

1. Include the following information in each test report:

a. Admixture dosage rates.
b. Slump.
c. Air content.
d. Seven-day compressive strength.
e. 28-day compressive strength.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301 (ACI 301M).

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 306.1.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M).

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 (ACI 301M) unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, **Type I** or **II**.
2. Fly Ash: ASTM C618, Class C or F.

B. Normal-Weight Aggregates: ASTM C33/C33M, **Class 3S** coarse aggregate or better, graded. Provide aggregates from a single source.

1. Alkali-Silica Reaction: Comply with one of the following:

a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.

b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. (2.37 kg/cu. m) for moderately reactive aggregate or 3 lb./cu. yd. (1.78 kg/cu. m) for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301 (ACI 301M).

2. Maximum Coarse-Aggregate Size: **1-1/2 inches (38 mm)**.
3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C260/C260M.

D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride [**in steel-reinforced concrete**].

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

E. Water and Water Used to Make Ice: ASTM C94/C94M, potable

2.3 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A, not less than 15mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Stego Wrap or approved equal

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.

1. Color:

a. Ambient Temperature Below 50 deg F (10 deg C): Black.
b. Ambient Temperature between 50 deg F (10 deg C) and 85 deg F (29 deg C): Any color.
c. Ambient Temperature Above 85 deg F (29 deg C): White.

C. Curing Paper: Eight-feet- (2438-mm-) wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.

D. Water: Potable or complying with ASTM C1602/C1602M.

E. Clear, Waterborne, Membrane-Forming, Nondissipating Curing Compound: ASTM C309, Type 1, Class B**, certified by curing compound manufacturer to not interfere with bonding of floor covering**.

2.5 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: **ASTM D1751, asphalt-saturated cellulosic fiber**.

2.6 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301 (ACI 301M).

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

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

1. Fly Ash or Other Pozzolans: 25 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use **water-reducing**], **high-range water-reducing or plasticizing** admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in **pumped concrete, concrete for heavy-use industrial slabs concrete for parking structure slabs, and concrete with a w/cm below 0.50**.

2.7 CONCRETE MIXTURES

A. Normal-weight concrete used for footings and foundation walls.
1. Minimum Compressive Strength: 3000 PSI.
2. Maximum w/cm: .50.
3. Slump Limit: [**4 inches (100 mm), plus or minus 1 inch (25 mm) or** [**8 inches (200 mm), plus or minus 1 inch (25 mm) for concrete with verified slump of 3 inches (75 mm) plus or minus 1 inch (25 mm)before adding high-range water-reducing admixture or plasticizing admixture**.
4. Air Content: 5-7%.

B. Normal-weight concrete used for interior slabs-on-ground.
1. Minimum Compressive Strength: 4000 PSI.
2. Maximum w/cm: .45.

3. Slump Limit: **4 inches (100 mm), plus or minus 1 inch or 8 inches (200 mm), plus or minus 1 inch (25 mm) for concrete with verified slump of 3 inches (75 mm) plus or minus 1 inch (25 mm)before adding high-range water-reducing admixture or plasticizing admixture.**
4. Air Content:

    a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and furnish batch ticket information.

PART 3 - EXECUTION

3.1 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.2 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.

1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
2. Face laps away from exposed direction of concrete pour.
3. Lap vapor retarder over footings and grade beams not less than 6 inches (150 mm), sealing vapor retarder to concrete.
4. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.

    a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches (150 mm) on all sides, and sealing to vapor retarder.

3.3 JOINTS

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

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
2. Place joints perpendicular to main reinforcement.

    a. Continue reinforcement across construction joints unless otherwise indicated.
    b. Do not continue reinforcement through sides of strip placements of floors and slabs.

3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as directed by Architect. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.

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

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

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

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

3.4 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M), but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301 (ACI 301M).

a. Do not use vibrators to transport concrete inside forms.
b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer.
c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.

4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.5 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 (ACI 301M) Surface Finish SF-1.0: For As-cast concrete texture imparted by form-facing material.

    a. Patch voids larger than 1-1/2 inches (38 mm) wide or 1/2 inch (13 mm) deep.
    b. Remove projections larger than 1 inch (25 mm).
    c. Tie holes do not require patching.
    d. Surface Tolerance: ACI 117 (ACI 117M) Class D.
    e. Apply to concrete surfaces **not exposed to public view**.

2. ACI 301 (ACI 301M) Surface Finish SF-3.0:

    a. Patch voids larger than 3/4 inch (19 mm) wide or 1/2 inch (13 mm) deep.
    b. Remove projections larger than 1/8 inch (3 mm).
    c. Patch tie holes.
    d. Surface Tolerance: ACI 117 (ACI 117M) Class A.
    e. Locations: Apply to concrete surfaces **exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete**.

B. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.6 FINISHING FLOORS AND SLABS

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

B. Scratch Finish:

1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch (6 mm) in one direction.
3. Apply scratch finish to surfaces **to receive mortar setting beds for bonded cementitious floor finishes**.

C. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 (ACI A117M) tolerances for conventional concrete.

3. Apply float finish to surfaces **to receive trowel finish**.

D. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces **exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system**.
7. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed **1/8 inch (3 mm)**.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces **indicated on Drawings**. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

3.7 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

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

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

3.8 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 (ACI 301M) and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M) for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h (1 kg/sq. m x h), calculated in accordance with ACI 305.1,) before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:

    a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
    b. Continuous Sprinkling: Maintain concrete surface continuously wet.
    c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
    d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
    e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.

        1) Recoat areas subject to heavy rainfall within three hours after initial application.
        2) Maintain continuity of coating and repair damage during curing period.

C. Curing Pool Formed Surfaces: Comply with ACI 308.1.
1. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously, cure 7 day minimum.

D. Curing Unformed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:

    a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

   a) Lap edges and ends of absorptive cover not less than 12-inches (300-mm).
   b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.

   a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
   b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

   a) Water.
   b) Continuous water-fog spray.

b. Floors to Receive Curing Compound:

1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Maintain continuity of coating, and repair damage during curing period.
4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer **unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project**.

c. Floors to Receive Curing and Sealing Compound:

1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.9 TOLERANCES

A. Conform to ACI 117 (ACI 117M).

3.10 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: **Owner will engage** a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
2. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

    a. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:

        1) Project name.
        2) Name of testing agency.
        3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
        4) Name of concrete manufacturer.
        5) Date and time of inspection, sampling, and field testing.
        6) Date and time of concrete placement.
        7) Location in Work of concrete represented by samples.
        8) Date and time sample was obtained.
        9) Truck and batch ticket numbers.
        10) Design compressive strength at 28 days.
        11) Concrete mixture designation, proportions, and materials.
        12) Field test results.
        13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
        14) Type of fracture and compressive break strengths at seven days and 28 days.

C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

D. Inspections:

1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by Architect.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.

    a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:

    a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    b. Perform additional tests when concrete consistency appears to change.

3. Slump Flow: ASTM C1611/C1611M:

    a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    b. Perform additional tests when concrete consistency appears to change.

4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete;

    a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

5. Concrete Temperature: ASTM C1064/C1064M:

    a. One test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.

6. Compression Test Specimens: ASTM C31/C31M:

    a. Cast and laboratory cure two sets of **three** 6-inch (150 mm) by 12-inch (300 mm) or 4-inch (100 mm) by 8-inch (200 mm) cylinder specimens for each composite sample.
    b. Cast, initial cure, and field cure **two** sets of t**wo** standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C39/C39M.

    a. Test one set of **three** laboratory-cured specimens at seven days and one set of two specimens at 28 days.
    b. Test one set of **two** field-cured specimens at seven days and one set of two specimens at 28 days.
    c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests:

    a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.

        1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 (ACI 301M), section 1.6.6.3.

12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 (ASTM E1155M) within **72** hours of completion of floor finishing and promptly report test results to Architect.

3.11 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

SECTION 04 40 00 – STONE MATERIALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Dry Stack stone.

1.2 REFERENCES

A. ASTM C 97 - Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Firm with experience of at least five projects of similar construction and scope. Include brief description of each project and name and phone number of Owner's Representative knowledgeable in each listed project. Other verifiable experience may be accepted in lieu of the above at the discretion of the Landscape Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation (as applicable).

B. Prevent excessive mud, fluid concrete, or other deleterious materials from coming in contact with and affixing to stone materials.

1.6 PROJECT CONDITIONS

A. Do not place backfill when subgrade is wet or frozen.

B. Do not place backfill during wet or freezing weather that prevents conformance with specified compaction requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide manufacturer's name, quarry location, and testing data for approval by Owner's Representative.

B. Requests for substitutions will be considered based on demonstrated conformance to material testing specification.

2.2 DRY STACK STONE

A. "Blockrock" for use in dry stack retaining walls. Ledge Metamorphic rock as quarried in the general areas South of Laurel and East of Edgar, Montana, having a beige and buff coloration.

1. Sizes per drawings.

2. Material shall conform to the following properties, per referenced testing methods:

a. LA Abrasion loss, crushed and sized to grading A (ASTM C 535)

1). 15% Maximum:

b. Specific Gravity, recommended and average of 8 rocks of varying geology (ASTM D 6473)

1). 2.40 min

2). 3% maximum absorption

3. Tonnage Calculations

a. 1 qty. (Blockrock) symbol on the drawings = 32" height x 48" long x 30" deep = 2.46 ton per symbol on average.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Properly prepare substrates for all material

3.2 PREPARATION

A. Clean surfaces thoroughly debris, roots, branches and extraneous materials prior to installation.

3.3 INSTALLATION GENERAL

A. Install in accordance with drawings and specifications.

3.4 INSTALLATION - BLOCKROCK

A. Lay out wall to the lines and grades indicated on the drawings. Use the string line and stakes to mark off any straight portions and marking paint to draw out any curves.

B. Prepare a trench base that follows a string line and/or marking paint. Trench should be 6 inches (152 mm) wider than the stone, bedding depth per details.

C. Fill the trench with bedding layer per drawings.

D. Level the base course of stone & compact per drawings. Place first layer of stone checking for level front to back and side to side and adjust accordingly.

E. Stack the second course on top of the base course. Do not line up the seams between the stones from one course to the other. Select stones that fit well with those on either side. Fit stones per drawings. Shim the stones as required to eliminate wobbling with stone or concrete products.

F. Each course should be set back per drawings to allow the wall to lean back into the ground that it will be retaining. Shim the backs of the stones to eliminate wobbling.

G. Progressively backfill the wall with the drainage aggregate after each two or three courses are stacked. Prior to backfilling, lay the geo-textile fabric on the soil behind the wall, and place the drainage aggregate between the wall and the fabric. The aggregate shall be a minimum of 8 to 12 inches (203 to 305 mm) from the wall to the fabric. Compact each layer of aggregate thoroughly. Fill soil in behind the fabric as the stone is added.

3.5 INSTALLATION – BOULDERS

A. Install boulders per plans

B. Orient boulder faces to expose lichen covered portions to surface.

C. Boulders generally shall occupy the same bury depth as occurred in nature.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Protect adjacent work areas and finish surfaces from damage during product installation.

END OF SECTION 04 40 00

SECTION 051213 - ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Architecturally exposed structural steel (AESS).

1.3 DEFINITIONS

A. AESS: Architecturally exposed structural steel.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1.5 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication of AESS components. **Shop Drawings for structural steel may be used for AESS.**

1. Identify AESS category for each steel member and connection, including transitions between AESS categories and between AESS and non-AESS.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU.

B. Shop-Painting Applicators: Qualified according to AISC's SSPC-QP 3.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Use special care in handling AESS to prevent twisting, warping, nicking, and other damage during fabrication, delivery, and erection. Store materials to permit easy access for inspection and identification. Keep AESS members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect AESS members and packaged materials from corrosion and deterioration.

1. Do not store AESS materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.8 FIELD CONDITIONS

A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with requirements of ANSI/AISC 303, Sections 1 through 9 and as modified in Section 10, "Architecturally Exposed Structural Steel."

2.2 FILLER

A. Polyester filler intended for use in repairing dents in automobile bodies.

2.3 PRIMER

A. Steel Primer:

1. Comply with project **Coatings specifications indicated on drawings.**

2.4 FABRICATION

A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.

1. Use special care handling and fabricating AESS before and after shop painting to minimize damage to shop finish.

B. Category AESS 1:

1. Comply with overall profile dimensions of AWS D1.1/D1.1M for welded built-up members. Keep appearance and quality of welds consistent. Maintain true alignment of members without warp exceeding specified tolerances.
2. Prepare surfaces according to Part 2 "Shop Priming" Article and SSPC-SP 6 (WAB)/NACE WAB-3.
3. Grind sheared, punched, and flame-cut edges to remove burrs and provide smooth surfaces and eased edges.
4. Make intermittent welds appear continuous, using filler or additional welding.
5. Seal weld open ends of hollow structural sections with 3/8-inch (9.5-mm) closure plates.
6. Limit butt and plug weld projections to 1/16 inch (1.6 mm).
7. Install bolt heads on the same side of each connection and maintain orientation consistently from one connection to another.
8. Remove weld spatter, slivers, and similar surface discontinuities.
9. Remove blemishes and surface irregularities resulting from temporary braces or fixtures by filling or grinding, before cleaning, treating, and shop priming.
10. Grind tack welds smooth unless incorporated into final welds.
11. Remove backing and runoff tabs, and grind welds smooth.

2.5 SHOP PRIMING

A. Shop prime steel surfaces, except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.

B. Surface Preparation: Clean nongalvanized surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 5 (WAB)/NACE WAB-1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION

A. Take special care during erection to avoid marking or distorting the AESS and to minimize damage to shop painting. Set AESS accurately in locations and to elevations indicated and according to ANSI/AISC 303 and ANSI/AISC 360.

1. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Take care to avoid any blemishes, holes, or unsightly surfaces resulting from the use or removal of temporary elements.
2. Grind tack welds smooth.
3. Remove backing and runoff tabs, and grind welds smooth.
4. Orient bolt heads on the same side of each connection and maintain orientation consistently from one connection to another.
5. Conceal fabrication and erection markings from view in the completed structure.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: **Owner will engage** a qualified testing agency to inspect AESS as specified in Section 051200 "Structural Steel Framing." The testing agency is not responsible for enforcing requirements relating to aesthetic effect.

B. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

END OF SECTION 051213

SECTION 31 25 73 – DETENTION BASIN SOIL

PART 1 GENERAL

1.01 SUMMARY

A. This section includes:

1. Detention Soil Mix
2. Storage

1.02 STANDARDS AND CODES

A. Reference Standards: This section incorporates by reference the latest versions of the following documents. These references are a part of this section as specified and modified.

Reference	Title
ASTM	Annual Book of ASTM Standards, American Society for Testing and Materials, Philadelphia, PA, 1997 or latest edition.

1.03 DEFINITIONS

A. Detention Soil Mix (DSM): A soil mix that has been specially blended and tested for use in Detention facilities with the intent to meet the following objectives:

1. Infiltrate runoff at a minimum rate of 5 inches per hour throughout the life of the facility, and
2. Have sufficient moisture retention and other agronomic properties to support healthy vegetation.

1.04 SUBMITTALS

A. Pre-Installation Submittals: The Contractor shall submit to the Engineer/Landscape Architect the following a minimum of 20 calendar days (or as directed by the Engineer/Landscape Architect) prior to the construction of Detention facilities:

1. DSM Submittals
   a. Two one (1) gallon samples of the DSM.
   b. Source certificates for all DSM materials.
   c. Sieve analysis of DSM per ASTM D422 performed within two (2) months of product delivery to site
   d. Certification from the soil supplier or an accredited testing agency that the DSM, including sand and compost components, conforms to all industry or technical society reference standards specified in Sections 2.01.A, 2.01.B, and 2.01C.
   e. A description of the equipment and methods used to mix the sand and compost to produce DSM.
   f. Organic content test results of the DSM, performed in accordance with Testing Methods for the Examination of Compost and Composting (TMECC) 05.07A, "Loss-On-Ignition Organic Matter Method."
   g. Permeability test results for DSM per ASTM D2434.
2. Sand Submittals
   a. Sieve analysis of sand per ASTM D422 performed within two (2) months of product delivery to site.

3. Compost Submittals

   a. Quality analysis results for compost performed in accordance with Seal of Testing Assurance (STA) standards, as specified in Section 2.01.C, and performed within two (2) months of product delivery to site.

   b. Sieve analysis of compost per TMECC 02.02-B performed within two (2) months of product delivery to site.

4. Other Submittals

   a. Cut sheets of any media or soil admixes to enhance moisture retention properties, if used.

   b. Testing agency qualifications as specified in Section 1.06.B.

5. Pre-approved suppliers:

   a. Pre-approved suppliers have been qualified by the Landscape Architect to provide DSM as described in this specification. Pre-approved suppliers are exempted from testing related to material certification, but are required to submit physical material samples.

   b. Rocky Mountain Compost – 3060 Farley Ln, Billings, MT 59101 (406)690-5742

1.05 QUALITY CONTROL AND QUALITY ASSURANCE

A. General: Test and inspect Detention materials and operations as Work progresses as described in this section. Failure to detect defective Work or materials at any time will not prevent rejection if a defect is discovered after installation, nor shall it constitute final acceptance.

B. Testing Agency Qualification:

1. General: Agencies that perform testing on Detention materials, including permeability testing, shall be accredited by STA, ASTM, AASHTO, or other designated recognized standards organization. All certifications shall be current. Testing agency shall be capable of performing all tests to the designated and recognized standards specified and shall provide test results with an accompanying Manufacturer's Certificate of Compliance. The following information shall be provided for all testing laboratories used:

   a. Name of lab(s) and contact person(s)

   b. Address(es) and phone number(s)

   c. Email address(es)

   d. Qualifications of laboratory and personnel including the date of current certification by STA, ASTM, AASHTO, or approved equal.

C. Responsibilities of Contractor

1. Submittals: Some of the tests required for this specification are unique, and DSM shall be considered a long-lead-time item. Under no circumstance shall failure to comply with all specification requirements be an excuse for a delay or for expedient substitution of unacceptable material(s). The requirements of Division 0 apply in their entirety.

2. Testing: All testing specified herein is the responsibility of the Contractor and shall be conducted by an independent testing agency, retained by the Contractor. The Owner reserves the right to conduct additional testing on all materials submitted, delivered, or in-place to ensure compliance with Specifications.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect the DSM from contamination and all sources of additional moisture at supplier site, during transport, and at the project site, until incorporated into the Work.

