YELLOWSTONE CO. TASK ORDER NO. 14 – CENTRAL AVENUE AND 48TH STREET WEST INTERSECTION IMPROVEMENTS

Yellowstone County, Montana

Project #21001.14

Intelligent Infrastructure.
Enduring Communities.

JANUARY 2026

sanbell

TABLE OF CONTENTS

INVITATION TO BID
YELLOWSTONE COUNTY, MONTANA
CENTRAL AVENUE AND 48th STREET WEST INTERSECTION IMPROVEMENTS

Yellowstone County will receive sealed bids for the **Central Avenue and 48th Street West Intersection Improvements** project (herein after "project") per the enclosed specifications until **3:00 PM on Monday, February 23, 2026**. All bids must be submitted in triplicate (1 original and 2 copies) to the Board of County Commissioners, P.O. Box 35000, Billings, MT 59107 or delivered to their office in the John V. Ostlund County Administration Building, Room 419, 2825 3rd Avenue North, Billings, MT 59101. Envelopes containing bids must be marked "Central Avenue and 48th Street West Intersection Improvements" in the lower right-hand corner.

All Bids received will be time and date stamped. The time and date stamped on each bid must indicate that it was received no later than 3:00 PM on Monday, February 23, 2026.

All timely bids will be opened and read aloud at 9:00 AM on Tuesday, February 24, 2026, in the Commissioners Board Room, Room 309, located on the third floor of the John V. Ostlund County Administration Building, 2825 3rd Avenue North, Billings, MT 59101. All bids received that are time and date stamped later than 3:00 PM on Monday, February 23, 2026, will not be opened.

The Yellowstone County Public Works Department is currently requesting bids for the Central and 48th Intersection Improvements project. The primary purpose of the project is to construct a signalized intersection and roadway widenings at Central Avenue and 48th Street West. The associated roadway improvements will extend approximately 600 feet along the west and south legs from the center of the intersection, approximately 560 feet along the east leg from the center of the intersection, and approximately 660 feet along the north leg from the center of the intersection. Miscellaneous works include culvert replacement, approach construction, utility coordination, and general milling and filling, and associated widening work.

Bid documents, including any addenda, will be available on the Yellowstone County website at https://www.yellowstonecountymt.gov/purchasing/.

There will be a non-mandatory Pre-Bid Conference held at Sanbell, 1300 N Transtech Way, at 2:00 p.m. on Wednesday, February 11, 2026. Interested CONTRACTORS are encouraged to attend.

All bids must include a bid bond made in favor of Yellowstone County in an amount equal to 10% of the total bid. The security may consist of cash, a cashier's check, a certified check, a bank money order, a certificate of deposit, a money market certificate, or a bank draft. The security must be: a) drawn and issued by a federally chartered or state chartered bank or savings and loan association that is insured by or for which insurance is administered by the Federal Deposit Insurance Corporation; b) drawn and issued by a credit union insured by the National Credit Union Share Insurance Fund c) a bid bond or bonds, original only, no copies, executed by a surety company authorized to do business in the State of Montana. Personal checks, business checks, and facsimiles will not be accepted for bid security.

No bid may be withdrawn prior to sixty (60) days after the scheduled time for receipt of the bids.

Each bidder must have a current Montana Public Contractor's Registration number when submitting their bid. The number must appear on the bid. All subcontractors, if any, must obtain a registration number prior to beginning any work on the project. Bid-only registrations are acceptable for the bidding process.

All contractors and subcontractors performing work pertaining to the construction, reconstruction, or improvement of any public road, street, or intersection, or a bridge construction repair or maintenance project awarded by any government agency, must obtain and maintain a Special Fuel User Permit from the Montana Department of Transportation.

The successful bidder will be required to provide the County with a performance bond and labor and materials bond, both for 100% of the contract amount, within ten (10) days of the execution of the contract and prior to starting any work on the project. The selected Contractor will also be required to provide a copy of their commercial liability insurance certificate and workers compensation coverage prior to beginning the project.

The successful bidder will be required to follow all the directives included in section 18-2-422 of the Montana Code Annotated concerning Montana Prevailing Wages. Those directives are as follows:

(1) the contractor and any subcontractors are required to pay the standard prevailing wage rate, including fringe benefits, for each job classification as stated in the current prevailing wage rate schedules. This information is included in the four (4) prevailing wage rate schedules that are being provided to each bidder as part of this bid package. The current schedules are also available at the State of Montana web-site (https://erd.dli.mt.gov/labor-standards/state-prevailing-wage-rates/). It is the responsibility of the contractors to obtain and use the applicable Wage Rate Schedules.
(2) each contractor and subcontractor is required to maintain payroll records in a manner readily capable of being certified for submission under statute 18-2-423, for not less than three (3) years after the contractor's and subcontractor's completion of work on the project;
(3) each contractor is required to post a statement of all wages and fringe benefits in compliance with statute 18-2-423.

Statute 18-2-423 is as follows: If a complaint is filed with the department alleging noncompliance with 18-2-422, the department may require the project to submit to it certified copies of the payroll records for workers employed on that project. A contractor or a subcontractor shall pay employees receiving an hourly wage on a weekly basis. If a wage violation complaint is filed with the department, the contractor or subcontractor shall provide the employee's payroll records to the department within 5 days of receiving the payroll request from the department.

The successful bidder will be required to give preference to the employment of bona fide Montana residents in the performance of the work on this project.

All state laws pertaining to Resident Bidders, both State and County will be adhered to if applicable.

A 5% retainage fee will be withheld from all progress payments made to the successful bidder. The fee will be returned to the contractor upon completion of the project and acceptance of the project by the County. The successful bidder will be required to pay the State of Montana a sum equal to 1% of the gross receipts from the public contract. The County will withhold this amount and forward it to the State of Montana.

The Contractor must, in performance of work under this contract, fully comply with all applicable federal, state or local laws, rules, regulations, including the Montana Human Rights Act, Civil Rights Act of 1964, the Age Discrimination Act of 1975 and the American with Disabilities Act of 1990. Any subletting or subcontracting by the Contractor subjects subcontractors to the same provisions. In accordance with section 49-3-207, MCA, the Contractor agrees that the hiring of persons to perform the contract will be made on the basis of merit and qualifications and there will be no discrimination based upon race, color, religion, creed, political ideas, sex, age, marital status, physical or mental disability, or national origin by the persons performing under the contract.

Requests for information relating to the bid package (plans and specifications) should be addressed to DJ Clark of Sanbell at (406) 869-3358. Questions concerning the bid procedure may be addressed to Matt Kessler of Yellowstone County at (406) 256-2717.

The Board of County Commissioners may award the project to the lowest and/or the best responsible bidder. The Board reserves the right to reject any or all bids received, to waive informalities to evaluate the bids submitted, and to accept the bid which best serves the interests of Yellowstone County.

Done by order of the Board of County Commissioners of Yellowstone County, MT this 27th day of January 2026.

Board of County Commissioners
Yellowstone County, Montana

_____
Mark Morse, Chair

(Seal)
Attest:

_____
Jeff Martin, Clerk and Recorder

INSURANCE REQUIREMENTS

The successful bidder (herein after "Contractor") shall maintain, at its sole cost and expense, commercial general liability insurance naming Yellowstone County/Yellowstone County Public Works as additional insured for this project against liability for damages for bodily injury, including death and completed operations and property damages in a minimum amount of One Million Dollars ($1,000,000.00) for each occurrence and Two Million Dollars ($2,000,000.00) in the aggregate arising from incidents which occur as the result of Contractors negligence during the project and for which Yellowstone County/Yellowstone County Public Works sole basis of liability is vicarious liability for the acts or omissions of the Contractor or/and subcontractors. Contractor shall maintain for this project, at its cost and expense, insurance against claims for injuries to persons or damages to property, including contractual liability which may arise from or in connection with the project by Contractor, agents, employees, representatives, assigns and sub-contractors. This insurance shall cover claims as may be caused by any negligent act or omission. The policy of insurance shall be an occurrence policy with a Best Rating of A- or better and must be in force throughout the project.

Contractor shall name on the Certificate of Liability Insurance Yellowstone County/Yellowstone County Public Works as additional insured throughout the project. In addition, Contractor will furnish to Yellowstone County a copy of the policy endorsement, CG 32 87 05 10, indicating that Yellowstone County/Yellowstone County Public Works are named as an additional insured under the Contractors insurance policy for this project. Contractor agrees to furnish both the Certificate of Insurance and policy endorsement at least ten (10) days prior to beginning work on the project.

Contractor agrees to defend, indemnify and hold harmless Yellowstone County /Yellowstone County Public Works from and against any and all claims demands, obligations causes of action, lawsuits and all damages and liabilities fines, judgments, costs, (including settlement costs), and expenses associated therewith (including reasonable attorney's fees and disbursements), arising from incidents that occur from the result of Contractor negligence during this project and for which Yellowstone County/Yellowstone County Public Works' sole basis of liability is vicarious liability for the acts or omissions of Contractor. The defense and indemnification obligations under this paragraph of the Invitation to Bid shall not be limited by any assertions or finding that Yellowstone County/Yellowstone County Public Works is liable for any damages by reason of a non-delegable duty.

WORKERS COMPENSATION

Contractor is required to maintain workers compensation insurance, or an independent contractor's exemption issued by the Montana Department of Labor covering Contractor and Contractor's employees. Contractor is not, nor are Contractor's workers, employees of Yellowstone County / Yellowstone County Public Works. Workers Compensation insurance, or the exemption from the workers compensation obligation must be valid for the entire period of the project.

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 assumes 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 OWNER'S 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; (d) has appropriate technical experience; and (e) attended 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 this 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 4.02A of the General Conditions 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 the 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 Hazardous Environmental Conditions 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 exploration, 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 the 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 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 Bidding 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 Site 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 indicated in the Bidding Documents;

H. Correlate 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. 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 of 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 Yellowstone County Public Works and in accordance with BMCC 13-501

ARTICLE 9 - CONTRACT TIMES

9.1 The number of days within which, or at 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 indicated 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 Paragraph 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 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 after 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 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 therefrom 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.

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.

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 acknowledgement 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.

13.12 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 the Contract documents prior to submission of the bid.

13.13 Bidders must be on the official plan holders list and must purchase contract documents.

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 address to the address shown in the Invitation to Bid.

A. The Bid will not be considered unless accompanied by proper Bid Security in accordance with Article 8 of these Instructions 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 - MODIFICATIONS AND WITHDRAWAL OF BIDS

16.1 Bids may be modified or withdrawn by an 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, non-conforming, 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 the 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 at least one fully signed counterpart to Successful BIDDER with a complete set of the Drawings and Specifications.

ARTICLE 22 - STATE LAWS AND REGULATION

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.

22.2 On all projects and contracts with 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

BID SUBMITTAL PACKAGE

CONTRACTOR/ANGENCY NAME

Bid Security Submitted (Circle One): Yes No

Addenda to Acknowledge (Circle One): Yes No

BID BOND

CONTRACTOR INSERT BID BOND HERE AND REMOVE THIS PAGE

PROJECT IDENTIFICATION: 21001.14

TASK NO.14 - Central Avenue and 48th Street West Intersection Improvements

THIS BID SUBMITTED TO:

Yellowstone County Public Works
c/o Sanderson Stewart
1300 N. Transtech Way
Billings, MT 59102

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 limitation 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 the 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 compete 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. Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided, determined as provided in the Contract Documents.

C. The undersigned agrees that the unit prices shall govern in checking the Bid, and should a discrepancy exist in the Total Estimated Price and Total Amount of Unit Prices Bid as listed below after extensions are checked and corrections made, if any, the Total Amount of unit Prices Bid as corrected shall be used in awarding this Contract.

D. The owner reserves the right to reject any or all bids.

SCHEDULE I - CENTRAL & 48TH INTERSECTION IMPROVEMENTS

ALL ITEMS ARE COMPLETE IN PLACE

ITEM NO.	EST. QTY		DESCRIPTION	UNIT PRICE $		TOTAL PRICE $
			GENERAL ITEMS			
101	1	LS	Mobilization/Demobilization	/	LS	=
102	1	LS	Taxes, Bonds, Insurance	/	LS	=
103	1	LS	Traffic Control	/	LS	=
104	1	LS	Stormwater Management and Erosion Control	/	LS	=
105	28	DAY	Changeable Message Boards	/	DAY	=
			DEMOLITION & SURFACE IMPROVEMENTS			
201	1,020	CY	Unclassified Excavation	/	CY	=
202	4,050	CY	Imported Fill	/	CY	=
203	3	EA	Remove Existing Irrigation Culvert	/	EA	=
204	2	EA	Remove Existing Irrigation Concrete Structure	/	EA	=
205	5	EA	Remove Existing Drainage Culvert	/	EA	=
206	4	EA	Remove and Reset Existing Mailbox	/	EA	=
207	5	EA	Remove Trees	/	EA	=
208	1	LS	Remove Misc. Vegetation	/	LS	=
209	4,870	SY	4-inch Asphalt Milling	/	SY	=
210	600	LF	Remove Existing Fence	/	LF	=
211	1	LS	Replace Topsoil	/	LS	=
212	9,280	SY	4-inch Thick Asphalt Concrete Surface Course (Type A Mod, PG70-28)	/	SY	=
213	1,865	CY	3-inch Minus Crushed Subbase Course	/	CY	=
214	926	CY	1.5-inch Minus Crushed Base Course	/	CY	=
215	4,410	SY	Separation Fabric	/	SY	=
216	128	LF	New Barbed Wire Fence	/	LF	=
217	85	LF	New Wooden Split Rail Fence	/	LF	=
218	5	EA	Replacement Trees	/	EA	=
			IRRIGATION IMPROVEMENTS			
301	74	LF	24" Corrugated Metal Pipe	/	LF	=
302	141	LF	28.5"x18" Elliptical RCP	/	LF	=
303	1,150	SF	Tensar NX750 Geogrid	/	SF	=