B. The Contractor is required to coordinate delivery of DSM with Detention facility excavation and soil installation. DSM should not be stockpiled onsite for any length of time. In no case shall DSM be stockpiled onsite for more than 24 hours without prior written approval by the Engineer/Landscape Architect. If stockpiling onsite for any length of time, DSM stockpiles shall meet the following requirements:

1. Locate stockpiles away from drainage courses, inlets, sewer cleanout vents, and concentrated stormwater flows
2. Place stockpiles on geotextile fabric
3. Cover stockpiles with plastic or comparable material
4. Contain stockpiles (and prevent contamination from adjacent stockpiles) with temporary perimeter barrier (e.g., sand bags, wattles, silt fence)

PART 2 **PRODUCTS**

2.01 DETENTION SOIL MIX (DSM)

A. General: DSM shall be a well-blended mixture of sand and compost, shall have sufficient moisture retention to support healthy plant growth, and shall meet the following criteria:

1. Mixture proportions: 30 to 40 percent Compost by volume and 60 to 70 percent Sand by volume
2. Organic matter content: 4 to 8 percent as determined by TMECC 05.07-A, Loss on Ignition Method.
3. Extraneous materials: DSM shall be free of all roots, plants, weeds, sod, stones, clods, pockets of coarse sand, construction debris, or other extraneous materials harmful to plant growth.
4. Permeability/Saturated Hydraulic Conductivity: 10 inches per hour (minimum) tested in accordance with ASTM D2434.
5. Acceptance of DSM quality and performance may be based on samples taken from stockpiles at supplier's yard, submitted test results, and/or onsite and laboratory testing of installed material at the discretion of the Engineer/Landscape Architect. The point of acceptance will be determined in the field by the Engineer/Landscape Architect.

B. Sand: Sand in the DSM shall conform to the requirements for Sand, Type B specified herein, unless otherwise approved by the Engineer/Landscape Architect.

1. Sand shall be free of wood, waste, coating, or any other deleterious material.
2. Sand material shall meet the following specifications for gradation.

Sieve Size[1]	**Percent Passing by Weight**	
	Type A[2]	**Type B (low fines)[3]**
3/8 inch	100	100
No. 4	90 to 100	90 to 100
No. 8	70 to 100	70 to 100

Sieve Size[1]	Percent Passing by Weight	
	Type A[2]	Type B (low fines)[3]
No. 16	40 to 95	40 to 85
No. 30	15 to 70	15 to 60
No. 50	5 to 55	8 to 15
No. 100	0 to 15	0 to 4
No. 200	0 to 5	0 to 2

[1] Sieve provided in nominal size square openings or United States Standard Sieve Series sizes.

[2] Sand conforming to ASTM C33 for Fine Aggregate satisfies the requirements of this specification for Sand, Type A.

[3] Type B (low fines) sand gradation pending local availability.

3. Coefficient of Uniformity: $C_u = \frac{D_{60}}{D_{10}}$: 4 or less for Sand, Type B.
4. Effective Particle Size (D_{10}): 0.3 to 0.5 mm for Sand, Type B.
5. All aggregate passing the No. 200 sieve shall be non-plastic.
6. Acceptance of grading and quality of the sand may be based on samples taken from stockpiles at supplier's yard or a submitted gradation report at the discretion of the Engineer/Landscape Architect. The point of acceptance will be determined in the field by the Engineer/Landscape Architect.

C. Compost: Compost in the DSM shall be well decomposed, stable, weed free organic matter sourced from waste materials including yard debris, wood wastes or other organic materials, not including biosolids or manure feedstock. Compost shall conform to California Code of Regulations Title 14, Division 7, Chapter 3.1 requirements, be certified through the USCC Seal of Testing Assurance (STA) Program, and meeting the criteria specified herein.

1. Feedstock: Feedstock materials shall be specified and include one or more of the following: landscape/yard trimmings, grass clippings, food scraps, and agricultural crop residues. Feedstock shall not include biosolids or manure.
2. Organic Matter Content: 35 to 75 percent by dry weight tested in accordance with TMECC 05.07-A (Loss on Ignition Organic Matter Method).
3. Carbon to Nitrogen Ratio: C:N between 15:1 and 25:1 when tested in accordance with TMECC 05.02-A.
4. Maturity/Stability: shall have a dark brown color and a soil-like odor. Compost exhibiting a sour or putrid smell, containing recognizable grass or leaves, or is hot (120°F) upon delivery or rewetting is not acceptable.
5. Nutrient Content: provide analysis detailing nutrient content including N-P-K, Ca, Na, Mg, S, and B.
    a. Total Nitrogen: 0.9 percent (minimum).
    b. Boron: Total shall be < 80 ppm
6. Salinity/Electrical Conductivity: less than 6.0 deciSiemen per meter (dS/m or mmhos/cm) per TMECC 04.10-A (1:5 Slurry Method, Mass Basis).
7. pH: 6.5 to 8 per TMECC 04.11-A (1:5 Slurry pH).

8. Gradation: Compost for DSM shall meet the following size gradation per TMECC 02.02-B (test shall be run on dry compost sample):

Sieve Size	Percent Passing by Weight	
	Min	***Max***
1 inch	99	100
1/2 inch	90	100
1/4 inch	40	90
No. 200	1	10

9. Bulk density: 500 to 1,100 dry pounds per cubic yard.

10. Moisture content: 30 to 55 percent of dry solids.

11. Inerts: compost shall be relatively free of inert ingredients, including glass, plastic and paper, less than 1 percent by weight or volume per TMECC 03.08A.

12. Weed seed/pathogen destruction: provide proof of process to further reduce pathogens (PFRP). For example, turned windrows must reach minimum 55°C for 15 days with at least 5 turnings during that period.

13. Select Pathogens

    a. Salmonella: less than 3 Most Probable Number per 4 grams of total solids, dry weight per TMECC 07.02.

    b. Coliform Bacteria: fecal coliform less than 1,000 Most Probable Number per gram of total solids, dry weight per TMECC 07.01.

14. Trace Contaminants Metals (lead, mercury, etc.): Product must meet US EPA, 40 CFR 503 regulations.

PART 3 EXECUTION

3.01 DETENTION SOIL MIX PLACEMENT

A. The Contractor shall not place DSM until the Engineer/Landscape Architect has reviewed and confirmed the following:

1. DSM delivery ticket(s): Delivery tickets shall show that the full delivered amount of DSM matches the product type, volume and manufacturer named in the submittals. Each delivered batch of DSM shall be accompanied by a certification letter from the supplier verifying that the material meets specifications and is supplied from the approved DSM stockpile.

2. Visual match with submitted samples: Delivered product will be compared to the submitted 1-gallon sample, to verify that it matches the submitted sample. The Engineer/Landscape Architect may inspect any loads of DSM on delivery and stop placement if the soil does not appear to match the submittals; and require sampling and testing of the delivered soil to determine if the soil meets the requirements of Section 2.01 before authorizing soil placement.

B. DSM placement, grading and consolidation shall not occur when the DSM is excessively wet, or has been subjected to more than 1/2 inch of precipitation within 48 hours prior to placement. Excessively wet is defined as being at or above 22 percent soil moisture by a

General Tools & Instruments DSMM500 Precision Digital Soil Moisture Meter with Probe (or equivalent). A minimum of three readings with the soil moisture probe will be used to determine the average percent soil moisture reading per each truck load. There should be no visible free water in the material.

C. The Contractor shall place DSM loosely. Soil shall be placed upon a prepared subgrade in accordance with these Specifications and in conformity with the lines, grades, depth, and typical cross-section shown in the Drawings or as established by the Engineer/Landscape Architect.

D. Excessively dry DSM may be lightly and uniformly moistened, as necessary, to facilitate placement and workability.

E. Compact DSM to 83 percent (+/- 2 percent) of the maximum dry density per modified Proctor test (ASTM D1557), or as directed by the Geotechnical Engineer. Determination of in-place density shall be made using a nuclear gauge per ASTM D6938. Moisture content determination shall be conducted on a soil sample taken at the location of the nuclear gage reading per ASTM D2216.

F. Grade DSM to a smooth, uniform surface plane with loose, uniformly fine texture. Rake, remove ridges, and fill depressions to meet finish grades.

G. Final soil depth shall be measured and verified only after the soil has been compacted. If after consolidation, the soil is not within +/- 3/4 inch of the grades and slopes specified on the Plans, add material to bring it up to final grade and raked.

H. The DSM shall be inspected and accepted for placement and finish grade by the Engineer/Landscape Architect prior to the installation of planting and mulch. Any DSM that does not conform to this Specification shall be remediated to the satisfaction of the Engineer/Landscape Architect, or removed and replaced with acceptable DSM, at the Contractor's expense.

3.02 PLANTING AND MULCHING

A. Detention facilities shall be planted and mulched as shown on the Plans.

B. Detention facilities shall not be planted or mulched when soils are excessively wet as defined in Section 3.04.

C. Detention facility areas contaminated by sediment laden runoff prior to planting or placement of mulch shall be remediated at the Contractor's expense by removing the contaminated DSM (top 3 inches minimum) and replacing with DSM per Section 2.01, to the lines and grades on the Plans.

END OF SECTION

SECTION 32 31 13 – CHAINLINK FENCE AND GATES

PART 1 PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. DIVISION 01 - GENERAL REQUIREMENTS: Drawings, quality, product and performance requirements, general and supplemental conditions apply as applicable to the project and project documents.

1.02 SUMMARY

A. This section includes materials applicable for commercial/industrial and security chain link fence gates

1. Polymer coated steel chain link fabric
2. Polymer coated galvanized steel framework and fittings
3. Gates: swing and cantilever slide
4. Installation

1.03 REFERENCES

A. ASTM A121 Specification for Metallic-Coated Carbon Steel Barbed Wire

B. ASTM A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric

C. ASTM A491 Specification for Aluminum-Coated Steel Chain-Link Fabric

D. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

E. ASTM A824 Specification for Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link

F. ASTM F552 Standard Terminology Relating to Chain Link Fencing

G. ASTM F567 Standard Practice for Installation of Chain Link Fence

H. ASTM F626 Specification for Fence Fittings

I. ASTM F668 Specification for Polymer Coated Chain Link Fence Fabric

J. ASTM F900 Specification for Industrial and Commercial Swing Gates

K. ASTM F934 Specification for Standard Colors for Polymer-Coated Chain Link

L. ASTM F1043 Specification for Strength and Protective Coatings of Metal Industrial Chain Link Fence Framework

M. ASTM F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

N. ASTM F1184 Specification for Industrial and Commercial Horizontal Slide Gates

O. ASTM F1345 Specification for Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Chain-Link Fence Fabric

P. ASTM F1664 Specification for Poly (Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used with Chain-Link Fence

Q. ASTM F1665 Specification for Poly (Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used with Chain-Link Fence

R. ASTM F1910 Specification for Long Barbed Tape Obstacles

S. ASTM F1911 Standard Practice for Installation of Barbed Tape

T. ASTM F2200 Specification for Automated Vehicular Gate Construction

U. ASTM F2781 Standard Practice for Testing Forced Entry, Ballistic, and Low Impact Resistance of Security Fence Systems

V. CLFMI SFR 2445Security Fence Recommendations

W. CLFMI CLF TPO211 Tested and Proven Performance of Security Grade Chain Link Fence Systems

X. CLFMI WLG2445 Chain Link Fence Wind Load Guide for the Selection of Line Post and Line Post Spacing

Y. UL 325 Door, Drapery, Gate, Louver and Window Operators

1.04 SUBMITTALS

A. Shop drawings: Site plan showing layout of fence location with dimensions, location of gates and opening size, cleared area, elevation of fence and gates, details of attachments and footings.

B. Certifications: Manufacturers material certifications in compliance with current ASTM specifications.

C. Domestic certifications: Material certifications, Made in U.S.A., Buy American Act or Buy America when required.

D. Specification Changes: May not be made after the date of bid.

1.05 QUALITY ASSURANCE

A. Manufacturer: Company operating in the United States having U.S. manufacturing facility/facilities specializing in manufacturing chain link fence products with at least 5 years experience.

B. Fence contractor: Company with demonstrated successful experience installing similar projects and products in accordance with ASTM F567 and have at least 5 years experience.

C. Tolerances: Current published edition of ASTM specifications tolerances apply. ASTM specification tolerances supersede any conflicting tolerance.

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver products to site per contract requirements.

B. Storage: Store and protect products off the ground when required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Master Halco www.masterhalco.com

B. Allied Tube and Conduit www.atcfence.com

C. Richards Fence www.richardsfence.com

D. Wheatland Tube www.wheatland.com

E. Dynamic Tube and Pipe www.dynamictubeandpipe.com

2.02 CHAIN LINK FABRIC

A. Steel Chain Link Fabric: 2 in. mesh, 9 gauge, heights per plans, ASTM F688

1. Polymer Coated Steel Fabric: ASTM F668, the wire gauge specified for polymer-coated wire is that of the metallic coated steel core wire

a. Class 2b fused and adhered

b. Color: black in compliance with ASTM F934

2. Fabric selvage: K&K for all fence heights

2.03 STEEL FENCE FRAMEWORK

A. Round steel pipe and rail: ASTM F1043 Group IA Heavy Industrial Fence Framework, schedule 40 galvanized pipe per ASTM F1083. Exterior zinc coating Type A, interior zinc coating Type A Regular Grade

1. Size posts per included table. Upsize corner posts per industry standard.

Post Sizing Table	
Fence Fabric Height	Group IA schedule 40 galvanized pipe ASTM F1083
	Min/Max O.D.
Up to 6 ft.	1.900" - 3.500"
Over 6 ft to 8 ft	2.375" - 4.000"
Over 8 ft to 10 ft	2.875" - 6.625"
Over 10 ft to 12 ft	2.875" - 6.625"
Over 12 ft to 14 ft	3.500" - 6.625"
Over 14 ft to 16 ft	4.000" - 6.625"
Over 16 ft to 18 ft	4.000" - 8.625"
Over 18 ft to 20 ft	4.500" - 8.625"

B. Polymer Coated Framework: Polymer coated framework shall have a PVC coating fused and adhered to the exterior zinc coating of the post or rail. PVC and polyolefin coatings shall have minimum thickness 10-mils (0.254 mm). Color to match fabric black per ASTM F934.

2.04 TENSION WIRE

A. Polymer Coated Steel Tension Wire: 7 gauge (0.177 in.) (4.50 mm) wire complying with ASTM F1664. Wire gauge specified is the core wire gauge.

1. Class 2b, fused and adhered, Color to match fabric black per ASTM F934.

2.05 FITTINGS

A. Tension and Brace Bands: Galvanized pressed steel complying with ASTM F626, minimum steel thickness of 12 gauge (0.105 in.) (2.67 mm), minimum width of ¾ in. (19 mm) and minimum zinc coating of 1.20 oz/ft² (366 g/m²). Bands supplied with 3/8 in. (9.53 mm) galvanized steel carriage bolts.

B. Terminal Post Caps, Line Post Loop Tops, Rail and Brace Ends, Boulevard Clamps, Rail Sleeves: In compliance to ASTM F626, pressed steel galvanized after fabrication having a minimum zinc coating of 1.20 oz/ft² (366 g/m²).

C. Truss Rod Assembly: In compliance with ASTM F626, 3/8 in. (9.53 mm) diameter steel truss rod with a pressed steel tightener, minimum zinc coating of 1.2 oz/ft² (366 g/m²), assembly capable of withstanding a tension of 2,000 lbs. (970 kg).

D. Tension Bars: In compliance with ASTM F626. Galvanized steel one-piece length 2 in. (50 mm) less than the fabric height. Minimum zinc coating 1.2 oz. /ft² (366 g/m²).

1. Bars for 2 in. (50 mm) and 1 ¾ in. (44 mm) mesh shall have a minimum cross section of 3/16 in. (4.8 mm) by 3/4 in. (19 mm).

2. Bars for 1 in. (25 mm) mesh shall have a cross section of 1/4 in. (6.4 mm) by 3/8 in. (9.5 mm).

3. Bars for small mesh 3/8 in. (10 mm), 1/2 in. (13 mm) and 5/8 in. (16 mm) shall be attached (sandwiched) to the terminal post using a galvanized steel strap having a minimum cross section of 2 in. (51 mm) by 3/16 in. (4.8 mm) with holes spaced 15 in. (381 mm) on center to accommodate 5/16 in. (7.9 mm) carriage bolts which are to be thru bolted thru the strap the mesh and thru the terminal post.

E. Polymer Coated Color Fittings: In compliance with ASTM F626. Polymer coating minimum thickness 0.006 in. (0.152 mm) fused and adhered to zinc coated fittings. Color to be black per ASTM F934.

2.06 TIE WIRE AND HOG RINGS

A. Tie wire and hogs rings per ASTM F626.

B. 9 gauge (0.148 in.) (3.76 mm) aluminum alloy ties or 9 gauge (0.148 in.) (3.76 mm) aluminum alloy hog rings

C. Polymer coated to match the coating, class and color to that of the chain link fabric.

2.07 SWING GATES

A. Swing Gates: single and double per plans. Galvanized steel welded fabrication in compliance with ASTM F900. Gate frame members 1.900 in. OD (48.3 mm) ASTM F1043 Group IA F1083 schedule 40 pipe Frame members spaced no greater than 8 ft. (2440 mm) apart vertically and horizontally.

B. Positive locking gate latch fabricated of 5/16 in. (7.9 mm) thick by 1 ¾" (44.45 mm) pressed steel galvanized after fabrication. Galvanized malleable iron or heavy gauge pressed steel post and frame hinges. Match gate fabric to that of the fence system. Finished to match fabric. Gateposts sized per table.

C. Install drop rods on all double swing gates. Drill pavement as necessary to seat drop rods.

Gate Fabric height up to and including 6ft.	
Gate Leaf Width	Post Outside diameter
Up to 4 ft.	2.375 in.
Over 4 ft to 10 ft	2.875 in.
Over 10 ft to 18 ft	4.00 in.
Gate Fabric height over 6 ft. to 12 ft.	
Gate Leaf Width	Post Outside diameter
Up to 6 ft.	2.875 in.
Over 6 ft to 12 ft	4.00 in.
Over 12 ft to 18 ft	6.625 in.
Over 18 ft to 24 ft	8.625 in.

D. Polymer coated gate frames and gateposts; match the coating type and color to that specified for the fence framework.

E. Moveable parts such as hinges, latches and drop rods may be field coated using a liquid polymer touch up.

F. Swing gate post size per ASTM F900

2.08 CONCRETE

A. Concrete for post footings shall have a 28-day compressive strength of 2,500 psi. (17.2 MPa).

PART 3 EXECUTION

3.01 CLEARING FENCE LINE

A. Clearing: Surveying, clearing, grubbing, grading and removal of debris for the fence line or any required clear areas adjacent to the fence is included in the earthwork contractor's contract. The contract drawings indicate the extent of the area to be cleared and grubbed.