ITEM NO.	EST. QTY		DESCRIPTION	UNIT PRICE			TOTAL PRICE
				$			$
304	30	CY	Excavatable Controlled Low Strength Material (MDT Mix)		/ CY	=	
305	4	EA	24" CMP FETs		/ EA	=	
306	1	EA	29"x18" Elliptical RC Flared End w/ Trashguard		/ EA	=	
307	1	EA	Water Tight Concrete Connection from 29"x18" RCP to Type III Diversion Box		/ EA	=	
308	50	LF	18" Corrugated Metal Pipe		/ LF	=	
309	4	EA	18" CMP FETs		/ EA	=	
310	439	LF	12" Corrugated Metal Pipe		/ LF	=	
311	18	EA	12" CMP FETs		/ EA	=	
312	1	EA	Type III Diversion Box		/ EA	=	
			SIGNS/STRIPING				
401	23	GAL	Epoxy Striping and Pavements Markings (White)		/ GAL	=	
402	30	GAL	Epoxy Striping and Pavements Markings (Yellow)		/ GAL	=	
403	4	EA	Remove/Reset Existing Sign & Post		/ EA	=	
404	12	EA	Remove Existing Sign(s) & Post		/ EA	=	
405	12	EA	New Sign, Post, & Foundation		/ EA	=	
406	4	EA	New Sign Panel on Mast Arm or Signal Standard		/ EA	=	
			TRAFFIC SIGNAL/ELECTRICAL IMPROVEMENTS				
501	10	LF	2-inch SCH 80 PVC Conduit		/ LF	=	
502	650	LF	3-inch SCH 80 PVC Conduit		/ LF	=	
503	4	EA	Pull Box - Composite Type 3		/ EA	=	
504	20	CY	Structural Concrete Pole Foundations		/ CY	=	
505	150	LF	Cable, Copper, 3AWG20-600V (Emergency Preemt)		/ LF	=	
506	1,000	LF	Cable, Copper, 7AWG14-600V		/ LF	=	
507	30	LF	Conductor, Copper, #6 AWG		/ LF	=	
508	750	LF	Conductor, Copper, #8 AWG		/ LF	=	
509	500.0	LF	Conductor, Copper, #10 AWG		/ LF	=	
510	50	LF	Video Detection Cable (Cat-5E)		/ LF	=	
511	50	LF	Ethernet Radio Communication Cable (Cat-5E)		/ LF	=	

ITEM NO.	EST. QTY		DESCRIPTION	UNIT PRICE			TOTAL PRICE
				$			$
512	4	EA	High Efficacy Luminaire LED		/ EA	=	
513	1	EA	Service Assembly		/ EA	=	
514	12	EA	12"x12"x12" Traffic Signal Indications		/ EA	=	
515	1	EA	Signal Cabinet Pedestal Type P		/ EA	=	
516	1	EA	Signal Controller		/ EA	=	
517	1	EA	Signal Cabinet Type P		/ EA	=	
518	3	EA	Standard Signal Pole w/ 45' Mast Arm (3A)		/ EA	=	
519	1	EA	Standard Signal Pole w/ 40' Mast Arm (3A)		/ EA	=	
520	1	EA	Video Imaging Vehicle Detection System		/ EA	=	
521	2	EA	Emergency Vehicle Preemtion Detector		/ EA	=	
522	1	EA	Ethernet Radio Communication System		/ EA	=	

TOTAL BID PRICE - SCHEDULE I - CENTRAL AND 48TH INTERSECTION IMPROVEMENTS $ _____

(Figures)

TOTAL BID PRICE - SCHEDULE I - CENTRAL AND 48th INTERSECTION IMPROVEMENTS

_____

_____

(Words)

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:

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

Submitted on_____, 2024

Montana Contractor's Registration No. (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 Person Authorized to Sign)

Title: _____

Attest: _____

Phone No.: _____ Fax No.: _____

Business Address: _____

_____

Phone No.: _____ Fax No.: _____

Date of Qualification to do Business _____

_____

(Corporate Seal)

A Joint Venture: Each Joint Venture Must Sign

Joint Venturer Name: _____
(Name, typed or printed)

By: _____
(Signature of Joint Venture Partner)

Name: _____
(Name, typed or printed)

Title: _____

Business Address: _____

_____

Phone No.: _____ Fax No.: _____

Joint Venturer Name: _____
(Name, typed or printed)

By: _____
(Signature of Joint Venture Partner)

Name: _____
(Name, typed or printed)

Title: _____

Business Address: _____

_____

Address of Joint Venture for Receipt of Official Communication:

Phone No.: _____ Fax No.: _____

Address: _____

_____

Phone No.: _____ Fax No.: _____

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

END OF SECTION

AGREEMENT FORM

Standard Form of Agreement
Between Owner and Contractor
on the Basis of a Stipulated Price

Central Avenue and 48th Street West Intersection Improvements

This agreement is dated as of the XXXth day of XXXXXX, 2026, by and between Yellowstone County, Montana (hereinafter called Owner), and XXXXXXX. (hereinafter called Contractor).

Owner and Contractor, in consideration of the material covenants hereinafter set forth, agree as follows:

1. Scope of Work

   Contractor shall provide all labor and material as generally outlined in the Owner's formal Invitation to Bid dated January 27, 2026, and more specifically, as is specified in the contract plans and specifications, all applicable jurisdictional standards and regulations, and based industry-accepted standards of care.

2. Contract Term

   Substantial Completion much be achieved within 50 calendar days after the official Notice to Proceed (NTP) date. Final Completion must be achieved within 30 days after the formal Substantial Completion date.

3. Contract Price

   Owner shall pay the Contractor the amount listed in their Bid Sheet ($XXXXX.XX) dated XXXXX, 2026.

4. Contractors Representation

   4.1 Contractor has examined and reviewed the Contract documents and other related paperwork.

   4.2 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 and furnishing of the work.

   4.3 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.

   4.4 Contractor has given Owner written notice of all conflicts, errors, ambiguities or discrepancies that the Contractor has discovered in the Contract Documents and that the Contract Documents are generally sufficient to indicate and convey the understanding of all terms and conditions for performance and furnishings of the work.

5. Contract Documents

The Contract Documents, which comprise the entire agreement between Owner and Contractor, consist of the following:

5.1 This Agreement.

5.2 The Owner's Invitation to Bid.

5.3 The Contractor's Bid Sheet dated XXXXX, 2026.

5.4 The Contractor's current Certificate of Insurance and Workers Compensation Coverage.

6. Miscellaneous

6.1 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 become due and moneys that are due may not be assigned without written 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 discharge the assignor from any duty or responsibility under the Contract Documents.

6.2 The successful bidder (herein after Contractor),shall maintain at its sole cost and expense, commercial general liability insurance naming Yellowstone County/ Public Works, as additional insured against liability for damages for bodily injury, including death and completed operations and property damages in a minimum amount of Seven Hundred Fifty Thousand Dollars ($750,000.00) for each claim and One Million Five Hundred Thousand Dollars , ($1,500,000.00), in the aggregate arising from incidents which occur as the result of Contractors negligence while performing any work or service and for which Yellowstone County / Public Works, sole basis of liability is vicarious liability for the acts or omissions of the Contractor or/and subcontractors. Contractor shall maintain at its cost and expense, insurance against claims for injuries to persons or damages to property, including contractual liability which may arise from or in connection with work or service by Contractor, agents, employees, representatives, assigns and sub-contractors. This insurance shall cover claims as may be caused by any negligent act or omission. The policy of insurance shall be an occurrence policy with a Best Rating of A- or better and must be in force throughout the period.

Contractor shall name on the Certificate of liability insurance Yellowstone County / Public Works as additional insured for on-site work or Maintenance Service. In addition, Contractor will furnish to Yellowstone County a copy of the policy endorsement, CG 32 87 05 10, indicating that Yellowstone County / Public Works, are named as an additional insured under the Contractors insurance policy.

Contractor agrees to furnish both the Certificate of insurance and policy endorsement at least ten (10) days prior to beginning work.

Contractor agrees to defend, indemnify and hold harmless Yellowstone County / Public Works from and against any and all claims demands, obligations, causes of action, lawsuits and all damages and liabilities, fines, judgments, costs, (including settlement costs), and expenses associated therewith (including reasonable attorney's fees and disbursements), arising from incidents that occur as a result of Contractor negligence and for which Yellowstone County / Public Works' sole basis of liability is vicarious liability for the acts or omissions of Contractor. The defense and indemnification obligations under this paragraph of the Agreement Form shall not be limited by any assertions or finding that Yellowstone County / Public Works is liable for any damages by reason of a non-delegable duty.

6.3 Contractor is required to maintain workers compensation insurance or an independent contractor's exemption issued by the Montana Department of Labor covering Contractor and Contractor's employees. Contractor and Contractor's workers are not employees of Yellowstone County / Public Works. Workers Compensation insurance, or the exemption from the workers compensation obligation, must be valid for the entire period.

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

6.5 Contractor must give preference to the employment of bona fide residents of Montana in the performance of this work.

6.6 All work and materials must be warrantied for a period of one (1) year from date of installation. Date of installation shall be the date of award of substantial completion for all items deemed to have been satisfactorily completed prior to the award of substantial completion. For any outstanding items installed or repaired after substantial completion, the date of installation shall be the date of award of final completion.

6.7 The Parties agree that the laws of the State of Montana shall govern this contract, and that the venue shall be in the Thirteenth Judicial District Court, Yellowstone County, Montana

6.8 Contractor agrees to defend, indemnify and hold harmless the County against all claims for injuries to person or damages to property occurred from or in Connection with the Contractors performance under the Agreement.

6.9 In the event of litigation between Contractor and the County, the Prevailing party shall be entitled to reimbursement of Court costs and Reasonable Attorney fees by the non-prevailing party.

7.0 The Contractor must, in performance of work under this contract, fully comply

with all applicable federal, state or local laws, rules, regulations, including the Montana Human Rights Act, Civil Rights Act of 1964, The Age Discrimination Act of 1975 and the American with Disabilities Act of 1990. Any subletting or subcontracting by the Contractor subjects contractors to the same provisions. In accordance with section 49-3-207, MCA, the Contractor agrees that the hiring of persons to perform the contract will be made on the basis of merit and qualification and there will be no discrimination based upon race, color, religion, creed, political ideas, sex, age, marital status, physical or mental disability, or national origin by the person performing under the contract.

8.0 Termination

This Agreement shall terminate in its entirety in accordance with the terms found in paragraph 2. However, either party may terminate this contract on thirty (30 calendar days written notice, or if prior to such action, the other party materially breaches any of its representations or obligations under this Agreement. Except as may be otherwise provided in this Agreement, such breach by either party will result in the other party being responsible to reimburse the non-defaulting party for all costs incurred directly as a result of the breach of this Agreement and shall be subject to such damages as may be allowed by law including attorneys' fees and costs of enforcing this Agreement.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in duplicate. One counterpart each will be delivered to OWNER and CONTRACTOR. All portions of the Contract Documents have been signed, initialed or identified by OWNER and CONTRACTOR.

This Agreement will be effective March _____ 2026.

OWNER:	CONTRACTOR:
Yellowstone County Billings, MT 59101	XXXXXXXX XXXXXXXX
_____	_____
Mark Morse BOCC Chair	Authorized Representative

Attest:

Jeff Martin_____
Clerk & Recorder

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*):

CONTRACT

Effective Date of Agreement:
Amount:
Description *(Name and Location)*:

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*):

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*):

CONTRACT

Effective Date of Agreement:
Amount:
Description (*Name and Location*):

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	**SURETY**
_____ (Seal)	_____ (Seal)
Contractor'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: 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*):

MONTANA PREVAILING WAGE RATES

MONTANA
PREVAILING WAGE RATES FOR HIGHWAY CONSTRUCTION SERVICES 2025

Effective: *July 1, 2025*

Note: These are revised 2025 rates and supersede the rates that were published on January 11, 2025

Greg Gianforte, Governor
State of Montana

Sarah Swanson, 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 ESD at erd.dli.mt.gov/labor-standards or contact:

Employment Standards Division
Montana Department of Labor and Industry
P. O. Box 8011
Helena, MT 59604
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.

SARAH SWANSON
Commissioner
Department of Labor and Industry
State of Montana

TABLE OF CONTENTS

MONTANA PREVAILING WAGE REQUIREMENTS:

WAGE RATES:

A. Date of Publication January 13, 2025

B. Definition of Highway Construction

The Administrative Rules of Montana (ARM), 24.17.501(3) – (3)(b), states *"Highway construction projects include, but are not limited to, the construction, alteration, or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, and parking areas, bridges constructed or repaired in conjunction with highway work, and other similar projects not incidental to building construction or heavy construction.*

Highway construction projects include, but are not limited to, alleys, base courses, bituminous treatments, bridle paths, concrete pavement, curbs, excavation and embankment (for road construction), fencing (highway), grade crossing elimination (overpasses or underpasses), guard rails on highways, highway signs, highway bridges (overpasses, underpasses, grade separation), medians, parking lots, parkways, resurfacing streets and highways, roadbeds, roadways, runways, shoulders, stabilizing courses, storm sewers incidental to road construction, street paving, surface courses, taxiways, and trails."

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 Highway 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, Heavy Construction and Nonconstruction Services occupations can be found on the internet at https://erd.dli.mt.gov/labor-standards/state-prevailing-wage-rates/ 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 18-2-418, 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.

WAGE RATES

BRICK, BLOCK, AND STONE MASONS

No Rate Established

Travel:
No Travel Pay Established

↑ Back to Table of Contents

CARPENTERS

Wage	Benefit
$36.49	$14.33

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

Wage	Benefit
$33.41	$16.51

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:
0-30 mi free zone
30-60 mi base pay+2.95/hr.
>60 mi base pay+4.75/hr

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 1

Wage	Benefit
$32.47	$12.77

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, Heavy Duty Drills; Herman Nelson Heater; Mucking Machine; Oiler, All Except Cranes/Shovels; Pumpman.

Zone Pay:
No zone pay established.

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 2

Wage	Benefit
$35.70	$12.77

Zone Pay:
No zone pay established.

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

↕ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 3

Wage	Benefit
$35.70	$12.77

Zone Pay:
No zone pay established.

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 Haul Truck, Articulating Trucks, Vac Truck.

↕ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 4

Wage	Benefit
$36.91	$12.77

Zone Pay:
No zone pay established.

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.

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 5

Wage	Benefit
$38.05	$12.77

Zone Pay:
No zone pay established.

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

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 6

Wage	Benefit
$39.27	$12.77

Zone Pay:
No zone pay established.

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

↑ Back to Table of Contents

CONSTRUCTION EQUIPMENT OPERATORS GROUP 7

Wage	Benefit
$41.95	$12.77

Zone Pay:
No zone pay established.

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.