3.02 FRAMEWORK INSTALLATION

A. Posts: Posts shall be set plumb in concrete footings in accordance with ASTM F567. Minimum footing depth, 24 in. (609.6 mm) plus an additional 3 in. (76.2 mm) for each 1 ft. (305 mm) increase in the fence height over 4 ft. (1220 mm). Minimum footing diameter four times the largest cross section of the post up to 4.00" (101.6mm) O.D. and three times the largest cross section of post greater than 4.00" (101.6mm). O.D. Gate posts require larger footings; minimum requirements are listed in ASTM F567.

1. Top of post concrete footing to be 4 inches (152 mm) below grade crowned to shed water away from the post. Line posts installed at intervals not exceeding 10 ft. (3.05 m) on center.

B. Top rail: When specified, install 21 ft. (6.4 m) lengths of rail continuous thru the line post or barb arm loop top. Splice rail using top rail sleeves minimum 6 in. (152 mm) long. The rail shall be secured to the terminal post by a brace band and rail end. Bottom rail or intermediate rail shall be field cut and secured to the line posts using boulevard bands or rail ends and brace bands.

1. Fences 12 feet (3.66 m) high or higher require mid rail

C. Terminal posts: End, corner, pull and gate posts shall be braced and trussed for fence 6 ft. (1.8 m) and higher and for fences 5 ft. (1.5 m) in height not having a top rail. The horizontal brace rail and diagonal truss rod shall be installed in accordance with ASTM F567.

D. Tension wire: Shall be installed 4 in. (101.6 mm) up from the bottom of the fabric.

E. Fences without top rail shall have a tension wire installed 4 in. (101.6 mm) down from the top of the fabric. Tension wire to be stretched taut, independently and prior to the fabric, between the terminal posts and secured to the terminal post using a brace band. Secure the tension wire to the chain link fabric with a 9 gauge hog rings 18 in. (457.2 mm) on center and to each line post with a tie wire.

3.03 CHAIN LINK FABRIC INSTALLATION

A. Chain Link Fabric: Install fabric to inside of the framework. Attach fabric to the terminal post by threading the tension bar through the fabric; secure the tension bar to the terminal post

with tension bands and 5/16 in. (7.94 mm) carriage bolts spaced no greater than 12 inches (304.8mm) on center.

B. Small mesh fabric less than 1 in. (25 mm), attach to terminal post by sandwiching the mesh between the post and a vertical 2 in. wide (50mm) by 3/16 in. (4.76 mm) steel bar using carriage bolts, thru bolted thru the bar, mesh and post spaced 15 in. (381 mm) on center.

C. Chain link fabric to be stretched taut free of sag. Fabric to be secured to the line post with tie wires spaced no greater than 12 inches (304.8 mm) on center and to rail spaced no greater than 18 inches (457.2 mm) on center. Secure fabric to the tension wire with hog rings spaced no greater than 18 inches (457.2 mm) apart. Aluminum alloy wire ties shall be wrapped around the post or rail and attached to a fabric wire picket on each side of the post or rail by twisting the tie wire around the fabric wire picket two full turns per ASTM F567. Excess wire shall be cut off and bent over to prevent injury. The installed fabric shall have a ground clearance on no more than 2 inches (50 mm).

3.04 GATE INSTALLATION

A. Swing Gates: Installation of swing gates and gateposts in compliance with ASTM F567. Direction of swing shall be outward. Gates shall be plumb in the closed position having a bottom clearance of 3 in. (76 mm) grade permitting. Hinge and latch offset opening space from the gate frame to the post shall be no greater than 3 in. (76 mm) in the closed position. Double gate drop bar receivers shall be set in a concrete footing minimum 6 in. (152 mm) diameter 24 in. (609.6 mm) deep. Gate leaf holdbacks shall be installed for all double gates.

3.05 NUTS AND BOLTS

A. Bolts: Carriage bolts used for fittings shall be installed with the head on the secure side of the fence. All bolts shall be peened over to prevent removal of the nut.

3.06 ELECTRICAL GROUNDING

A. Grounding: Grounding of the fence and gates is not the responsibility of the fence contractor and not included in the fencing scope of work for this contract.

3.07 CLEAN UP

A. Clean Up: The area of the fence line shall be left neat and free of any debris caused by the installation of the fence.

END OF SECTION 32 31 13

SECTION 32 84 00 - IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and provisions of Contract, including General Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes the following:

1. Furnishing and installation of all exterior irrigation system components.
2. Furnishing and installing all low voltage control wiring, including connection into controller terminal strip.
3. Furnishing and installing irrigation system controller, excluding 120 volt wiring.

B. Trenching and backfill for irrigation system components is specified in Section 32 84 10 of this Specification.

C. Electrical Contractor shall furnish and install all 120 volt or greater wiring, including all necessary conductors, raceways and conduits, breakers, fuses, label plates and miscellaneous items required for a complete functioning installation. Contractor shall coordinate with utility provider for point of connection in location as noted on the plans.

1.3 QUALITY ASSURANCE

A. Qualifications of Installer: Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed and material manufacturer's recommended methods of installation and who shall direct all work performed under this section.

B. Coordination of Work: All work of this section, and the installation of all lawns and all plant materials shall be performed by one Contractor.

C. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with the latest rules of the National Electrical Code and National Plumbing Code for all electrical and plumbing work and materials. Where provisions of pertinent codes and standards conflict with the requirements of this section of these Specifications, the more stringent provisions shall govern.

1.4 SUBMITTALS

A. Material List: Before any irrigation system materials are delivered to the job site, submit to the Owner’s Representative a complete list of all irrigation system materials proposed to be furnished and installed.

1. Show manufacturer's name and catalog number for each item, furnish complete catalog cuts and technical data, and furnish the manufacturer's recommendations as to method of installation.

2. Do not permit any irrigation system component to be brought onto the job site until it has been approved by Owner's Representative.

1.5 PRODUCT HANDLING

A. Protection: Use all means necessary to protect irrigation system materials before, during, and after installation and to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

PART 2 - MATERIALS

2.1 PIPE:

A. Plastic Pipe:

1. Pipe sizes shall conform to those shown on the plans. No substitutions of smaller pipe shall be allowed. Substitutions of larger pipe may be approved. All pipe rejected due to damage, defects, or non-conformance to the specifications shall be removed immediately from the site.
2. All plastic pipe shall be rigid unplasticized PVC-160, PVC 200 conforming to ASTM D-1784 and D-2241 standard specifications for PVC plastic pipe, or as shown in drawings. The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, deleterious, wrinkles, and dents.
3. All pipe shall be continuously and permanently marked with the following information. Manufacturer's name or trademark, size, schedule and type of pipe, working pressure at 73 degrees F (22.8 degrees C). and National Sanitation Foundation (N.S.F.) approval.
4. All pipe 2-1/2 inches (6.4 cm) and smaller shall be slip type joints. All pipe 3 inches (7.6 cm) and larger shall be gasket type joints. All pipe fittings to be installed for pipe 2-1/2 inches (-6.4 cm) and smaller shall be molded fittings manufactured of the same material as the pipe and shall be suitable for solvent weld or threaded connections. All pipe fittings to be installed for pipe 3 inches (7.6 cm) and larger shall be epoxy coated steel fittings with compression gaskets as manufactured by Pierce, PO Box 528, Eugene, OR 97440,(503-485-3111), or approved equal.
5. Slip fitting socket taper shall be so sized that a dry unsoftened pipe end, conforming to these special provisions, can be inserted no more than halfway into the socket. Plastic saddle and flange fittings will not be permitted. Only schedule 80 pipe or fittings may be threaded.
6. When connection is plastic to metal, plastic male adapters shall be used. The male adapters shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be Teflon Tape only.

B. Sleeves:

1. All sleeve material shall be rigid unplasticized PVC-Schedule 40 pipe. The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, deleterious, wrinkles, and dents.
2. All sleeves shall be 4" or larger as required to facilitate mainlines, lateral lines and wire sizes as shown on the plans.

2.2 RISERS

A. Spray Heads: All stationary spray heads shall have risers of high density polyethylene plastic pipe ("funny pipe") with spiral barbed ell fittings. Minimum length of "funny pipe" shall be 18 inches.

B. Rotor Pop-up Heads: All rotor heads shall have Lasco Unitized Swing Joints.

2.3 FITTINGS

A. Solvent Weld:
1. All fittings 2-1/2" and smaller shall be schedule 40 solvent weld. Fittings shall be manufactured by Lasco, Spears or approved equal.

B. Gasketed:
1. All fittings 3" and larger shall be ductile iron. Fittings shall be manufactured by Harco, Sceptor or approved equal.

2.4 MANUAL VALVES

A. Gate Valves:

1. All manual gate valves, sizes 2 inches (5 cm) and smaller, shall be all bronze double disc wedge type with integral taper seats and with non-rising stem.
2. All gate valves of 2-1./2 inches (6.4 cm) size or larger shall be iron body, brass trimmed, double disc wedge type with integral taper seats and with non-rising stems, 125 PSI rated. Gate valves shall function and be equal to PGL 701-A flanged, PGL 705-A threaded, or PGL 708-A gasketed.

2.5 VALVE BOXES

A. All valve boxes for valves 3" and larger and air release valves shall be Carson model 1419 standard with non-hinged cover or approved equal. Contractor to provide Carson model 1419E 6" extension boxes as required.
B. All valve boxes for valves smaller than 3" shall be Carson model 910-10" round or approved equal.
C. All manual control valves, zone shut-off valves, gate valves or globe valves unless otherwise indicated, shall be installed in valve access box of proper size as required for easy access to the valve. Standard valve box to be Carson 1419-12B with locking green cover or approved equal.

2.6 SPRINKLER HEADS

A. Sprinkler heads shall be as indicated on the plans or approved equal
B. Sprinklers shall be attached to the irrigation system per the drawings. Sprinklers to be properly set and adjusted for optimal operation.
C. Contractor shall deliver four (4) spare heads for each type used and four (4) sets of sprinkler head adjustment tools for each head type used to the Owner.

2.7 AUTOMATIC REMOTE CONTROL VALVES

A. Automatic control valves shall be per the drawings or approved equal. Size of valves as follows: Flows up to 30 GPM to be 1" automatic control valve, flows from 31 GPM to 75 GPM to be 1-1/2" automatic control valve, flows from 76 GPM to 100 GPM to be 2" automatic control valve or per manufacture's recommendations.
B. Automatic control valves to be installed as shown on the plans. Contractor shall adjust pressure regulation as necessary to provide optimal performance of the irrigation heads.
C. Contractor shall provide two (2) spare valves for each size used to the Owner.

2.8 IRRIGATION CONTROLLER

A. Controller location to be coordinated with Owner and Owner's Representative. All wires to be in conduit for a professional installation.

2.9 CONTROL CABLE

A. All electrical control wire to match manufacturer's specifications. Contractor shall supply and install complete system per manufacturer's recommendations including electrical grounding, electrical splices and ancillary items required for a complete system.

B. Verification of wire types and installation procedures shall be checked to conform to local codes.

2.10 OTHER MATERIALS

A. Materials to be furnished: Supply as part of this contract the following tools:

1. Two keys for each automatic controller.

The above equipment shall be turned over to the Owner at the conclusion of the project. Before final inspection can occur, evidence that the Owner has received materials must be shown to the Owner's Representative.

B. All other materials, not specifically described but required for a complete and proper irrigation system installation, shall be new, first quality of their respective kinds, and subject to the approval of the Owner's Representative.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection: Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence. Verify that irrigation system may be installed in strict accordance with all pertinent codes and regulations, the original design, the referenced standards, and the manufacturer's recommendations.

B. Discrepancies: In the event of discrepancy, immediately notify the Owner's Representative. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 FIELD MEASUREMENTS

A. Make all necessary measurements in the field to ensure precise fit of items in accordance with the original design.

3.3 TRENCHING AND BACKFILLING

A. Perform all trenching and backfilling as specified by Section 328410 of this Specification.

3.4 INSTALLATION OF PIPING

A. Layout the piping system in strict accordance with the plans. Where piping is shown on the plans to be under paved areas but running parallel and adjacent to planted areas, the intention is to install the piping in the planted areas.

B. Pipe Depth: All mainlines shall be installed with 18 inches minimum cover over the pipe with the exception of the 6" mainline which is to have a minimum of 36" of cover and the 4" mainline which is to have a minimum of 24" of cover. All laterals shall be installed with 12 inches minimum cover over the pipe.

C. Line Clearance: All lines shall have a minimum clearance of 4 inches (10.2 cm) from each other, and 6 inches (15.2 cm) from lines of other trades, except through pipe sleeves. Parallel lines shall not be installed directly over one another but should be separated sufficiently to allow for repairs.

D. Inspection of Pipe and Fittings: Carefully inspect all pipe and fittings before installation, removing all dirt, scale, and burrs and reaming as required; install all pipe with all markings up for visual inspection and verification.

E. Plastic Pipe:

1. Plastic pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacturer.
2. All plastic joints shall be solvent-weld joints or slip seal joints. Only the solvent cement recommended by the pipe manufacturer shall be used. All plastic pipe and fittings shall be installed as outlined and instructed by the pipe manufacturer and it shall be the Contractor's responsibility to make arrangements with the pipe manufacturer for any, field assistance that may be necessary. The Contractor shall assume full responsibility for the correct installation.
3. Slip seal gasketed joints shall be used on all pipe 3 inches (7.6 cm) and larger.
4. All plastic to metal joints shall be made with plastic male adapters.
5. The solvent-weld joints shall be made dry.
6. The solvent-weld joints shall be allowed to set at least 24 hours before pressure is applied to the system on PVC pipe.

F. Thrust Blocks:

1. Provide concrete thrust blocks for all pipe as required by the schedule on the plans.
2. All thrust blocks shall bear directly on undisturbed earth. Center pipe in the middle of thrust block.

3.5 INSTALLATION OF EQUIPMENT

A. General:

1. All fittings, valves, etc. shall be carefully placed in the trenches as shown on the plans.
2. All control wires shall be clearly labeled, by station using weatherproof material, both at the controller and at the valve. The inside cover of all automatic valve boxes shall also have the station number clearly painted in white.
3. All sprinklers, having adjustable nozzles, shall be adjusted for proper and adequate distribution of the water over the coverage pattern of the sprinkler.
4. All nozzles on stationary pop-up sprinklers or stationary spray heads shall be tightened after installation. All sprinklers having an adjusting screw, adjusting stem or adjusting friction collars shall be adjusted as required for the proper arc of coverage, radius, diameter and/or discharge.

B. Lawn Sprinkler Heads:

1. Install lawn sprinkler heads where indicated on the plans and in strict accordance with the manufacturer's recommendations.
3. Set heads to grade at initial install.
2. Along walks and driveways where finished grade is established, set all heads 1/4 inch (64mm) below surface of pavement at time of installation and 1-1/2 inches (3.8 cm) from pavement. Stake all temporary risers.
3. Set all heads to final grade where sod lawn will be installed.
4. Upon completion of maintenance period, reset all lawn sprinkler heads flush with grade and firmly anchor with soil.

3.6 AUTOMATIC IRRIGATION CONTROLLER

A. Controllers per plans. Mount as directed by Owner's Representative. All wires to be in conduit for a professional installation.

3.7 TESTING AND INSPECTION

A. Closing-in Uninspected Work: Do not allow or cause any of the work in this section to be covered up or enclosed until it has been inspected, tested, and approved by the Owner's Representative. Where trenches are not closed at the end of the day Contractor shall accept all liability for any damage or injury that may result from open trenches. Provide barricades and warning tape as necessary around all open trenches.

B. Flushing: Before backfilling the mainline, and with all control valves in place, but before lateral pipes are connected, completely flush and test the mainline and repair for all leaks; flush out each section of lateral pipe before sprinkler heads are attached.

C. Testing:

1. Make all necessary provisions for thoroughly bleeding the line of air and debris.
2. Before testing, fill the line with water for a period of at least 24 hours.
3. After valves have been installed, test all live water lines for leaks at a pressure of 100 psi for a period of two hours, with all couplings exposed and with all pipe sections centerloaded. Contractor shall provide deliver/documentation of system testing.

4. Furnish all necessary testing equipment and personnel.
5. Correct all leaks and retest until acceptance by the Owner's Representative.

D. Final Inspection:

1. Thoroughly clean, adjust, and balance all systems.
2. Demonstrate the entire system to the Owner's Representative, proving that all remote control valves are properly balanced, that all heads are properly adjusted for radius and arc of coverage, and that the installed system is workable, clean, and efficient.

3.8 INSTRUCTIONS

A. Record Drawings:

1. Record accurately on one set of black and white prints of the site plan all installed work including both pressure and non-pressure lines.
2. Upon completion of each increment of work, transfer all such information and dimensions to the print. The dimensions shall be recorded in a legible and workmanlike manner. Maintain as-built drawings on site at all times. Make all notes on drawing in pencil (no ball point pen). When the work has been completed, transfer all information from the field record print to a set of reproducible drawings.
3. Dimension from two permanent points of reference (buildings, monuments, sidewalks, curbs, pavement, etc.). Locations shown on as-built drawings shall be kept day to day as the project is being installed. All dimensions noted on drawings shall be 1/8 inch (32mm) in size (minimum).
4. Show locations and depths of the following items:

    a. Point of connection
    b. Routing of sprinkler pressure lines
    c. Gate valves
    d. Sprinkler control valves
    e. Quick coupling valves
    f. Routing of control wires
    g. Sprinkler heads
    h. Other related equipment

B. Controller Charts:

1. As-built drawings must be approved by Owner's Representative before charts are prepared.
2. Provide one controller chart for each controller supplied showing the area covered by automatic controller, of the maximum size controller door will allow.
3. The chart is to be a reduced drawing of the actual as-built system. Chart shall be a photo positive with different colored shading used to show area of coverage for each station. When completed and approved, the chart shall be hermetically sealed between two pieces of plastic. The chart shall be mounted in the controller using Velcro or equal type of semi-permanent fastening device.
4. These charts must be completed and approved prior to final acceptance of the irrigation system by the Owner.

C. Operation and Maintenance Manuals: Prepare and deliver to the Owner's Representative within ten calendar days prior to completion of construction, four individually bound copies of the operations and maintenance manual. The manual shall describe the material installed and shall

be in sufficient detail to permit operating personnel to understand, operate and maintain all equipment. Spare parts lists and related manufacturer information shall be included for each equipment item installed. Each complete, bound manual shall include the following information.