↑ Back to Table of Contents

CONSTRUCTION LABORERS GROUP 1/FLAG PERSON FOR TRAFFIC CONTROL

Wage	Benefit
$27.71	$12.80

Zone Pay:
No zone pay established.

↑ Back to Table of Contents

CONSTRUCTION LABORERS GROUP 2

Wage	Benefit
$30.87	$12.36

Zone Pay:
No zone pay established.

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.

↑ Back to Table of Contents

CONSTRUCTION LABORERS GROUP 3

Wage	Benefit
$31.10	$12.36

Zone Pay:
No zone pay established.

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.

↑ Back to Table of Contents

CONSTRUCTION LABORERS GROUP 4

Wage	Benefit
$32.12	$12.36

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:
No zone pay established.

↑ Back to Table of Contents

DIVERS

	Wage	Benefit
Stand-By	$46.33	$18.38
Diving	$92.66	$18.38

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

DIVER TENDERS

Wage	Benefit
$45.30	$18.38

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

ELECTRICIANS

Wage	Benefit
$39.08	$20.00

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.

Per Diem
District 4
>60 mi. $80.00/day
Per Diem in Big Sky and West Yellowstone $125/day.

↕ Back to Table of Contents

IRONWORKERS – REINFORCING IRON AND REBAR WORKERS

Wage	Benefit
$34.83	$25.37

Duties Include:
Structural steel erection; assemble prefabricated metal buildings; cut, bend, tie, and place rebar; energy producing windmill type towers; metal bleacher seating; handrail fabrication and ornamental steel.

Travel:
All Districts
0-45 mi. free zone
>45-85 mi. $100.00/day
>85 mi. $150.00/day

↑ Back to Table of Contents

IRONWORKERS – STRUCTURAL IRON AND STEEL WORKERS

Wage	Benefit
$30.43	$25.22

Duties Include:
Structural steel erection; assemble prefabricated metal buildings; cut, bend, tie, and place rebar; energy producing windmill type towers; metal bleacher seating; handrail fabrication and ornamental steel.

Travel:
All Districts
0-45 mi. free zone
>45-85 mi. $100.00/day
>85 mi. $150.00/day

LINE CONSTRUCTION – EQUIPMENT OPERATORS

Wage	Benefit
$38.38	$18.60

Duties Include:
All work on substations

Travel:
No Free Zone
$60.00/day

↑ Back to Table of Contents

LINE CONSTRUCTION – GROUNDMAN

Wage	Benefit
$29.96	$17.64

Duties Include:
All work on substations

Travel:
No Free Zone
$60.00/day

↑ Back to Table of Contents

LINE CONSTRUCTION – LINEMAN

Wage	Benefit
$50.11	$19.88

Duties Include:
All work on substations

Travel:
No Free Zone
$60.00/day

↑ Back to Table of Contents

MILLWRIGHTS

Wage	Benefit
$40.45	$21.25

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
$36.00	$12.84

Zone Pay:
No zone pay established.

↑ Back to Table of Contents

PILE BUCKS

Wage	Benefit
$36.49	$14.33

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

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.

↑ Back to Table of Contents

TRUCK DRIVERS

	Wage	Benefit
Pilot Car Driver	$28.21	$12.57
Truck Driver	$35.74	$12.57

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:
No zone pay established.

↑ Back to Table of Contents

SPECIAL PROVISIONS

PROJECT ADMINISTRATION

SP-1 FORMAT

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

Document	*Available From*
Montana Public Works Standard Specifications (MPWSS) Sixth Edition, April 2010	Montana Contractors Association 1717 11th Avenue PO Box 4519 Helena, MT 59604 406-442-4162
City of Billings Standard Modifications to MPWSS Sixth Edition, January 2021	City of Billings Public Works Department Engineering Division 2224 Montana Avenue Billings, MT 59101 406-657-8231 *– or online at –* https://www.billingsmtpublicworks.gov/DocumentCenter/View/105/Standard-Mods-January-2021-PDF

The following Special Provisions include additional requirements that are specific to this project. In case of a conflict, defer to the Special Provisions, followed by the City of Billings Standard Modifications (Standard Mods) to Montana Public Works Standards Specifications, Sixth Edition (MPWSS), and finally MPWSS.

SP-2 PROJECT DESCRIPTION

This project shall consist of the installation of culverts, street lighting, a traffic signal, and reconstruction of the roadway (combination of full reconstruction and mill and overlay) to widen the road at the intersection of 48th Street West and Central Avenue for installation of left-turn lanes on all four (4) intersection approaches.

SP-3 PLANS/SPECIFICATIONS

The Contract Drawings consist of **26** sheets that bear the following general title: **Yellowstone Co. Task Order 14: Central Avenue and 48th Street West Intersection Improvements.**

Contractor shall construct project only using plan sheets marked “Issued for Construction.”

Montana Prevailing wage rates for Highway Construction shall be used for all work. Highway Construction wage rates are included in this contract.

SP-4 CONTRACT & SCHEDULING

One (1) contract will be awarded for this project with all bid items contained in one (1) bid schedule.

The contract time allowed for this project from the date that contract time commences (Notice to Proceed) to the date of Substantial Completion is **50 calendar days**. Unless otherwise noted hereinafter, Final Completion of all work not required for Substantial Completion (see next SP) shall occur within **30 calendar days** after the date of Substantial Completion.

Due to the anticipated long lead time for traffic signal poles, mast arms, and controller cabinets, the installation of those items and any traffic signal installation that would typically occur after installation of these items will not be required to achieve Substantial Completion. Instead, final electrical improvements must be installed and fully operational by **September 30, 2026**.

SP-5 SUBSTANTIAL COMPLETION

It is the responsibility of the Contractor to initially request the granting of Substantial Completion at a point in the project when it considers the project to be ready for its intended use. The date of Substantial Completion will generally be determined by the Engineer upon completion of (at a minimum, but not necessarily limited to) the following major project components:

1. Installation, including successful completion of testing and acceptance for all culverts, division boxes, and other infrastructure associated with irrigation ditch and borrow (roadway drainage) ditch improvements.
2. Installation, successful completion of testing, and acceptance of all asphalt, concrete, and gravel surface improvements;
3. Installation of traffic signal pole foundations, pull boxes, and electrical conduits; installation of wiring is NOT required for Substantial Completion and should be delayed until the time when all, final electrical improvements can be installed;
4. Installation of permanent pavement markings; and
5. Installation of all signs (except for the signs to be installed on signal poles or mast arms). This includes temporary stop signs if the electrical improvements are not installed and functional.

The Engineer reserves the right to withhold the determination of Substantial Completion if there are questions that persist about completion or quality of improvements.

SP-6 CONSTRUCTION STAKING

A. The Engineer will set construction stakes to give the Contractor measurements, lines, locations, and grades necessary for construction. Work shall be performed

in conformity with these stakes. The Contractor shall protect all benchmarks and reference stakes including construction stakes, from damage or removal. Stakes destroyed or removed by the Contractor will be replaced by the Engineer at the Contractor's expense. Actual cost to the Engineer for replacement will be billed to the Owner and shall then be deducted from payments due the Contractor.

B. The Contractor shall notify the Engineer in writing, with all staking requests. These requests shall be made 72 hours in advance.