1. Index sheet stating Contractor's address and telephone number, duration of guarantee period, list of equipment with names and addresses of local manufacturer representatives.
2. Complete operating and maintenance instructions on all major equipment.
3. In addition to the above maintenance manuals, provide the maintenance personnel with instructions for system operation and show written evidence to the Owner at the conclusion of the project that this service has been rendered.

3.9 GUARANTEE PERIOD

A. Guarantee: The entire irrigation and water system shall be guaranteed to give satisfactory service for a period of one year from date of acceptance by the Owner. Should any trouble develop within the time specified above due to inferior or faulty materials or workmanship, the trouble shall be corrected at no expense to the Owner. Any and all damages resulting from faulty materials or workmanship shall be repaired by the Contractor to the satisfaction of the Owner, at no cost to the Owner.

B. Guarantee Period Services:

1. The Contractor shall winterize the system and perform spring start-up of the system during the guarantee period. These functions shall be coordinated in advance with the Owner, and the Owner's personnel shall be encouraged to participate.
2. Upon re-energizing the system, the Contractor shall repair any leaks or breaks and shall check each head and valve, making any adjustment necessary.

END OF SECTION 32 84 00

SECTION 32 84 10 - IRRIGATION TRENCHING AND BACKFILL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and provisions of Contract, including General Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes the following:

1. Trenching and backfilling for all irrigation system components.
2. Boring under driveways, walks, and curbs.
3. Furnishing and installation of all pipe sleeves.

B. Furnishing and installing irrigation system components is specified in Section 32 84 00- Irrigation System of this Specification.

1.3 QUALITY ASSURANCE

A. For actual prosecution of the work, use only personnel who are skilled in the work required, familiar with recommended methods of installation, and thoroughly familiar with the requirements of this work.

1.4 UNDERGROUND OBSTRUCTIONS

A. The Contractor shall contact all utilities for locations of their installations prior to initiating work.

B. The Contractor shall preserve, intact, any underground pipes or other utilities encountered during construction. In case any such utilities or other structures are accidentally broken or damaged, the Proprietor of the underground installation shall be immediately notified, and they shall be immediately replaced in a condition at least equal to that in which they were found, all at the expense of the Contractor.

C. Use of Explosives: Use of explosives is not permitted.

PART 2 -MATERIALS

2.1 PIPE SLEEVES

A. Pipe sleeves shall be Schedule 40 PVC pipe, size as necessary for installation of irrigation system (main line, lateral lines and wiring) as shown on the plans.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection: Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

B. Verify that trenching may be completed in accordance with the original design and the referenced standards.

C. Discrepancies: In the event of discrepancy, immediately notify the Owner's Representative. Do not proceed with installation in areas of discrepancy until all discrepancies have been fully resolved.

3.2 TRENCHING/PULLING

A. General:

1. All mainlines to be open trenched. All lateral lines can be open trenched or pulled. If Contractor intent is to pull pipe, Contractor shall submit pulling method to the Owner's Representative prior to commencement of work.
2. Perform all trenching required for the installation of irrigation system components. Make all trenches in accordance with OSHA Requirements with sufficient width to provide free working space at both sides of the trench and around the installed item as required for gluing, joining, backfilling, and compacting while minimizing width of trenches.

B. Depth:

1. Trench to sufficient depth to give a minimum of 18 inches of fill above the top of the pipe measured from the adjacent finished grade under driveways and sidewalks.
2. All mainline shall have a minimum cover of 18 inches above the pipe unless as noted below. All laterals shall have a minimum cover of 12 inches above the pipe.
3. All 6" mainline pipe to have a minimum of 36" of fill above the top of the pipe.
4. All 4" mainline pipe to have a minimum of 24" of fill above the top of the pipe.
5. All 3" and smaller mainline pipe to have a minimum of 18" of fill above the top of the pipe.

C. Correction of Faulty Grades: Where trench excavation is inadvertently carried below proper elevations, backfill with material approved by the Owner's Representative and then compact to provide a firm and unyielding subgrade to the approval of the Owner's Representative and at no additional cost to the Owner.

D. Trench Bracing:

1. Properly support all trenches in strict accordance with all pertinent rules and regulations.
2. Brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind will be fully protected from damage.
3. In the event of damage to such improvements, immediately make all repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

4. Arrange all bracing, sheeting and shoring so as to not place stress on any portion of the completed work until the general construction thereof has proceeded far enough to provide sufficient strength.

E. Removal of Trench Bracing: Exercise care in the drawing and removal of sheeting, shoring, bracing, and timbering to prevent collapse or caving of the excavation faces being supported.

F. Grading and Stockpiling Trenched Material: Control the stockpiling of trenched material in a manner to prevent water running into the excavations. Do not obstruct surface drainage but provide means whereby storm and waste waters are diverted into existing gutters, other surface drains, or temporary drains.

G. Methods:

1. All trench excavation shall be made by open cut. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading, and to prevent slides or cave-ins. All material not required for backfill or not suitable for backfill, shall be removed from the site by the Contractor. Banks of trenches shall be kept as nearly vertical as possible, and shall be properly sheeted and braced as may be necessary to prevent caving.
2. Trench widths in paved streets or in areas where proximity to other structures require vertical cuts, shall not be wider than is required for proper handling, jointing and bedding of the pipe.
3. The bottom of the trenches shall be accurately graded to line and grade, and provide uniform bearing and support for each section of the pipe on undisturbed soil, at every point along its entire length. Depressions for joints shall be dug after the trench bottom has been graded, and shall be only of such length, depth and width as required for properly making the particular type joint. Care shall be taken not to excavate below the depths indicated.
4. Where rock occurs in trench excavation, the rock shall be removed to a depth of 6 inches (15.2 cm) below the established grade line, and to a width of 12 inches (30.5 cm) greater than the outside diameter of the pipe to be installed in the trench.

H. Pavement Removal:

1. Where excavation of trenches requires the removal of asphaltic pavement, the pavement shall be cut in a straight line along the edge of the excavation by use of a concrete saw or similar approved equipment to obtain straight, square and clean break; and, after backfilling and subgrade preparations are completed, hot plant mix asphaltic concrete shall be replaced and compacted.
2. Excess material, including rock, broken concrete, bituminous materials, debris or other materials not suitable for backfill, shall be removed from the site and disposed of by the Contractor.

3.3 BORING

A. Locations: Boring shall be used to route pipe, wiring, or both under concrete structures such as walks or curbs where trenching is impractical. Sleeves shall be installed in all bored holes.

B. Method: Boring shall be accomplished with a drill, auger, water jet, or any other instrument approved by the Owner's Representative capable of producing a precise hole. Boring shall not disturb overlaying structures or cause settlement and damage to those structures. Contractor shall submit boring method to the Owner's Representative for approval prior to commencement of work.

3.4 SLEEVES

A. Locations: Sleeves shall be installed wherever routing of a pipe, wiring, or both crosses a paved area or passes through a bored hole.

B. Methods:

1. Sleeves laid in open trenches shall be uniformly and evenly supported by undisturbed soil on the trench bottom. Backfill shall conform to standards hereinafter specified.
2. Sleeves installed in borings shall be forced through and shall have a snug fit throughout the length of the bored hole. Sleeves cracked or broken shall not be accepted.

3.5 BACKFILL

A. Inspection: The trenching shall not be backfilled until inspection has been completed and the pipe installation, including the grade, alignment and jointing has been found to be in compliance with the requirements of the plans and specifications.

B. Around and Over Pipe:

1. Select backfill material consisting of sand, fine gravel or select earth, free of large lumps or rocks larger than 3/4 inch (19 mm) shall be used in backfilling around and over the installed pipe.
2. The select material shall be obtained from the excavation material removed from the trench and shall be processed by screening, sifting, or selective sorting, so as to produce the type of backfill herein specified. The Contractor may at his option and own expense provide an acceptable imported material.
3. Backfill material shall be carefully deposited around and over the pipe in layers not more than 6 inches (15.2 cm) thick, loose measurement, unless otherwise permitted by the Owner's Representative, wetted to optimum moisture content and uniformly compacted to at least 95 percent of the maximum density obtainable at optimum moisture content as determined by AASHTO T99 Method A or D (latest revision), until the pipe has a cover depth of at least 12 inches (30.5 cm).

C. Remainder of Trench Backfill:

1. The remaining depth of the trench shall be backfilled with excavation material removed from the trench, which shall be wetted or dried to near optimum moisture content.
2. Inclusion of a limited amount of stones and rocks will be permitted. Stones and rocks shall in no case be larger than 3/4 inch. The size and amount of rocks used in backfill shall be such that they will not interfere with proper compaction.
3. This material shall be carefully deposited in layers of a thickness suitable to the equipment selected by the Contractor for proper compaction and compacted to at least 95 percent of the maximum density as determined by AASHTO T99 Method A or D (latest revisions). The method of compaction selected by the Contractor shall not cause damage of any nature to the installed pipe.
4. The use of a water puddling of this portion of the trench backfilling may be used if the specified density can be obtained and the backfill material is suitable for this type of trench compaction.

3.6 PAVEMENT REPLACEMENT

A. Pavement replacement shall utilize the same materials and design as the original pavement.

3.7 CLEANUP

A. Upon completion of the work, the entire site shall be cleared of all debris, and ground surfaces shall be finished to smooth, uniform slopes and shall present a neat and workmanlike appearance. Cleanup shall be considered an incidental item, and no additional payment shall be made for any cleanup item. All fences, culverts, gravel driveways or other obstructions removed or modified during construction, shall be replaced in a condition at least equal to their pre-construction condition, and shall be approved by the Owner’s Representative.

3.8 MAINTENANCE

A. The Contractor shall, for a period of one (1) year after completion and final acceptance of the work, maintain and repair any trench or boring settlement which may occur, and shall make suitable repairs to any pavements, sidewalks, or other structures which may become damaged as a result of settlement. All such maintenance and repair shall be at the Contractor's expense.

END OF SECTION 32 84 10

SECTION 32 92 00 - TURF AND GRASSES

PART 1-GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of each Contract, including General Conditions, Supplementary Conditions, and other Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION

A. Work in this section consists of furnishing all plant, labor, equipment, and performing all operations to finish grade topsoil, to prepare seedbeds, seeding native grass and seeding or sodding lawn areas, maintenance and protection of all planted areas.

B. All exterior lawn areas within the seeding limits, except surfaces occupied by buildings, plant beds and paving, except areas indicated to be undisturbed shall be seeded or sodded as shown on Plans.

C. All areas disturbed by construction activities including but not limited to irrigation trenches, contractor staging areas and general disturbed areas to be seeded as specified in this section per the drawings.

1.3 RELATED WORK DESCRIBED ELSEWHERE

A. Irrigation System- Section 32 84 00.

B. Landscaping- Section 32 93 00.

1.4 QUALITY ASSURANCE

A. Qualification of Workmen:

1. Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed and the best methods for their installation and who shall direct all work performed under this section.

1.5 PRODUCT HANDLING

A. Protection:

1. Upon delivery of sod to the work site use all means necessary to protect and maintain the sod before, during, and after installation and to protect the installed work and materials of all other trades.
2. All seed shall be delivered to the job site in the original bags with tags certifying purity, germination, common and botanical name for each species, and percent weed seed. All tags shall be removed from the bags by the Owner's Representative. Untagged seed bags shall be rejected.

B. Storage:

1. Seed, hydromulch, and hydromulch tackifier shall be kept in dry storage away from contaminants.

C. Replacements:

1. In the event of rejection of the seed or sod, immediately make all replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

D. Notice to Proceed:

1. The Contractor shall not proceed with seeding or sodding operations until the irrigation system has been tested and approved by the Owner's Representative.

E. Schedules:

1. Install seed mixes during the specified time periods. If special conditions exist that may warrant a variance in the specified plant dates or conditions, a written request shall be submitted to the Owner's Representative stating the special conditions and proposed variance.

F. Substitutions:

1. Request for substitutions, shall be submitted in writing prior to bid and in accordance with Section 01 25 00.

PART 2 -MATERIALS

2.1 SEED

A. General: All grass seed shall be:

1. Free from noxious weed seeds, and recleaned.
2. Grade A recent crop seed.
3. Treated with appropriate fungicide.
4. Delivered to the site in sealed containers with dealer's guaranteed analysis.

2.3 FERTILIZER

A. Soil Testing:

1. Verify fertilization needs by sampling and testing topsoil soil prior to purchasing fertilizer. The test sample shall be obtained by sampling six different locations at the project site. Soil from sampled locations shall be mixed in equal parts to provide a compiled sample for testing.

   Testing by an approved laboratory shall include:

   a. A test for soil pH,

b. A test for electrical conductivity (EC),

c. A test for the amount of nitrogen, phosphorus and potassium present (NPK),

d. A test to determine the amount of organic matter present (OM).

2. Results of tests shall be reviewed by the Owner and Engineer prior to purchase of fertilizer. If tests results are typical for the area, fertilization operations may commence as specified. If test results are not typical for the general campus area, Owner will provide modified formulation and application rate specifications by Change Order.

B: General:

1. All fertilizer to be commercially prepared and shall contain the following percentages by weight:

a. 16% Nitrogen.
b. 16% Phosphoric Acid.
c. 16% Potash.

2. Commercial fertilizer shall be complete, uniform in composition, dry and free-flowing. The fertilizer shall be delivered to the site in the original waterproof containers, each bearing the manufacturer's statement of analysis.

B. Special Protection:

1. If stored at the site, protect fertilizer from the elements at all times.

2.4 MULCH

A. All mulch for hydroseeding shall be North American Green GeoSkin (includes tackifier) as supplied by True North Steel, Billings, MT 59102 (406) 656-2253 or approved equal. Application rate per manufacture's recommendations.

2.5 MULCH TACKIFIER

A. See mulch above.

2.6 WATER

A. Water for seeding operations shall be Contractor's responsibility.

2.7 TOPSOIL

A. Native Topsoil
1. Refer to Montana Standard Specifications Subsections 203.80 Topsoil Salvaging and placing, 610.00 Topsoiling and 713.06 Topsoil Material.

B. Imported Topsoil
1. In the event sufficient quantities of native topsoil cannot be salvaged from the site, the Contractor shall provide imported topsoil to supplement the project requirements. The

Contractor shall provide topsoil that meets or exceeds the quality of the native topsoil material available on site. Contractor shall provide source and analysis information to the Owner's Representative, for his approval, prior to delivery. The Contractor shall incorporate into the topsoil, amendments necessary to provide topsoil fertility and quality, equal to or exceeding the characteristics of the native topsoil.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that seeding or sodding may be completed in accordance with the original design and the referenced standards.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 FINISH GRADING

A. Preparation

1. General Seeding & Landscaping Areas: For areas of general seeding, contractor shall provide a 4" minimum compacted, depth of topsoil on all lawn areas. Topsoil shall be graded smoothly and evenly. Lawn area sub grade shall be roughed and scarified 6" minimum depth to except and bind with the finish layer of topsoil. Topsoil shall be spread in a non-muddy, unfrozen condition. Surface finish shall be +/- 0.1 foot. Compaction of the topsoil layer shall be ±85% maximum dry density. Refer to Montana Department of Highways Standard Specifications Subsections 610.00 Topsoiling.203.08 Topsoil Salvaging and Placing, 713.06 topsoil material.

2. Reclaimed Areas: For areas reclaimed from pavement or gravel drives & parking, contractor shall provide a 4" minimum compacted, depth of topsoil on all lawn areas. Topsoil shall be graded smoothly and evenly. Lawn area sub grade shall be roughed and scarified 12" minimum depth, or to a sufficient depth to loosen sub grade as directed by the Owner's Representative, to prevent a hardpan and bind with the finish layer of topsoil. Topsoil shall be spread in a non-muddy, unfrozen condition. Surface finish shall be +/- 0.1 foot. Compaction of the topsoil layer shall be ±85% maximum dry density. Refer to Montana Department of Highways Standard Specifications Subsections 610.00 Topsoiling.203.08 Topsoil Salvaging and Placing, 713.06 topsoil material.

B. Finish Grading:

1. Grade lawn areas to finish grades, filling as needed or removing surplus dirt and floating areas to a smooth uniform grade. All lawn areas shall slope to drain. Where no grades

are shown, surfaces shall have a smooth and continual grade between existing or fixed controls (such as walks, curbs, catch basins, elevations at steps or building). Roll, scarify, rake and level as necessary to obtain true even lawn surfaces. All finish grades shall meet approval of the Owner's Representative before grass seed is sown or sod is laid.

C. Fine Grading:

1. Upon completion of finish grading, perform all fine grading required in planting areas, using topsoil obtained from the site.

D. Weed Control:

1. Prior to application of seed the seed bed shall be roughed up to a depth of 1/8 inch (32mm).
2. Moisten the seedbed to a depth of I inch (2.5 cm) to promote germination of any seeds contained in the topsoil.
3. After weeds have germinated and are growing vigorously, spray with Roundup in strict conformance with manufacturers specifications. Seeding shall be executed 7 days following Roundup application. Do not disturb the sterilized seedbed in any way prior to seeding.

3.3 SOWING NATIVE AND LAWN GRASS

A. Preparation:

1. Seed bed preparation shall pertain to the preparation of the surface of the ground to receive the seed. The ground shall be hand or machine raked so as to remove all debris, clods, rocks, and other material larger than 1 inch (2.5 cm), to a depth of 4 inches (10.2 cm). Such debris, clods, rocks, and other material so removed shall be disposed of off the immediate property. Seed bed preparation shall not commence until the moisture conditions make the ground area and soil friable.
2. If there has been a time lapse following the placement of the topsoil to allow it to become settled and compacted on the surface, the area to be planted with seed shall be thoroughly worked to a depth of 3 to 4 inches (7.6 cm to 10.2 cm) so as to provide a surface of such condition that it will allow application of the seed in compliance with these Specifications.
3. Apply fertilizer at a rate of 5 pounds per 1,000 square feet (2.5 kg per 100 m1. Rake fertilizer lightly into top 1 inch (2.5 cm) of prepared seedbed.
4. Seed beds should be firm prior to seeding. Seed beds should be permitted to settle or should be firmed by rolling before seedings are made.

B. Sowing:

1. Immediately prior to the application of the seed, the soil shall be loose to a depth of at least 1 inch (2.5 cm) and free from all material as specified. If soil is too loose or dry for good handling, it should be moistened and rolled lightly.
2. Seeding Methods
   a. Hand Broadcast –Hand broadcast shall be used in sensitive areas where other methods may cause unnecessary disturbance or in areas where species with a small seed are being applied. Contractor must receive approval for areas of broadcast seeding by Owner's representative if not designated on the plans. Seed should be applied at double the specified seeding rate in all areas of broadcast seeding. All broadcast seeded areas shall receive straw or hydro mulch per specifications.

b. Drill Seeding – The seed drill shall be capable of accurately seeding native grass and forb species. Areas where drill seeding can be used will need to be accessible by a tractor and drill.

The drill seeder shall have multiple seed boxes for different types and sizes of seed. Seed agitators are required to drop seed into a series of planters. The planters open a slot in the ground and plant the seeds ensuring that each seed is effectively planted to an optimal depth. The seeder must be able to be calibrated to the rate required for each type of seed, and must be able to be pulled by a wheeled or crawler tractor.

The soil surface shall not be compacted. Shallow tilling (no greater than 2" below soil surface) may be required if soil surface is compacted. All drill seeded areas shall receive straw or hydro mulch.

c. Hydroseeding - All seed shall be placed by hydraulic methods. Seed and mulch shall be applied in separate and distinct operations except that a minimal amount of mulch may be added to the seed slurry as a visual aid during the seeding process. Mulch applied with seed shall not exceed one pound mulch for each five gallons water (25 kg mulch for each liter of water). This mulch shall be deducted from the total quantity to be applied. The application of the seed slurry shall be made with the equipment having a built-in agitation system and operating capacity sufficient to agitate, suspend and homogeneously mix a slurry containing water, seed, and mulch. The slurry shall be sprayed over the soil in a uniform coat. Wherever practical, the slurry shall be applied normal to the surface being treated to effectively drill the seed into the seedbed. Hydromulch application shall follow seeding as soon as practical, with consideration for minimal soil erosion through washing. All seeded areas shall be mulched before work is terminated on any day.

3. Non-irrigated grass areas shall be seeded between March 1 and March 31 or between October 15 and October 31 unless otherwise directed by the Owner's Representative.
4. Seed shall be sown exercising great care that a uniform distribution of seed is obtained.
5. Mulch application shall follow seeding as soon as practical, with consideration for minimal soil erosion through washing. All seeded areas shall be mulched within 24 hours of placement.

B. Mulching:
1. Mulch all seeded areas. Topsoil or seed which washes out for reasons attributable to the Contractor's activities or failure to take proper precautions, shall be replaced at the Contractor's expense.
2. Hydro Mulching:
   a. All structures shall be protected from hydraulic application of mulch material. Any material deposited on walks, streets, inlets, or other structures, shall be removed.
   b. Mulch shall not be applied in the presence of free surface water, but may be applied on damp ground.
   c. Apply tank mixed mulch and tackifier at a rate of 2000 pounds per acre.
   d. Tank Mix:
      1. Tank mix shall meet the manufacturer's specifications and proportions:
      2. Add tackifier and mulch to hydroseeder with machine in operation. Run hydroseeder agitator for a minimum of 2 minutes prior to applying tank mix to prepared seedbeds.
3. Straw Mulching:
   a. Straw mulching shall be used only on areas of drill or broadcast seeding. The work consists of placing a straw mulch cover on slopes or other designated areas

following seeding. Crimped straw consists of a layer of straw or hay spread or blown over the seeded or graded soil surface. The straw is then mechanically anchored to the soil surface. The action of rolling an implement over the surface of the straw creates rows of straw that stand up. The remainder of the straw protects the soil's surface.

b. Materials- Grass Hay or Straw Mulch: Grass hay or straw mulching material shall be certified noxious weed seed free. The mulch shall have been baled dry, in bales of approximately equal weight and shall be relatively dry when applied. Materials having characteristics making them unsuitable for the purpose intended will be rejected. The Owner's representative shall approve the materials prior to installation.

c. Placing- The straw mulch shall be placed within 24 hours after the seeding or grading has been completed. Mulching operations shall not be performed during periods of high winds, which impede the proper placing of the mulch. The placing of mulch shall begin on the windward side of the areas to be covered. On gentle to moderate slopes, straw mulch can be applied by hand broadcasting to a uniform depth of 2 - 3 inches. On steep slopes, the straw should be blown onto the slope to achieve the same degree of cover. For machine application, the machine shall blow or eject mulch, by a constant air stream, that controls the amount of mulch. The machine shall cause a minimum of cutting or breakage of the mulch. Mulch containing excessive moisture, which prevents uniform feeding through the machine, shall not be used. Mulch shall be placed uniformly over the seeded areas at a rate of 4000 pounds per acre (or one 74 pound bale per 800 square feet). Approximately 10 -20 percent of the soil surface shall be visible through the mulch blanket prior to mulch tiller (punching) operation. Excessive cover, which will smother seedlings, shall be avoided. The Owner's Representative may order the placement of mulch on any area where protection is necessary to prevent erosion or encourage vegetation establishment. The mulch shall extend into existing vegetation or be stabilized on all sides to prevent wind or water damage which may start at the edges.

d. Punching- Immediately following application, the mulch shall be punched into the soil. Punching shall be accomplished using one of three methods depending on slope and equipment availability:

1. Hand Punching- A spade or shovel is used to punch straw into the slope until all areas have straw standing perpendicularly to the slope and embedded at least 4 inches into the slope. It shall be punched about 12 inches apart.

2. Roller Punching- A roller equipped with straight studs not less than 6 inches long, from 4 - 6 inches wide and approximately one inch thick shall be rolled over the slope.

3. Crimper Punching- Like roller punching, the crimper has a series of dull, flat disks with notched or cutout edges. The disks shall be approximately 20 inches (500 mm) in diameter, ¼ inch (6 mm) thick, spaced approximately 8 inches (200 mm) apart which force straw mulch into the soil. Crimping shall be done in two directions with the final pass across the slope. Tiller members shall be ballasted; to push mulch into the soil approximately three inches with ends exposed above the soil surface. The mulch tiller shall follow as closely as possible behind the mulcher. More than one pass of the mulch tiller may be required to assure adequate anchoring.

Example of crimped straw

Example of mechanical straw crimper

C. Protection: Protect all seeded areas by erecting temporary fences, barriers, signs, etc. as necessary to prevent traffic. Barriers shall remain in place for at least six (6) weeks unless other arrangements are made with the Owner's Representative.

3.4 MAINTENANCE

A. General:

1. Maintain all native grass and lawn areas for a period of 30 days following substantial completion of the job.
2. Contractor shall coordinate with the Owner to ensure seed establishment in disturbed areas. Overall turf maintenance of areas outside disturbed/seeded is not the responsibility of the Contractor. Reseeding of areas as needed is the responsibility of the Contractor.

B. Work Included:

1. All irrigated areas shall be watered as required.
2. All areas shall be watched closely so that they are "not permitted to dry out or to form puddles of water, or to be washed by over-application.
3. Mow all lawn at 1- 1/2 inches (3.8 cm) with a self bagging mower each time its height reaches 3 inches (7.6 cm). Maintain through minimum three mowings to provide an even

stand over the entire seeded area. Continue mowing all lawns at 1-1/2 inches (3.8 cm) until acceptance.

4. Mow native areas to a height of 6" per direction of Owner's representative, for a maximum of 4 mowings throughout seed establishment.

C. Replacements:

1. Any area that fails to produce an adequate stand of grass as determined by the Owner until Final Completion shall be reseeded by the Contractor at no additional expense to the Owner. If seeding is found to be unsatisfactory the final completion date shall be extended as required until seeding acceptance by Owner at the Contractor's expense.
2. Replacements required because of vandalism or other causes beyond the control of the Contractor are not part of the Contract.

D. Extension of Maintenance Period:

1. Continue the maintenance period at no additional cost to the Owner until all previously noted deficiencies have been corrected, at which time the final inspection shall be made.

END OF SECTION 32 92 00

SECTION 32 93 00 -LANDSCAPING

PART I-GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and provisions of Contract, including General Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 SUMMARY

A. This Section includes the following:

1. Furnishing all plants, labor, equipment, and performing all planting of trees, shrubs and groundcovers.

B. Installation of lawns is specified in Section 32 92 00– Turf and Grasses, of this Specification.

1.3 QUALITY ASSURANCE

A. Qualification of Workmen: Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed, the best methods for their installation, and who shall direct all work performed under this section.

B. Coordination of Work: All work of this section, and the installation of all irrigation systems and all lawns shall be performed by one Contractor.

1.4 STANDARDS

A. All plants and planting materials shall meet or exceed the Specifications of federal, state, and county laws requiring inspection for plant disease and insect control. Quality and size shall conform with the current edition of American Standards for Nursery Stock, ANSI Z60.I, as adopted by the American Association of Nurserymen, and with the schedule shown on the plans.

B. All plants shall be true to name and one of each bundle or lot shall be tagged with the name and size of the plants in accordance with the standards of practice of the American Association of Nurserymen. In all cases, botanical names shall take precedence over common names.

PART 2 -MATERIALS

2.1 PLANT MATERIALS

A. General: Plant materials shall mean trees, shrubs, groundcovers and plants of all descriptions, required to be furnished for the project, in accordance with the plans and specifications. All plant material must be true to name, which shall conform to Standardized Plant Names of the American Joint Committee on Horticultural Nomenclature, and shall be legibly tagged with the name and

size of the material according to the general nursery practice as recommended by the American Association of Nurserymen.

B. Condition: All plants shall be first class representatives of their normal species or varieties. Unless otherwise specified, plants shall have average or normally developed branch systems and vigorous root systems. Plants shall be free from scale, disfiguring knots, sun scald injuries, abrasions of the bark, or other objectionable blemishes. Weak plants will not be accepted. Plants must show appearance of normal health and vigor in strict accordance with these Specifications. All stock shall be nursery grown.

C. Disease: All plant material shall comply with state and federal laws with respect to inspection for plant disease and infection. Any inspection certificates required by law shall accompany each shipment, invoice, or order of stock.

D. Size Variance: When planted in masses, plants shall be subject to tests that will eliminate more than twenty (20%) percent variance from uniform size and that will ensure at least fifty (50%) percent conformity to larger rather than smaller Sizes.

E. Inspection: All plant material shall be subject to approval and inspection at any place, before, during and/or after planting. Any plant material not approved by the Owner's Representative shall be immediately removed from the site. No plant material shall be accepted with loose or broken balls.

2.2 OTHER MATERIALS

A. Guying Materials: Stakes shall be 2 inches (5 cm) metal t-post stakes, minimum length 3 feet (.9m), with the exposed portion of the stake painted dark green or brown. Guys shall be canvas or cloth straps. Staking is mandatory, see details.

B. Mulch: Mulch types per plans. Submit samples for approval prior to installation.

C. Weed Barrier Fabric: Weed barrier fabric shall be Typar Style 3201, as manufactured by Reemay Company or approved equal. Installed under all mulch areas unless noted otherwise in plans.

D. Bed Edging: All edging shall be 1/8 inch x 4 inches (3.2 mm x 102 mm) aluminum edging, mill finish, as manufactured by Permaloc Corporation, 13505 Barry Street, Holland, MI 49424. Telephone 1-800-356-9660 or 616-399-9600. Fax 616-399-9770. Or approved equal.

1. Inspection: Prior to all work of this section, carefully inspect installation work of other trades and, verify that all such work is complete to the point that installation of edging may properly commence.
2. Discrepancies: In the event of discrepancy, immediately notify the Owner's Representative. Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.
3. Installation: Install all edging where indicated on the Plans, anchoring all edging firmly in place and maintaining smooth curves and straight lines in accordance with manufacturer's recommended installation procedures. Place line stakes approximately 3.2 feet o.c. (96 cm o.c.), and plumb. Place splicer stakes in a manner so that smooth lines are maintained at all times. Kinked or waving edging, or edging not uniformly graded, shall be rejected, and replaced at no additional cost to the Owner.

2.3 PLANTING MIXTURE

A. Topsoil: The topsoil shall be loose, friable, and shall contain an ordinary amount of humus. It shall contain no lumps of soil, rocks larger than 1 inch (2.54 cm), or sticks, roots, and other debris. It shall be sufficiently fertile to sustain normal healthy plant growth and shall not have a pH value higher than 7.0 or lower than 5.5. The topsoil shall be delivered in an unfrozen and non-muddy condition and must meet the approval of the Owner's Representative.

B. Preparation: Native soil shall be used as fill around plants.

PART 3 -EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection: Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence. Verify that planting may be completed in accordance with the original design and the referenced standards.

B. Discrepancies: In the event of discrepancy, immediately notify the Owner's Representative. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 PLANTING TREES AND SHRUBS

A. General: Plant nursery stock immediately upon delivery to the site and approval by the Owner's Representative except that, if this is not feasible, heal-in all balled material with damp soil and protect from sun and wind. Regularly water all nursery stock in containers or healed in, and place them in a cool area protected from sun and drying winds.

B. Excavation of Plant Holes:

1. Excavation shall be accomplished in such a manner as to provide a 1/2 inch (13 mm) drop from all pavements to the finished surface of beds. Excavate shrub pits to provide not less than 6 inches (15.2 cm) of planting mixture beyond the side of the container and at least 6 Inches (15.2 cm) deeper than the container, but in no case shall depth be less than 16 inches (40.6 cm) below finished grade.
2. Tree pits shall have gradually sloping sides and horizontal bottoms. Depth of pit below finish grade shall be at least 6 inches (15.2 cm) greater than the depth of the ball. In no case shall depth of tree pits be less than 24 inches (61 cm) below finished grade. Diameter of pits for all trees shall be at least three times greater than the maximum diameter of the tree ball or root system, see details.

C. Planting Operation:

1. Trees and shrubs shall be supplied in sizes shown on the Landscaping Plan with all plants "Balled and Burlapped" or containerized. During planting operations, the nursery stock shall not be exposed to the sun, drying winds, or winter freezing. Roots of evergreens shall not be exposed to the air.
2. Planting may be executed at any time between March 1 and September 30, provided the ground is not frozen and water is available. The Contractor shall take all precautions he deems necessary against desiccation, freezing, or other potential damage to plant

materials due to weather conditions existing or that may be expected at the time of planting and during the maintenance and guarantee periods.

3. The soil in the bottom of the hole, which has been excavated to the prescribed requirements, shall be loosened to a depth of 3 inches (7.6 cm) and mixed with an equal amount of topsoil. A mound of soil shall be formed in the center of the hole to support the ball of the plant. The plant shall be placed on the mound of soil and held in a vertical position. Handle all "Balled and Burlapped" shrubs and trees by the earth ball and not by the top, exercising care not to drop or loosen the ball. After setting the shrub or tree at proper depth, untie or cut rope at trunk of plant and loosen burlap carefully without disturbing the earth ball.
4. Remove all containers and wire baskets from top 2/3 of plant root ball in a careful manner so that the root ball is not damaged.
5. The plants shall be so set, by adjusting the elevation of the mound, that after settlement the plant will stand at approximately the same depth it stood in the nursery or field, see details.
6. The plant hole shall be backfilled with native soil placed in layers around the ball. Each layer shall be carefully tamped in place in a manner to avoid injury to the ball or disturbing the position of the plant. When approximately two-thirds of the plant hole has been backfilled, the hole shall be filled with water and the soil allowed to settle around the roots. Balled and burlapped plants shall have the burlap cut away or folded back from the top of the ball before applying the water. After the water has been absorbed, the plant hole shall be filled with native soil and tamped lightly to grade. Any settlement shall be brought to grade with topsoil.
7. In the case of planting in the open on hot days, shorten the time between planting and watering.

3.3 STAKING TREES

A. All trees must be guyed with three metal t-post stakes driven into the ground outside the saucer. The stakes shall be equally spaced. The tree will be secured to the stakes by canvas or cloth straps around the first lateral branch. The straps should have a maximum of 1/2 inch (13 mm) slack. Do not have taut. Remove after one year, at time of final inspection, provided that trees are in acceptable free-standing condition. Staking is mandatory.

3.4 PRUNING

A. The brushed or broken parts of large or fleshly roots shall be cut off smooth before planting. Evergreen plants shall not be pruned except to remove dead or broken branches. Deciduous plants shall be pruned using proper pruning practices as approved by a certified arborist.

B. Trees and shrubs that have been so badly pruned as to spoil their form and usefulness shall be removed and replaced.

3.5 INSPECTION

A. Scheduling: In addition to the normal progress inspections, schedule and conduct the following formal inspections, giving the Owner’s Representative at least 48 hours prior notice of readiness for inspection.

1. Inspection of plants in containers prior to planting.
2. Inspection of plant locations, to verify compliance with the plans.

3. Substantial completion inspection after completion of planting. Schedule the substantial completion inspection sufficiently in advance, and in cooperation with the Owner's Representative so that final inspection may be conducted within 24 hours after completion of planting.
4. Final inspection at the end of the maintenance period, provided that all previous deficiencies have been corrected.

3.6 MAINTENANCE

A. General: Maintain all planting, starting with the delivery or collection of plant materials and continuing until completion of job. Maintenance shall include all watering, weeding, cultivating, spraying, and pruning necessary to keep the plant materials in a healthy growing condition and to keep the planted areas neat and attractive throughout the maintenance period. Provide all equipment and means for proper application of water. Protect all planted areas against damage, including erosion and trespassing, by providing and maintaining prior safeguards.

B. Settlement: If any tree, shrub, or plant bed settles more than 1 inch (2.54 cm) below the established grade, the plant shall be raised to the proper level and not merely covered with additional mulch.

C. Replacements: At the end of the maintenance period, all plant material shall be in a healthy growing condition. During the maintenance period, should the appearance of any plant indicate weakness and probability of dying, immediately replace the plant with a new and healthy plant of the same type and size without additional cost to the Owner.

D. Extension: Continue the maintenance period at no additional cost to the Owner until all previously noted deficiencies have been corrected at which time the final inspection shall be made. When final inspection is made and deficiencies are noted, the maintenance period will continue until such deficiencies are corrected at no additional cost to the Owner.

3.7 GUARANTEE

A. Time Frame: Guarantee all plant materials to remain healthy and in a vigorous growing condition for a period of 1 year following substantial completion. The final inspection shall be one year from the date of substantial completion.

B. Replacements: All replacements shall be the same species as originally installed.

END OF SECTION 32 93 00

SECTION 32 94 13 - BED EDGING

PART 1- GENERAL

1.1 DESCRIPTION

A. The work of this section consists of providing and installing edging for planting beds.

1.2 RELATED WORK DESCRIBED ELSEWHERE

A. Trees, Shrubs, and Groundcovers -Section 02840.

1.3 QUALITY ASSURANCE

A. For actual installation of edging, use only personnel who are skilled in the work required, familiar with the manufacturer's recommended method of installation, and thoroughly familiar with the requirements of this work.