C. If Contractor believes a stake is incorrect, Contractor shall immediately notify Engineer. Stakes shall be left in the ground for verification of error. If stakes are removed, Engineer will not be responsible for verifying staking and or utility or surface improvements installation. Contractor is ultimately responsible for verifying that a stake conforms to the plans and is ultimately responsible for verifying that all utility and surface improvements are in conformance to the plans and within the right-of-way in accordance with this special provision.

SP-7 CONTRACTOR WORK HOURS

The schedule for this project has been figured based on the Contractor working five (5) days per week (Monday through Friday, excluding legal holidays) and ten (10) hours per day. Should the Contractor and/or Contractor's subcontractor(s) desire to work during other than the above-referenced hours, approval to do so must be obtained from the Engineer. If the additional work hours result in costs above and beyond the Engineer's contract fees, the actual cost of the additional Engineer's services will be the responsibility of the Contractor and will be deducted from the Contractor's application for payment. These costs shall not be considered a part of the liquidated damages. Listed below is the applied rate schedule in the event the Engineer is due additional compensation.

Hourly Fee Schedule

Staff Personnel Services		
Staff Engineer II	=	$ 130.00
Project Engineer II	=	$ 160.00
Principal	=	$ 250.00
Inspector	=	$ 150.00
Surveyor	=	$ 130.00

No work shall be done outside the hours specified above, nor on Saturdays, Sundays, or legal holidays, without the written approval of the Owner or unless otherwise specified herein. However, work necessary in case of emergencies or for the protection of equipment or finished work may be done without the Owner's approval.

SP-8 GEOTECHNICAL REPORT

A geotechnical investigation was performed, and a summary report was prepared by SK Geotechnical that provides analysis and recommendations for this project. Recommendations in

that report shall be considered as part and parcel to these specifications unless otherwise noted. For the Contractor's reference, the report has been included as a section of the Project Book.

SP-9 STORMWATER MANAGEMENT AND EROSION CONTROL

The Contractor shall make note that this project will be subject to Montana Department of Environmental Quality Storm Water General Discharge Permit authorization if the total area of disturbance is more than one acre. All Storm Water Management and Erosion Control shall comply with the requirements set forth in the General Permit for Storm Water Discharges Associated with Construction Activity which can be obtained from MDEQ at:
http://deq.mt.gov/wqinfo/mpdes/stormwaterconstruction.mcpx

SP-10 TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS

General Requirements

All traffic control plans and procedures shall follow the requirements of the current edition of the Montana Public Works Standard Specifications (MPWSS) except where otherwise specified herein. Traffic control will be accomplished and paid for in accordance with Section 01570 of the MPWSS. The lump sum bid item for traffic control shall include all necessary signage, temporary striping, barriers, temporary gravel, flagging personnel and other temporary infrastructure as shown on the traffic control plans, as described in these special provisions and as otherwise necessary to accomplish traffic control for all required work with the exception of Changeable Message Sign (CMS) applications, which shall be bid separately so that adjustments can be made reasonably for number of applications and length of time.

Alternative traffic control plans and procedures as submitted by the Contractor will be considered for approval if it can be demonstrated that they would provide equal or improved maintenance of traffic, access, and safety when compared to the approach/requirements of this special provision. However, the Contractor is advised to bid according to the contract documents and schedule as provided herein since the acceptability of alternate plans/procedures will be at the discretion of the County and the Engineer. No guarantees are implied herein for alternative assumptions made for bidding purposes.

Schedule/Closures

The Contractor will be allowed to close the Central Avenue/48th Street West intersection for the entire (Spring/Summer of 2026) duration of the contract (from NTP to Substantial Completion). Signed detour routes that direct traffic to King Avenue West via Shiloh Road and 56th Street West must be provided during all roadway closures (see specific requirements below). Local residential access for homeowners, businesses, and essential services such as mail and package delivery and garbage/recycling collection MUST be always provided for.

Traffic Control and Detour Requirements

Four (4) changeable message signs (CMS), two (2) of which that read "CENTRAL AVE CLOSED AT 48TH ST" and two (2) of which that read "48TH ST CLOSED AT CENTRAL AVE," and that also provide the start date and expected duration of the closure must be installed a minimum of five (5) business days prior to the closure of the intersection.. The "CENTRAL AVE CLOSED . . . " CMS

shall be placed on Central Avenue, immediately west of Shiloh Road (facing east), and immediately east of 56th Street West (facing west). The "48TH ST CLOSED . . . " CMS shall be placed on 48th Street West, immediately north of King Avenue West (facing south) and immediately south of Grand Avenue (facing north). At the start of the intersection closure, the CMS may be removed and replaced with four (4) static signs that provide the same information as provided on the CMS. The static signs shall be placed in the same locations as the CMS. The static signs shall be maintained in those locations throughout the intersection closure. The detour routes must also be signed using standard, MUTCD-compliant signage to communicate detour route turns at major intersections (Shiloh & Central, Shiloh & King, 56th & Central, and 56th & King). The Contractor shall submit a detailed traffic control plan to be reviewed by the Engineer and approved by the County. The plan must be submitted for review a minimum of two (2) weeks prior to the planned start date for the intersection closure.

If additional roadway, intersection, or lane closures are needed for the traffic signal installation work that is to be completed after Substantial Completion, the Contractor shall re-submit traffic control plans accordingly with detailed information about the type and duration of closures. Additional use of CMS may be required.

SP-11 LIMITS OF CONSTRUCTION

The Contractor is required to confine construction activities to within the public right-of-way, public easements, and designated City and County-owned utility right-of-way.

Unless specifically designated for removal, all trees and other existing features located in or adjacent to easements and rights-of-way shall not be touched, damaged, trimmed, or injured. All restoration outside the limits of the construction areas shall be at the Contractor's expense.

INVESTIGATIVE WORK

SP-12 PRIVATE UTILITIES COORDINATION

The Contractor shall coordinate operations with Montana-Dakota Utilities Company, Northwestern Energy, Yellowstone Valley Electric Cooperative, Lumen (formerly Centurylink), AT&T, Spectrum, TCT, TDS, Vision Net, and other utility owners for the moving, crossing, support or reinstallation of services, poles, lines, and all related appurtenances.

Contract information for known providers is listed below. However, it is the responsibility of the Contractor to verify ownership of facilities and contact responsible parties listed whether listed herein or not.

MDU – Justin Fenton, justin.fenton@mdu.com
Northwestern Energy – Taylor Erskine, (406) 655-2539, taylor.erskine@northwestern.com
Lumen (formerly Centurylink) – Nicholas Dyce, (406) 417-3257, nicholas.dyce@lumen.com
AT&T – Gary Donovan, (406) 256-6607, gd0521@att.com
Spectrum – Eric Fitzgerald, eric.fitzgerald@charter.com
TDS Telecom – Robert Webb, (406)850-4078, Robert.webb@tdstelecom.com
Vision Net – Art Anderson, (406)690-5027, art.anderson@vision.net

SP-13 ABANDONED UTILITIES

Abandoned underground installations such as water mains, gas mains, sanitary sewers, storm drains, storm laterals, and storm manholes, telephone lines, power lines, and buried structures relating to these utilities in the vicinity of the work shall be expected. Contractor shall notify utility owner prior to removal of an abandoned utility to receive permission. All work associated with abandoned utilities, including removal and disposal, is considered incidental to the project and no additional payment shall be made.