PART 2 - MATERIALS

2.1 MANUFACTURER

A. All edging shall be 1/8 inch x 4 inches (3.2 mm x 102 mm) aluminum edging, mill finish, as manufactured by Permaloc Corporation, 13505 Barry Street, Holland, MI 49424. Telephone 1-800-356-9660 or 616-399-9600. Fax 616-399-9770 or approved equal.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this section, carefully inspect installation work of other trades and, verify that all such work is complete to the point that installation of edging may properly commence.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Owner's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.

3.2 INSTALLATION

A. Install all edging where indicated on the Plans, anchoring all edging firmly in place and maintaining smooth curves and straight lines in accordance with manufacturer's recommended installation procedures.

B. Place line stakes approximately 3.2 feet o.c. (96 cm o.c.), and plumb. Place splicer stakes in a manner so that smooth lines are maintained at all times. Kinked or waving edging, or edging not uniformly graded, shall be rejected, and replaced at no additional cost to the Owner.

END OF SECTION 32 94 13

PAGE LEFT INTENTIONALLY BLANK

APPENDIX

RIMROCK
ENGINEERING, INC.

GEOTECHNICAL ENGINEERING REPORT

Poly Vista Park
38th Street West
Billings, Montana

March 24, 2021
Project No. G21023

Prepared for:

Land Design, Inc.
1670 S. 48th St. West
Billings, Montana 59106

Prepared by:

Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, Montana 59101

RIMROCK ENGINEERING, INC.

5440 Holiday Avenue · Billings, Montana 59101: · Phone: 406.294.8400 · www.rimrock.biz

March 24, 2021

Mr. Michael Verseman
Land Design, Inc.
1670 S. 48th St. West
Billings, Montana 59106

Re: Geotechnical Engineering Report
Poly Vista Park
38th Street West
Billings, Montana

Dear Mr. Verseman:

Rimrock Engineering, Inc. has completed the geotechnical engineering services for the referenced project. The attached report presents the results of our findings. Our work consisted of subsurface exploration, laboratory testing, engineering analyses, and preparation of this report.

We appreciate this opportunity to be of service to you and are prepared to provide construction materials testing services during the construction phase of the project. If you have any questions regarding this report or need additional information or services, please contact us.

Sincerely,
RIMROCK ENGINEERING, INC.

Matt Geering, P.E.
Principal/Vice President

Wade Reynolds
Principal/President

TABLE OF CONTENTS

PAGE

EXECUTIVE SUMMARY I

1.0 INTRODUCTION AND SCOPE 1
1.1 Project Description 1
1.2 Purpose and Scope of Work 1

2.0 INVESTIGATION 1
2.1 Field Exploration 1
2.2 Laboratory Testing 2

3.0 SITE & SUBSURFACE CONDITIONS 2
3.1 Site Conditions 2
3.2 Subsurface Soil Conditions 3
3.3 Groundwater Conditions 3
3.4 Laboratory Test Results 3

4.0 RECOMMENDATIONS 4
4.1 Geotechnical Concerns/Considerations 4
4.2 Earthwork 4
4.2.1 Site and Subgrade Preparation 4
4.2.2 Material Requirements 5
4.2.3 Compaction Requirements 6
4.2.4 Utility Trench Backfill 6
4.2.5 Site Drainage 6
4.2.6 Construction Considerations 7
4.3 Helical Pier Foundation System 7
4.4 Rammed Aggregate Piers 8
4.5 Shallow Foundation System 9
4.6 Concrete Slabs 10
4.7 Corrosion Protection 11
4.8 Pavements 11

5.0 ADDITIONAL SERVICES 13
5.1 Project Bid Documents 13
5.2 Construction Observation/Testing and Plan Review 13

6.0 LIMITATIONS 13

APPENDICES

Appendix A Vicinity/Site Map, Logs, USCS Description/Log Key
Appendix B Laboratory Test Results

EXECUTIVE SUMMARY

Rimrock Engineering has completed the geotechnical engineering services for the Poly Vista Park project to be located along 38th Street West in Billings, Montana. Based on the results of our geotechnical investigation, the site can be developed for the proposed project consistent with the recommendations provided in this report. The following geotechnical conditions and considerations were identified:

- The subsurface profile generally consists of sandy silt and silty sand soils which extended to the maximum depths explored of 16 feet. Groundwater was not encountered while drilling or for the short duration the borings were allowed to remain open.

- Sandy silt and/or silty sand soils were encountered at anticipated foundation and floor slab elevations. Based on the geotechnical engineering analyses, subsurface exploration and laboratory test results, the site soils are stiff in consistency and/or loose to medium dense in relative density, moderately compressible, and potentially collapsible with increased moisture.

- In our opinion, structures can be supported using a shallow spread footing foundation system bearing on a zone of geotextile and/or geogrid-reinforced structural fill. Performance of this system is directly related to the proper treatment and re-compaction of the native soils, placement and control of geotextiles and structural fill, and good positive drainage for the life of the structure.

- A higher level of assurance against movement related distress would be supporting the structures using a rammed aggregate piers or helical piers at this site. In our opinion, a deep foundation system provides the highest level of assurance against movement related distress to the completed structures.

- To reduce the potential for movement related distress to concrete slabs, we recommend a minimum of 8 inches of structural fill reinforced with a layer of Mirafi RS380i be used for slab support.

It should be noted that specific project details were not fully developed or included in this section. The information provided in this executive summary should be used in conjunction with the entire report for design purposes.

GEOTECHNICAL ENGINEERING REPORT

Poly Vista Park
38th Street West
Billings, Montana

1.0 INTRODUCTION AND SCOPE

1.1 Project Description

The project consists of improvements to Poly Vista Park located along 38th St. West in Billings, Montana. Improvements are expected to include new structures and paved areas.

Estimated structural loads are expected to be on the order of 2 kips per lineal foot or less for continuous strip footings. We anticipate floor loads will be on the order of 150 pounds per square foot (psf). Please notify us if these assumptions are not valid so that we may re-evaluate and, if necessary, revise our geotechnical recommendations.

1.2 Purpose and Scope of Work

The purpose of this study is to evaluate the feasibility of the proposed development with respect to the observed subsurface conditions and to provide information, opinions, and geotechnical engineering recommendations relative to:

- General soil and groundwater conditions
- Site and subgrade preparation
- Recommended foundation type(s) and design parameters
- Estimated settlement of foundations
- Pavement thickness design
- Corrosivity of site soils
- General earthwork and site drainage

Our scope of services consisted of background review, site reconnaissance, field exploration, laboratory testing, engineering analyses, and preparation of this report.

2.0 INVESTIGATION

2.1 Field Exploration

The subsurface exploration consisted of drilling two (2) borings on March 5, 2021 to approximately 16 feet below existing grades. The borings were drilled using our truck mounted drill rig equipped with solid flight augers. Groundwater levels were measured during drilling operations, if

encountered. Upon completion of drilling and/or groundwater measurements, the borings were backfilled with drill cuttings and compacted with the equipment at hand.

Logs of the borings along with a Vicinity/Site Map are included in Appendix A. The borings were located in the field by Rimrock Engineering based on the site plan provided. Estimated ground surface elevations were set at 100 for purposes of this investigation. The locations and elevations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

Rimrock Engineering personnel logged the soil conditions encountered in the borings. At selected intervals, samples of the subsurface materials were taken by driving split-spoon samplers, pushing Shelby tube samplers, and collecting auger cuttings. Penetration resistance measurements were obtained by driving the samplers into the subsurface materials with a 140-pound automatic hammer falling 30 inches. The penetration resistance value is a useful index in estimating the relative density, or consistency, of the materials encountered. The sample was tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification.

2.2 Laboratory Testing

The purpose of the laboratory testing is to assess the physical and engineering properties of the soil samples collected in the field to be used in our geotechnical evaluations and analyses. Laboratory testing was performed on selected soil samples to assess the following:

- Visual classification (USCS)
- Moisture content
- Sieve analysis
- Atterberg limits
- Consolidation/swell
- Moisture/density relationship
- California Bearing Ratio (CBR)
- Water soluble sulfate, pH & resistivity

The soil descriptions presented on the boring logs are in accordance with the Unified Soil Classification System (USCS). Individual laboratory test results can be found in Appendix B at the end of this report.

3.0 SITE & SUBSURFACE CONDITIONS

3.1 Site Conditions

The project site is located along the west side of 38th Street West at Poly Vista Park in Billings, Montana. The site consists of an existing gravel parking lot and baseball field. The site is relatively flat with slight drainage to the south. The surrounding areas consist mainly of Poly Vista Park and residential developments.

3.2 Subsurface Soil Conditions

Based on the materials encountered in our borings, the subsurface profile generally consists of sandy silt and silty sand soils which extended to the maximum depths explored of 16 feet. The subsurface silt soils had Standard Penetration Test (SPT) N-values in the range of 15 blows per foot which indicates the soils to be stiff in consistency, have moderate compressibility, and relatively low shear strength characteristics. SPT N-values in the sand ranged from 4 to 22 bpf indicating the sand are loose to medium dense in relative density with moderate to high compressibility. For a more detailed description of the subsurface conditions, please refer to the individual boring logs provided in Appendix A.

3.3 Groundwater Conditions

The borings were observed while drilling and after completion for the presence and level of groundwater. Groundwater was not encountered while drilling or for the short duration the borings were allowed to remain open. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Groundwater can be expected to fluctuate with varying seasonal and weather conditions and other factors not evident at the time of the investigation. Evaluation of the factors that affect groundwater fluctuations is beyond the scope of this report.

3.4 Laboratory Test Results

The site soils were tested for grain size distribution (sieve analysis) and Atterberg Limits. Atterberg limits are a basic measure of the critical water contents of a fine-grained soils. The clayey soils encountered in the borings generally have high plasticity. Results are summarized below:

Location	Depth (ft)	USCS	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Gravel (%)	Sand (%)	Clay/Silt (%)
B-1	4.5	ML	24	21	3	0.0	49.7	50.3
B-2	9.5	SM	NP	NP	NP	0.0	61.9	38.1

A sample of the silt soils was tested for consolidation/swell potential. The sample was allowed to consolidate under a confining pressure of 1,000 pounds per square foot (psf). Once consolidation under the surcharge load was complete, the sample was inundated with water and allowed to swell/collapse. After movement from the addition of water ceased, incremental loads were then applied to further consolidate the sample.

Consolidation/swell test results indicate that the fine-grained soils exhibit moderate compressibility and slight collapse potential with increased moisture (See Consolidation Tests in Appendix B). Results are summarized below:

Location	Depth (ft)	Material	Dry Unit Weight (pcf)	Strain @ 2,000 psf (%)	Collapse(-)/Swell(+) (%)
B-1	4.5	ML	107	2.2	-0.2

A representative sample of the near surface soils was collected for Moisture-Density Relationship (M/D) and California Bearing Ratio (CBR) testing. The results are summarized in the following table:

Location	Depth, (ft)	Material	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR
B-1/B-2	1-3	ML/SM	108.4	14.6	5.6

4.0 RECOMMENDATIONS

4.1 Geotechnical Concerns/Considerations

Sandy silt and/or silty sand soils were encountered at anticipated foundation and floor slab elevations. Based on the geotechnical engineering analyses, subsurface exploration and laboratory test results, the site soils are stiff in consistency and/or loose to medium dense in relative density, moderately compressible, and potentially collapsible with increased moisture.

In our opinion, structures can be supported using a shallow spread footing foundation system bearing on a zone of geotextile and/or geogrid-reinforced structural fill. Performance of this system is directly related to the proper treatment and re-compaction of the native soils, placement and control of geotextiles and structural fill, and good positive drainage for the life of the structure.

A higher level of assurance against movement related distress would be supporting the structures using a rammed aggregate piers or helical piers at this site. In our opinion, a deep foundation system provides the highest level of assurance against movement related distress to the completed structures.

4.2 Earthwork

The following sections present recommendations for site and subgrade preparation and placement of fill materials on the project. Earthwork on the project should be observed and tested by Rimrock Engineering.

4.2.1 Site and Subgrade Preparation

Vegetation, topsoil, existing structures, existing pavements, existing utilities (if present), and other unsuitable materials (e.g. debris, desiccated soil, frozen soil, etc.) should be removed from the proposed construction area. It is anticipated that general excavations for the proposed construction can be accomplished with conventional earthmoving equipment such as tractor mounted backhoes and tracked excavators.

If the structural fill option is desired, excavations should allow for the placement of at least 1.5 feet of geotextile-reinforced structural fill beneath footings and 8 inches of aggregate base beneath floor slabs. Excavation for structural fill placement should extend laterally beyond all edges of the foundation at least 12 inches per foot of over-excavation depth.

The excavated site soils, cleaned of all organic/deleterious material, construction debris, and rock greater than 3 inches in nominal size (if encountered), may be stockpiled on-site and used as wall/trench backfill, and landscaping materials. The processed clayey soils will provide some advantage as wall/trench backfill to limit potential for surface water infiltration.

Underlying the structural fill, we recommend a separation/stabilization geotextile such as Mirafi RS380i be placed at the interface between the prepared subgrade and the structural fill zone to help stabilize the subgrade as well as keep the subgrade soils from intruding into the structural fill zone.

In order to mitigate construction disturbance and improve uniformity of subgrade support, prior to placement of structural fill and geotextiles, subgrade should be scarified a minimum of 8 inches, moisture conditioned to near optimum, and compacted to 95 percent of the maximum dry density (ASTM D698). Rimrock Engineering should be contacted to observe the subgrade surface to ascertain integrity consistent with the design assumptions.

Within the proposed areas to receive pavement and fill materials, scarification, re-compaction and proof-rolling of the subgrade soils is recommended. Subgrade soils beneath pavement and fill areas should be scarified to a depth of at least 12 inches, moisture conditioned to within 3 percent of optimum and compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D698. The moisture content and compaction of subgrade soils should be maintained until pavement construction. The prepared subgrade in areas to receive pavement should be proof-rolled by a tandem axle dump truck loaded to its capacity. The proof-rolling should be observed by Rimrock Engineering to identify areas of soft subgrade. Any areas that become unstable or “pump” under the loaded dump truck should be excavated to a depth to be determined by Rimrock Engineering and replaced with a dense graded gravel/sand mixture to stabilize the subgrade. Once the subgrade has been proof-rolled and approved by the geotechnical engineer, base course may be placed. Additionally, a geogrid or geotextile separation/stabilization fabric may be required to stabilize soft subgrade soils.

4.2.2 Material Requirements

It is anticipated that excavated materials will be used to the extent practical as site, wall, and trench backfill. The material suitability should be evaluated by the geotechnical engineer prior to use. Moisture conditioning and processing of on-site soils will likely be required.

Structural fill should be a crushed aggregate and meet the criteria outlined below:

Gradation	Percent finer by weight (ASTM C136)
3"	100
No. 4 Sieve	30-75
No. 200 Sieve	15 (max)
Liquid Limit	25 (max)
Plasticity Index	6 (max)

4.2.3 Compaction Requirements

Fill materials should be placed and compacted in loose lift thicknesses of 8 inches or less when heavy, self-propelled compaction equipment is used. When hand-guided equipment such as jumping jack or plate compactor is used, loose lift thicknesses should be on the order of 4 to 6 inches.

The following table lists the compaction requirements for the different types of fill recommended in this report.

Item	Description
Compaction Requirement (ASTM D698)	**Scarified Subgrade Soils:** 95% **Structural Fill:** 98% **Aggregate Base (beneath slabs and pavements):** 95% **Wall/Trench Backfill:** 97% beneath pavements, 95% elsewhere
Moisture Content (ASTM D698)	±3 % of optimum

4.2.4 Utility Trench Backfill

All trench excavations should be made with sufficient working space to permit construction including backfill placement and compaction. Utility trenches are a common source of water infiltration and migration. All utility trenches that penetrate beneath the structure should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate beneath the structure. We recommend constructing an effective clay “trench plug” that extends at least 5 feet out from the structure. The plug material should consist of clay compacted at a water content at or above the optimum water content. The clay fill should be placed to completely surround the utility line above the bedding zone and be compacted in accordance with recommendations in this report. Trench plug material should conform to MPW specifications.

4.2.5 Site Drainage

Positive drainage should be provided during construction and maintained throughout the life of the proposed project. Infiltration of water into utility or foundation excavations must be prevented

during construction. All grades must provide effective drainage away from the structure during and after construction. Water permitted to pond next to the structure can result in greater soil movements than those discussed in this report. Estimated movements described in this report are based on effective drainage for the life of the structure and cannot be relied upon if effective drainage is not maintained.

In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 10 percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

Downspouts, roof drains or scuppers should be extended and discharged beyond the backfill zone when the ground surface beneath such features is not protected by exterior slabs or paving. Landscaped irrigation adjacent to the foundation system should be minimized, eliminated, or strictly regulated.

4.2.6 Construction Considerations

Although the exposed subgrade is anticipated to be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. The use of light, rubber-tracked construction equipment would aid in reducing subgrade disturbance. Should unstable subgrade conditions develop, our geotechnical engineer should review conditions and provide recommendations for stabilization.

The site should be graded to prevent ponding of surface water on, or direction of runoff toward, the prepared subgrades or excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed.

As a minimum, all temporary excavations should be sloped or braced as required by Occupational Health and Safety Administration (OSHA) regulations to provide stability and safe working conditions. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations, as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

Rimrock Engineering should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during foundation preparation and installation, compaction of backfill, and final preparation for construction of the structure.

4.3 Helical Pier Foundation System

Helical piers offer a deep foundation alternative for supporting the proposed structure. These consist of a steel helix welded to a solid steel shank. They are screwed through the soils using a hydraulic motor, usually attached to a mini excavator or skid-steer loader. Shank extensions are added, as needed, to reach the required bearing depth. Installation torque is monitored and has been shown to be a reliable method for estimating the individual pier capacity. This alternative avoids the potentially compressible/collapsible soil by extending loads to less compressible/collapsible bearing soils. Since helical piers do not require an open hole; no casing, drilling slurry, reinforcing steel or special concrete placement is typically required, nor is there any waste material requiring disposal.

For the conditions at this site, it is advisable to install helical piers to the maximum allowable installation torque to obtain the maximum capacity from each pier. Based on our experience, competent materials are expected at depths ranging from 50 to 70 feet. We recommend design of the piers be performed by a licensed installer. Settlement of a helical pier foundation system should be about ½-inch, when designed in accordance with the recommended allowable capacities. At least one load test should be performed to verify the helical piers develop the design capacity without exceeding ½-inch vertical deflection. Foundation elements such as pier caps or footings should extend at least 3.5 feet below final grade to provide frost protection.

4.4 Rammed Aggregate Piers

In our opinion, rammed aggregate piers may be a viable foundation alterative at the site due to the subgrade conditions. This foundation system has been used on similar soil conditions with success. Structures can be supported by shallow spread footings bearing on rammed aggregate piers constructed on a design spacing determined by a specialty contractor using proprietary drilling/installation methods.

Stone column foundation systems or rammed aggregate piers are accomplished by down-hole vibratory methods. The technique involves the installation of backfill material into the soil so that dense and sometimes deep stone columns are formed that are tightly interlocked with the surrounding overburden soils. This system improves the subgrade below conventional spread footings, grade beams, and floor slabs and reduces the compressibility of the underlying soil.

Stone column soil reinforcement elements are typically constructed at 24 or 30-inch diameters. Shaft lengths typically range from 8 and 20 feet as measured from footing subgrade; however, deeper shafts are achievable. The result of construction is a reinforced zone of soil directly under footings that allows for the construction of shallow spread footings proportioned for a relatively high bearing pressure. It is reasonable to assume that allowable bearing pressures in the range of 3,000 to 4,500 psf can be expected pending analysis with actual construction and structural load information.

Stone column elements are spaced singly or in close groups beneath interior footings to support concentrated column loads. Beneath continuous footings, stone column elements typically are

spaced at 6 to 12 feet on center depending on loads, soil conditions, and other design requirements.

Stone column soil reinforcement should be designed and constructed by a licensed installer. The installer should provide a stone column layout and detailed design calculations sealed by a professional engineer licensed in the State of Montana. The design parameters should be verified by a full-scale modulus test (similar to a pile load test) performed in the field. Rimrock Engineering should be retained to monitor the modulus test and subsequent installation of production stone column elements.

4.5 Shallow Foundation System

If deep foundations are not desired, the proposed structures can be supported by a shallow spread footing foundation system or thickened edge monolithic slab bearing on a minimum of 1.5 feet of geotextile and/or geogrid-reinforced structural fill. The spread footing foundation system constructed on structural fill as described above, may be designed for a maximum allowable bearing pressure of 2,000 pounds per square foot (psf). The design bearing pressure applies to dead load plus design live load conditions. The design bearing pressure may be increased by one-third when considering total loads that include wind or seismic conditions. A coefficient of friction value of 0.45 can be used for footings bearing on structural fill.

It should be noted that because the monolithic slab is not allowed to 'float' independent of the foundation, differential movement and cracking between the slab and the thickened edge foundation may occur. If used, the monolithic slab should be designed by a structural engineer to take this into account as well as the anticipated wall and point loads.

Rigid insulation panels should be placed along the exterior of the thickened edge for frost protection. These panels should extend outward approximately 4 feet and be sloped away from the structure to promote drainage of infiltration away from the structure.

Provided the structure is properly constructed, the total and differential movement resulting from the structural loads is estimated to be on the order of 1 inch and ¾ inch respectively. However, greater movements are possible given the site soil conditions. Foundation movement will depend upon the variation within the subsurface soil profile, structural loading conditions, embedment depth of footings, thickness of compacted fill, and quality of earthwork operations. Additional foundation movements could occur if water from any source infiltrates the foundation soils; therefore, proper drainage is critical and should be provided in the final design, during construction and for the life of the project.

If conventional shallow spread footing and stem walls are used, exterior foundations should be embedded a minimum of 3.5 feet below lowest adjacent exterior finish grade for frost protection and confinement. Interior footings should be bottomed at least 18 inches below lowest adjacent finish grade for confinement. Wall foundation dimensions should satisfy the requirements listed in

the latest edition of the International Building Code. Reinforcing steel requirements for foundations should be provided by the design engineer.

The base of all foundation excavations should be free of water and loose material prior to placing structural fill. Concrete should be placed soon after structural fill placement to reduce the potential for bearing surface disturbance. If the soil bearing levels become excessively dry, disturbed, saturated, or frozen, the affected material should be removed and replaced with suitable material prior to placing concrete. It is recommended that Rimrock Engineering be retained to observe and approve the foundation materials and their preparation for compliance with our recommendations and design assumptions.

4.6 Concrete Slabs

We recommend that a minimum of 8 inches of geotextile-reinforced structural fill be used for interior slab support. A leveling course, typically 4 to 6 inches of sand/gravel, is often provided below the concrete slabs, and can be considered part of the zone of base.

Additional floor slab design and construction recommendations for are as follows:

- Positive separations and/or isolation joints should be provided between slabs and all foundations, columns or utility lines to allow independent movement
- Contraction joints should be provided in slabs to control the location and extent of cracking
- Floor slabs should be structurally independent of any building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between slab and foundation
- The use of a vapor retarder should be considered beneath concrete slabs-on-grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer and slab contractor should refer to ACI 302 for procedures and cautions regarding the use and placement of a vapor retarder
- Floor slabs should not be constructed on frozen subgrade
- Other design and construction considerations, as outlined in Section 302.1R of the ACI Design Manual, are recommended.

Exterior slabs-on-grade founded on the site soils may experience some movement due to the volume change of the near surface materials through moisture variation or freeze-thaw cycles. This movement may lead to loss of positive drainage away from the building and could present a tripping hazard where slab sections move independently. Potential movement could be reduced by:

- Performing regular joint-sealing maintenance
- Minimizing moisture variations in the subgrade
- Minimizing moisture introduction to slab surfaces
- Controlling moisture-density during placement

- Placing effective control joints on relatively close centers
- Using designs which allow vertical movement between the exterior features and adjoining structural elements

4.7 Corrosion Protection

A soil sample was submitted for water soluble sulfate testing. The results are summarized in the following table:

Location	Depth (ft)	Material	Soluble Sulfate Content (%)	Resistivity (ohm-cm)	pH
B-1	2.5	ML	0.01	1,870	7.9

Water soluble sulfate values less than 0.10 are considered to have negligible attack potential on normal strength concrete. As a result, Type I-II Portland cement can be specified for all project concrete. However, if additional protection in this regard is desired, Type V cement should be specified.

Resistivity values between 1,000 and 3,000 are considered to be strongly aggressive with regard to corrosion of buried metals. If corrosion of buried metal is critical, it should be protected using a non-corrosive backfill, wrapping, coating, sacrificial anodes, or a combination of these methods, as designed by a qualified corrosion engineer.

4.8 Pavements

Pavement section alternatives for this project were designed based on the procedures outlined in the 1993 Guideline for Design of Pavement Structures by the American Association of State Highway and Transportation Officials (AASHTO).

For purposes of this design analysis, a terminal serviceability index of 2.0, an inherent reliability of 85 percent, and a subgrade drainage coefficient of 0.9 were used. It is anticipated that pavement subgrade soils will consist of clay soils which are typically considered poor materials for pavement support. A California Bearing Ratio (CBR) value of 5.6 was used in the pavement design analysis. Please note that this CBR value and the pavement section alternatives provided assume that the site soils will be re-compacted and left in-place within the pavement areas. If this is not the case, Rimrock Engineering should be notified to provide additional pavement design recommendations based on the subgrade soils which will be present below the pavement sections.

Specific traffic data was not provided for this project. Therefore, we have assumed an equivalent 18-kip single axle load (ESAL) of 60,000 to represent the design traffic intensity for the proposed parking and access drives over a 20-year design period. Please notify us if any of the parameters used in the pavement design do not adequately define the anticipated conditions. Select from the following pavement alternative, or an approved equivalent.

Traffic Area	Asphalt Concrete	Portland Cement Concrete	Base Course	Total
Parking & Access	3	-	8	11
	-	5	4	9
Dumpster Locations	-	7	4	11

Asphalt concrete should be composed of a mixture of aggregate, filler and additives (if required), and approved bituminous material. The asphalt concrete should conform to approved mix designs which include volumetrics, Marshall properties, optimum asphalt cement content, job mix formula, and recommended mixing and placing temperatures. The asphalt concrete should be consistent with an approved mix design conforming to Montana Public Works (MPW). Mix designs should be submitted prior to construction to verify their adequacy. Aggregate used in the asphalt should meet MPW specifications for quality and gradation.

Asphalt material should be placed in maximum 3-inch lifts (compacted thickness) and should be compacted to the minimum standards outlined in the MPW specifications. Aggregate base course should consist of a blend of sand and gravel which meets MPW specifications for quality and gradation. Aggregate base course should be compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D 698.

Where rigid pavements are used, the concrete should be obtained from an approved mix design conforming to the MPW specifications, including the following minimum properties:

- Compressive Strength @ 28 days: 4,000 psi minimum
- Entrained Air Content: 4% to 7%

Each pavement alternative should be evaluated with respect to current material availability and economic conditions. The pavement sections presented herein are based on design parameters selected by Rimrock Engineering based on experience with similar projects and soil conditions. Design parameters may vary with the specific project and material source. Variation of these parameters may change the thickness of the pavement sections presented. Rimrock Engineering is prepared to discuss the details of these parameters and their effects on pavement design and reevaluate pavement design as appropriate.

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. If heavy construction traffic is allowed on unfinished pavement sections or sections not designed for such traffic, premature rutting and/or failure may occur.

The pavement sections provided in this report represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance

should be planned and provided for through an on-going pavement management program. Preventive maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Preventive maintenance consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance program, additional engineering input is recommended to determine the type and extent of preventive maintenance appropriate. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

5.0 ADDITIONAL SERVICES

5.1 Project Bid Documents

It has been our experience during the bidding process, that contractors often contact us to discuss the geotechnical aspects of the project. Informal contacts between Rimrock Engineering and an individual contractor could result in incorrect or incomplete information being provided to the contractor. Therefore, we recommend a pre-bid meeting be held to answer any questions about the report prior to submittal of bids. If this is not possible, questions or clarifications regarding this report should be directed to the project Owner or his designated representative. After consultation with Rimrock Engineering, the project Owner (or his representative) should provide clarifications or additional information to all contractors bidding the job.

5.2 Construction Observation/Testing and Plan Review

The recommendations made in this report are based on the assumption that an adequate program of tests and observations will be made during construction to verify compliance with these recommendations. We recommend that project plans and specifications be reviewed by Rimrock Engineering to verify compatibility with our findings and recommendations. Additional information concerning the scope and cost of these services can be obtained from our office.

The review of plans and specifications and the field observation and testing by Rimrock Engineering are an integral part of the conclusions and recommendations made in this report. If we are not retained for these services, the Client agrees to assume Rimrock Engineering's responsibility for any potential claims that may arise during construction.

6.0 LIMITATIONS

Recommendations contained in this report are based on our field explorations, laboratory tests, and our understanding of the proposed construction. The study was performed using a mutually agreed upon scope of work. It is our opinion that this study was a cost-effective method to evaluate the subject site and evaluate some of the potential geotechnical concerns. More detailed, focused,

and/or thorough investigations can be conducted. Further studies will tend to increase the level of assurance; however, such efforts will result in increased costs. If the Client wishes to reduce the uncertainties beyond the level associated with this study, Rimrock Engineering should be contacted for additional consultation.

The soils data used in the preparation of this report were obtained from borings made for this investigation. It is possible that variations in soils exist between the points explored. The nature and extent of soil variations may not be evident until construction occurs. If any soil conditions are encountered at this site which is different from those described in this report, our firm should be immediately notified so that we may make any necessary revisions to our recommendations. In addition, if the scope of the proposed project changes, our firm should be notified. This report has been prepared for design purposes for specific application to this project in accordance with the generally accepted standards of practice at the time the report was written. No warranty, express or implied, is made.

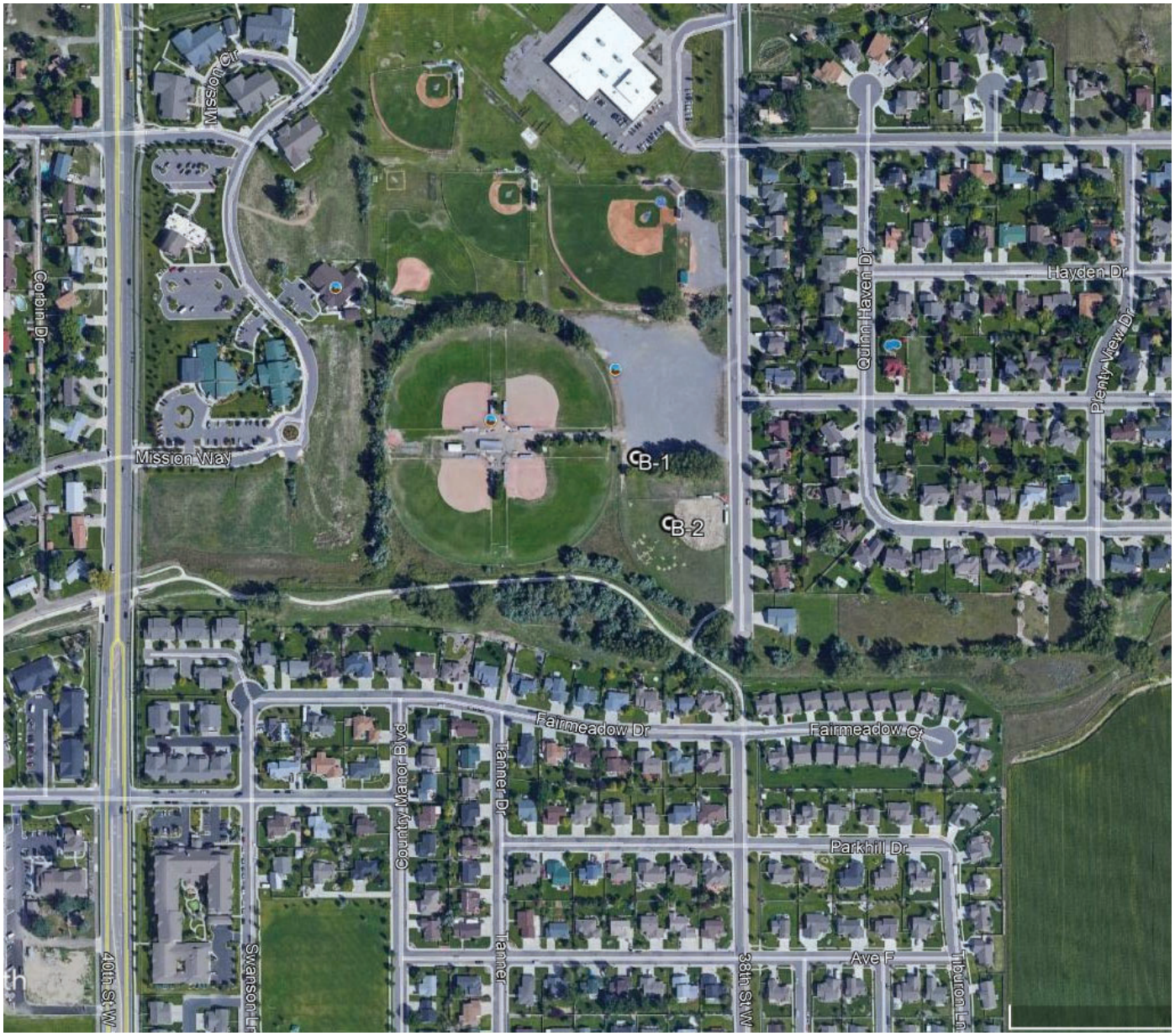
Other standards or documents referenced in any given standard cited in this report, or otherwise relied upon by the authors of this report, are only mentioned in the given standard; they are not incorporated into it or “included by reference,” as that latter term is used relative to contracts or other matters of law.

This report may be used only by the Client and for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on- and off-site), or other factors including advances in man’s understanding of applied science may change over time and could materially affect our findings. Therefore, this report should not be relied upon after 36 months from its issue. Rimrock Engineering should be notified if the project is delayed by more than 24 months from the date of this report so that a review of site conditions can be made, and recommendations revised if appropriate.

It is the Client’s responsibility to see that all parties to the project including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor’s option and risk. Any party other than the Client who wishes to use this report shall notify Rimrock Engineering of such intended use. Based on the intended use of the report, Rimrock Engineering may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the Client or anyone else will release Rimrock Engineering from any liability resulting from the use of this report by any unauthorized party.

APPENDIX A

Field Exploration



Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, MT 59101 Tel. (406) 294-8400

PROJECT NO. G21029

VICINITY/SITE MAP

POLY VISTA PARK
38th Street West
Billings, Montana

N

BORING NUMBER B-1

Rimrock Engineering, Inc.

CLIENT Land Design
PROJECT NAME Poly Vista Park
PROJECT NUMBER G21029
PROJECT LOCATION Billings, MT
DATE STARTED 3/5/21 **COMPLETED** 3/5/21
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY B.H. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		GRAVEL SURFACING										
		(ML) SANDY SILT Light brown, stiff, low plasticity, fine sand.	SPT	100	6-7-8 (15)			11				
5			ST	100			107	10	24	21	3	50
		(SM) SILTY SAND Light brown, loose, fine sand.	SPT	100	4-4-5 (9)			6				
10			SPT	100	3-2-2 (4)			9				
15			SPT	100	2-2-3 (5)			6				

Bottom of borehole at 16.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 3/23/21 13:19 - G:\PROJECTS\2021\G21029.GPJ

BORING NUMBER B-2

Rimrock Engineering, Inc.

CLIENT Land Design
PROJECT NAME Poly Vista Park
PROJECT NUMBER G21029
PROJECT LOCATION Billings, MT
DATE STARTED 3/5/21 **COMPLETED** 3/5/21
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
DRILLING CONTRACTOR Rimrock Engineering, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
AT TIME OF DRILLING ---
LOGGED BY B.H. **CHECKED BY** M.G.
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		TOPSOIL										
		(SM) SILTY SAND Light brown, medium dense, fine sand, sandy silt layers/lenses.										
			SPT	100	5-6-7 (13)			4				
5			SPT	100	10-11-11 (22)			6				
10			SPT	100	4-5-7 (12)			12	NP	NP	NP	38
15			SPT	100	3-6-4 (10)			6				

Bottom of borehole at 16.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 3/23/21 13:19 - G:\PROJECTS\2021\G21029.GPJ

KEY TO SYMBOLS

Rimrock Engineering, Inc.