GENERAL UTILITY ITEMS

SP-14 FLOWABLE FILL

Flowable fill shall be installed above utility crossings where standard subgrade preparation (8" or less from subgrade) cannot be completed, or as directed by the Engineer. In addition, when crossing under or over dry utilities where it is not possible to get compaction equipment between the existing utilities and new pipe or the necessary required clearances, the Contractor shall use flowable fill in lieu of the specified bedding gravels or trench backfill. This item is intended to be used as a "diggable" solid separation layer between utilities where clearances cannot be met. Flowable fill shall be placed 6" vertically above and below the excavated utility and shall be placed 18" horizontally from the outside of the utility.

SP-15 GAS MAIN DRESSER COUPLINGS

The Contractor is to contact a natural gas company field representative when they expose dresser couplings on the gas line and identify and mark their location.

SP-16 IRRIGATION DITCHES

There are active irrigation ditches within the project area. It is anticipated that all culvert replacements impacting irrigation will be completed prior to irrigation turn-on (typically around April 15). The re-routing of lateral irrigation ditches may or may not also be completed prior to irrigation turn-on. However, the Contractor is responsible for ensuring that all in-service irrigation ditches remain functional, at all times, unless an interruption to service is approved by ALL upstream or downstream impacted land owner(s) AND (If applicable) tenant farmer(s).

SURFACE IMPROVEMENTS

SP-17 RECYCLED ASPHALT MILLINGS

As a cost reduction measure, asphalt millings may be utilized in the subbase section. If used, millings must be thoroughly mixed with the 3-inch minus subbase course, and the blend must not contain more than 50% millings. There will be no separate or additional payment to the contractor for using millings as part of the sub-base. Any millings not used for sub-base installation shall be stockpiled and delivered to Yellowstone County gravel pit (near 6720 Laurel Airport Road). Contractor to coordinate delivery of millings with Andy Dean (406/208-9077).

SP-18 ASPHALT PAVING
The 4-inch asphalt pavement section must be installed in two 2-inch lifts. The use of a leveling ski and 6 to 8-inch slope shoe at the centerline and shoulder will be required.

SIGNS/STRIPING

See *Technical Specifications* for guidance on requirements for installation of pavement markings.

SP-19 SIGNS, SIGN POSTS, AND UTILITY POLES
Any existing signs, sign posts, and utility poles that are determined to be in the path of the work but are not designed in the contract documents for removal, reset, or replacement shall be temporarily removed, stored in a secure location, and later replaced in their previous location unless otherwise specified in the contract plans. The conditions of MPWSS Section 02114 shall apply to this section with the exception that there shall be no separate measurement and payment for this item. Signs, posts, and associated hardware that are designated for removal or replacement shall be disposed of properly by the Contractor, with all associated costs being incidental to the project.

STREET LIGHTING/TRAFFIC SIGNAL

See *Technical Specifications*

LANDSCAPE

SP-20 LANDSCAPE SURFACE RESTORATION
Landscape features consisting of grass (including native grass and sod) and landscape rock or much that are disturbed on private property or in the public right-of-way shall be restored to original or better condition unless otherwise directed in the plans or by the Engineer. Trees, shrubs, and other landscape elements not specifically referenced herein will not be replaced unless specifically referenced in the contract plans. Payment for landscape surface restoration shall made using associated bid items.

SP-21 REPLACEMENT TREES
Replacement trees shall be 2" caliper minimum Ivory Silk Japanese Lilac (Syringa reticulata 'Ivory Silk', single-stem) trees. All trees shall conform to the American National Standards Institute (ANSI) Z60.1. All trees must be free of insects, diseases, mechanical injuries, and other objectionable features at the time of planting. Location of replacement trees shall not interfere with utilities, easements, fire hydrants, or sight triangles. Contractor to follow the tree planting guidelines provided by the City of Billings Forestry Department or standard tree planting guidelines.

TECHNICAL SPECIFICATIONS

Technical specifications have been included in the Contract Documents and are incorporated by reference. The attached technical specifications shall be considered a part of these Special Provisions in determining precedence of the Contract Documents. Technical specifications are included for the following:

Section 02581 – Pavement Markings and Markers
Section 02584 – Electrical Specifications

EXPLANATION OF BID ITEMS (MEASUREMENT AND PAYMENT)

The following narratives are intended to clarify the scope of certain Bid Items but are to be considered supplemental to the rest of the Contract Documents and not necessarily all inclusive of items, which must be completed for payment of each Bid Item.

In some cases, additional quantities of items may be added to the actual takeoff quantities from the plans to account for unknown underground conditions such as additional water services, curb stops, pipe bends, flowable fill backfill, underground utility crossings and surface restoration quantities.

Unclassified Excavation. This item shall be measured and paid for on a per cubic yard (CY) basis matching the specifications outlined in MPWSS Section 02230. except as modified herein. Included in this item are removal and disposal of existing hard surfacing items as shown on the plans. All placement of fill as required for the project shall be considered as incidental to the unclassified excavation bid item. All excess materials generated from excavation work not re-used as part of the construction work shall be hauled off-site and disposed of properly as work that is also incidental to the project.

Measurement shall be per the lines and grades shown on the plans and shall be calculated by the neat line method from existing surface to the top of subgrade. This item is only used for excavation within the roadway extents as all other excavation is included is other bid items per City of Billings Standard Modifications.

END OF SECTION

TECHNICAL SPECIFICATIONS

SECTION 02581
PAVEMENT MARKINGS AND MARKERS

EPOXY PAVEMENT MARKINGS

A. DESCRIPTION

This work consists of surface preparation, furnishing, and applying epoxy pavement lines, words, and symbols shown in the Contract or directed by the Engineer.

B. MATERIALS

Use a two component 100 percent solids epoxy material. No fillers or pigment extenders are permitted in the material. Follow the manufacturer's mixing ratio when mixing the two components. Mix the components within ± 2.5 percent of the manufacturer's recommended mix ratio. Ensure the components, when combined, do not contain or produce volatile solvents.

Use resin/pigment component meeting the following requirements:

RESIN / PIGMENT COMPONENT (% BY WEIGHT) PIGMENT	WHITE	YELLOW
TiO2, meeting ASTM D-476, Type II	18-25	12-17
Organic Yellow		7-9
Epoxy Resin	75-82	74-82

Test the epoxy content of the epoxy resin following ASTM D 1652 and calculate as the weight per epoxy equivalent (WPE) for both white and yellow. Determine the epoxy content on a pigment free basis. The accepted epoxy content range (WPE) is ± 50 of the manufacturer's target value.

Ensure the activator/curing agent meets the following requirements:

1. Test the amine value under ASTM D 2074.
2. Ensure the total amine value meets the manufacturer's target value with the acceptance range being ± 50 of the target value.

Hardness: Ensure the epoxy has a Shore D hardness of between 75 and 100 when tested under ASTM D 2240.

Tensile Strength: Ensure the epoxy meets a minimum 6,000-psi (42 MPa) tensile

strength per ASTM D 8638.

Compressive Strength: Epoxy shall meet a minimum compressive strength of 12,000 psi (83MPa), using a maximum compression rate of 1/4-inch (6.38 mm) per minute with the sample measuring 1/2-inch (12.7 mm) high by 1/2-inch (12.7 mm) in diameter.