CLIENT Land Design **PROJECT NAME** Poly Vista Park

PROJECT NUMBER G21029 **PROJECT LOCATION** Billings, MT

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

GW: USCS Well-graded Gravel

ML: USCS Silt

SM: USCS Silty Sand

TOPSOIL: Topsoil

SAMPLER SYMBOLS

Standard Penetration Test

Shelby Tube

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION

Water Level at Time Drilling, or as Shown

Water Level at End of Drilling, or as Shown

Water Level After 24 Hours, or as Shown

KEY TO SYMBOLS - GINT STD US LAB.GDT - 3/23/21 13:19 - G:\PROJECTS\2021\G21029.GPJ

APPENDIX B

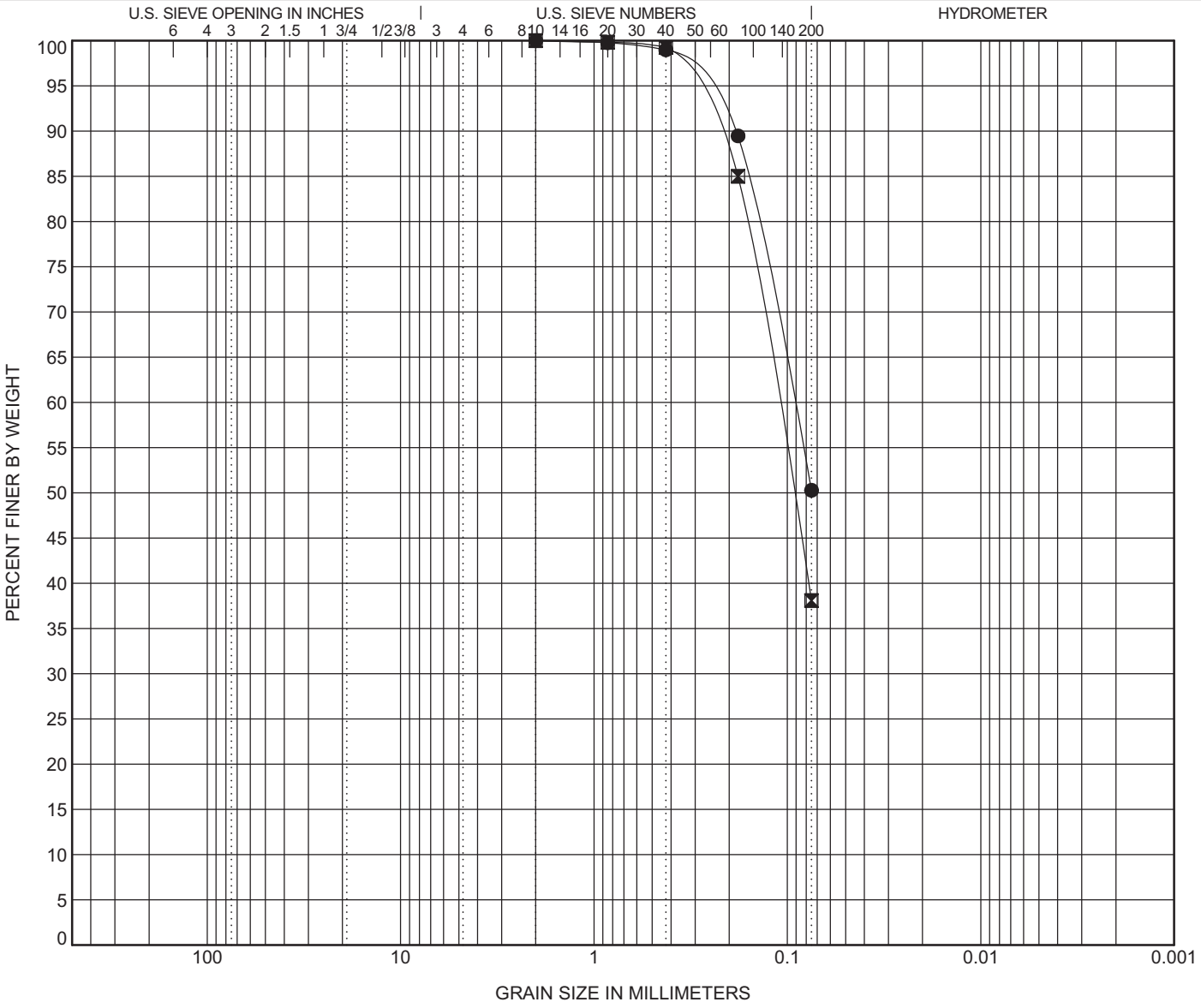
Laboratory Test Results

GRAIN SIZE DISTRIBUTION

Rimrock Engineering, Inc.

CLIENT Land Design **PROJECT NAME** Poly Vista Park

PROJECT NUMBER G21029 **PROJECT LOCATION** Billings, MT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-1**	**4.5**	**SANDY SILT(ML)**	**24**	**21**	**3**		
⊠	**B-2**	**9.5**	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-1**	**4.5**	**2**	**0.093**			**0.0**	**49.7**	**50.3**	
⊠	**B-2**	**9.5**	**2**	**0.113**			**0.0**	**61.9**	**38.1**	

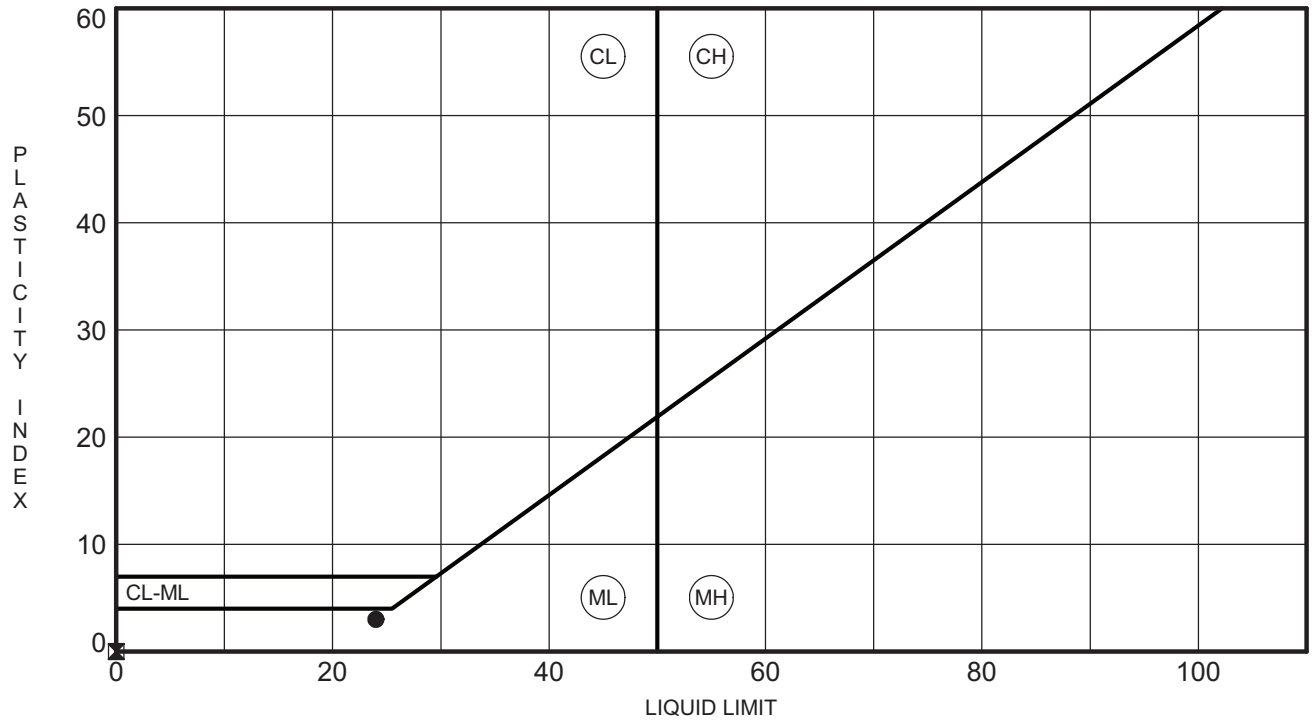
GRAIN SIZE - GINT STD US LAB.GDT - 3/23/21 12:40 - G:\PROJECTS\2021\G21029.GPJ

ATTERBERG LIMITS' RESULTS

Rimrock Engineering, Inc.

CLIENT Land Design **PROJECT NAME** Poly Vista Park

PROJECT NUMBER G21029 **PROJECT LOCATION** Billings, MT



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	**B-1**	**4.5**	**24**	**21**	**3**	**50**	**SANDY SILT(ML)**
⊠	**B-2**	**9.5**	**NP**	**NP**	**NP**	**38**	**SILTY SAND(SM)**

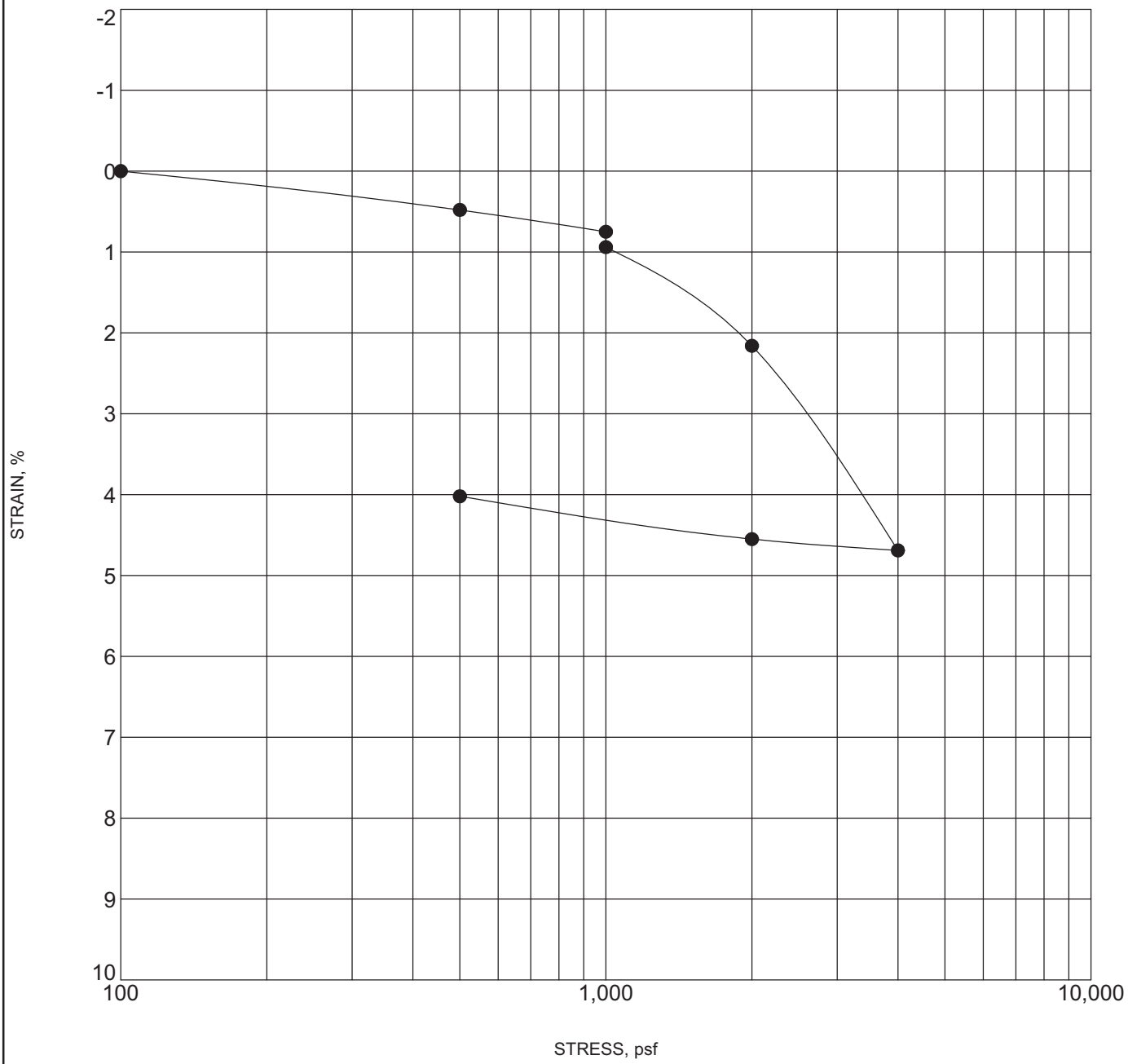
ATTERBERG LIMITS - GINT STD US LAB.GDT - 3/23/21 12:40 - G:\PROJECTS\2021\G21029.GPJ

CONSOLIDATION TEST

Rimrock Engineering, Inc.

CLIENT Land Design **PROJECT NAME** Poly Vista Park

PROJECT NUMBER G21029 **PROJECT LOCATION** Billings, MT



BOREHOLE	DEPTH	Classification	γ_d	MC%
● B-1	4.5	**SANDY SILT(ML)**	**107**	**10**

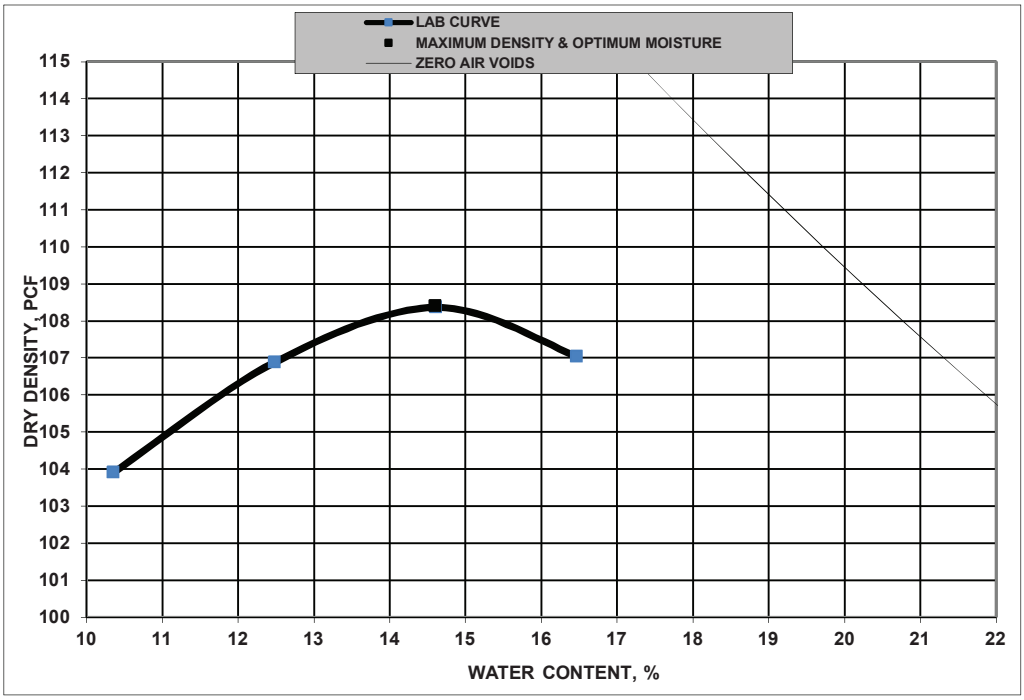
CONSOL STRAIN - GINT STD US LAB.GDT - 3/23/21 12:41 - G:\PROJECTS\2021\G21029.GPJ

RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Land Design	**Project No:**	G21029
		Date of Report:	3/23/2021
Project Name:	Poly Vista Park	**Sample Location:**	B-1/B-2
Project Location:	Billings, Montana	**Sample Depth:**	1'-3'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	Sandy Silt(ML)/Silty Sand(SM)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	3/5/2021

MOISTURE-DENSITY RELATIONSHIP



Maximum Density, PCF:	108.4
Optimum Moisture, %:	14.6
Test Method:	ASTM D698
Visual Classification:	Sandy Silt(ML)/Silty Sand(SM)

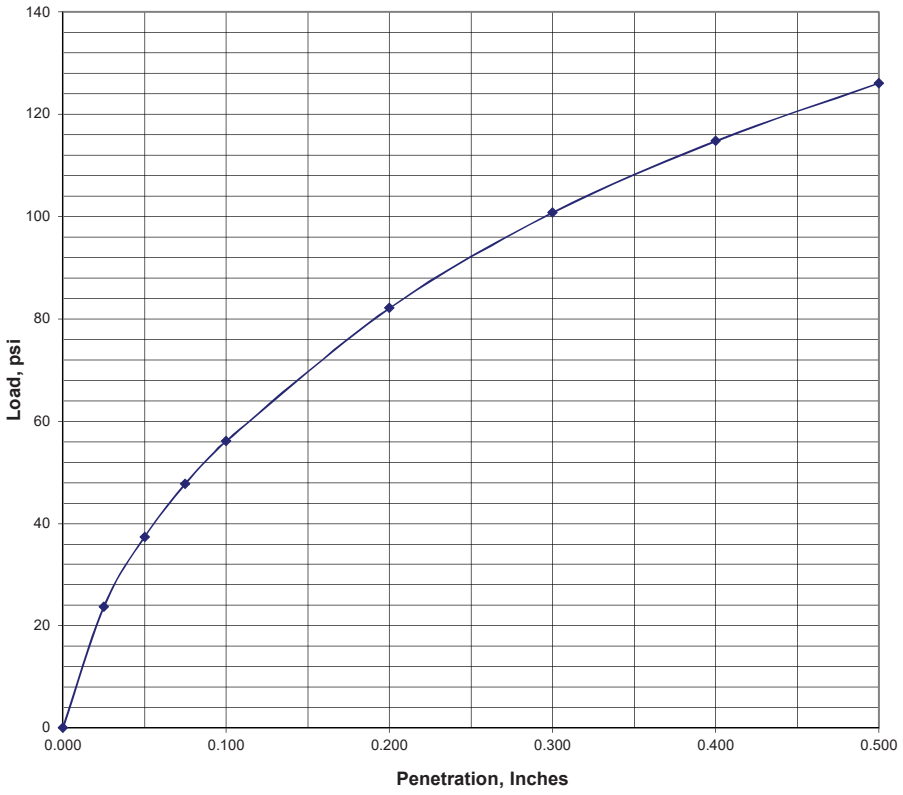
RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Land Design	**Project No:**	G21029
		Date of Report:	3/23/2021
Project Name:	Poly Vista Park	**Sample Location:**	B-1/B-2
Project Location:	Billings, Montana	**Sample Depth:**	1'-3'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	Sandy Silt(ML)/Silty Sand(SM)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	3/5/2021

CALIFORNIA BEARING RATIO

LABORATORY BEARING RATIO (CBR)



% CBR @ 0.1" **5.6**