Color: White is to match Federal color chip # 37875. Colorimeter readings may be taken on the white portion of a Leneta form 5c if requested by the Owner. Color Coordinates are Y =79.80, x = 0.3136, y = 0.3244. A ± 6 percent tolerance applies to the coordinates. Yellow is to match Federal color chip # 595B-33538. Colorimeter readings may be taken on the white portion of a Leneta form 5c if requested by the Owner. Color coordinates are Y = 48.32, x =0.4851, y = .4455. A ± 6 percent tolerance applies to the coordinates.

Viscosity: Ensure the individual components viscosity is within ten percent of each other at the recommended spray temperature and that the activator/curing agent has a constant viscosity at the manufacturer's recommended spray temperature.
Mixing and Application: Mix and apply the components following all of the manufacturer's recommendations.

Packaging and Storage: Transport and store the epoxy marking material at the project in the manufacturer's original container. Follow the manufacturer's instructions for material storage and handling. Ensure each container is marked identifying the color, batch or lot number, manufacturer's name, address, and date of manufacture.

Material Acceptance: Furnish a manufacturer's certification that has a certified copy of a laboratory report listing the results of the specified tests and certifying that the materials furnished meet the specifications. Refer to the applicable specification in the certification.

Glass Beads: Provide glass beads for reflectorizing traffic pavement markings that are spherical, transparent, have a smooth, lustrous surface and meet the pavement marking manufacturer's recommendations. Ensure the delivered beads are free from extraneous material and bead clumps easily break up while handling and distributing onto the stripe. Ensure the glass beads do not contain more than 20 percent irregularly shaped particles when tested under ASTM D 1155. Ensure the glass beads do not impart a noticeable daytime hue to white pavement markings. Ensure the beads can withstand refluxing in distilled water in a Soxhlet extractor for 90 hours without noticeable dulling of the surface luster and not more than 2.5 percent loss in weight.

Glass Beads shall meet the following gradations, tested using ASTM D-1214

REFLECTIVE GLASS BEAD GRADATION SIEVE NUMBER	PERCENT PASSING
20 (0.850 mm)	100
30 (0.600 mm)	75-95
50 (0.300 mm)	15-35
100 (0.150 mm)	0-5

C. CONSTRUCTION REQUIREMENTS

Furnish a manufacturer's material certification or data sheet for the product to be used. Do not apply materials that do not meet the contract requirements.

Apply the markings to within ± 1/4 inch (6 mm) of the specified width. Apply the centerline and shoulder lines within 0.30 feet (90 mm) of the true line. Ensure the stripe does not deviate by more than 0.15 foot (50 mm) in 500 feet (150 m). Apply all other markings (words, symbols, stop bars, crosswalks, hash marks, and others) within 0.25 feet (75 mm). Apply words, symbols, letters, and/or numeral pavement markings free of gaps and fully solid. Remove and replace out of specification pavement markings as directed by the Owner at the Contractor's expense.

Use equipment manufactured to apply the material type. Ensure the equipment prevents paint spray or bead loss outside the specified line width. Equip the pavement-marking machine with a flow meter and totalizer that measures paint quantities in gallons (liters), to the nearest 0.1 gallon (0.1 L). Calibrate the flow meter before use on the project and when directed. Locate the flow meter in the flow line to the spray nozzles. Locate the totalizer where it can be easily read. Stop bars, crosswalks, and words/symbols may be applied with hand-operated equipment.

Prepare the surface to be painted meeting the paint manufacturer's recommendations. Remove loose material by sweeping and brooming no more than two days before striping.

Contractor is responsible for all striping layouts. Approval of the preliminary layout is required prior to installation of final striping. Contact Dakota Martonen (406-237-6289)

for striping layout approval. A notice of at least one workday is required on request for approval.

Apply the material following the manufacturer's recommendations. Apply pavement markings during daylight hours only.

Apply final pavement markings a minimum of 30 calendar days, and a maximum of 45 calendar days, after final asphalt lifts are completed. When final pavement markings are the only remaining item of work on the project, contract time assessment will be suspended until either, beginning final pavement markings application, or 45 calendar days elapse after final asphalt lifts are completed. The Owner may extend the 45 days due to holidays or inclement weather that prevent the application of final pavement markings.

Apply a 20-mil ± 2 mil (0.508 mm ± 0.051 mm) thick wet film immediately followed by applying at least 25 lbs/gallon (3 kg/L) of glass beads to the epoxy. Ensure application equipment accurately meters the two components and produces and maintains the mixing head temperature, all meeting the epoxy manufacturer's specifications. Immediately terminate striping application if the applied stripe(s) are less than 18 mils thick. The Owner will identify deficient stripe thickness by comparing the tank quantities measured and used against the length, width, and application rate of the applied stripe.

Apply the pavement marking material when the pavement is dry and the ambient temperature is 40 °F (4.4 °C) and rising or follow the manufactures surface and temperature requirements, whichever is more restrictive.

D. MEASUREMENT AND PAYMENT

All pavement markings shall be measured for payment on a gallon basis for actual material used.

Price and payment are full compensation for all labor, equipment, tools, materials, and incidentals necessary to complete these items.

SECTION 02584
ELECTRICAL SPECIFICATIONS

A. General

All materials supplied by the Contractor shall be new. All improvements and equipment disturbed, damaged, or removed in the performance of the work are to be replaced or repaired to the satisfaction of the Owner. All incidental items not shown on the plans or specified, and which are necessary to complete the intended installation shall be furnished and installed as though such items were shown on the plans or specified.

All electrical equipment shall conform to the standards of the National Electrical Manufacturers Association (NEMA). In addition to the requirements of these Special Provisions and the project Specifications and Plans, all material and work shall conform to the requirements of the National Electric Code (NEC), the Electric Service Requirements and Guidelines of NorthWestern Energy, the standards of the American Society for Testing Materials (ASTM), the American Standards Association (ASA), the American Association of State Highway and Transportation Officials (AASHTO), and the State laws or local ordinances which may apply.

All traffic signal and street lighting electrical work not covered in this section shall be in accordance with the Montana Department of Transportation (MDT) "Standard Specifications for Road and Bridge Construction" and subsequent amendments. The requirements of this section shall govern if any conflicts between this section and MDT Standard Specifications.

B. Guarantees

If it is normal trade practice to furnish a guarantee for the work provided herein, the Contractor shall turn this guarantee over to the City of Billings, for potential dealing with the Guarantor. The extent of such guarantees will not be a factor in selecting the successful bidder.

C. Contractor Qualifications

The Traffic Signal Contractor shall have an IMSA Level II Certification or shall have successfully completed the installation of traffic equipment and hardware for at least five (5) complete intersections. An employee with the above required qualifications shall be on-site and actively involved in all phases of the traffic signal installation. The contractor is required to submit documentation of certification prior to the successful bid being awarded.

D. Maintenance of Signals

When the signal installation has been completed and the new hardware is made functional, the Contractor will be responsible for its operation until the project is 100% done and accepted by the City. The Contractor shall arrange to have someone maintain the signal on weekends, nights, and holidays. This person's name shall be left with the project manager so

that in case of a malfunction, they can notify this person. If the Contractor does not do this, the City will hire the work done and the Contractor will be charged time and materials spent on the project. The changeover at each intersection shall be scheduled at least 5 working days in advance with City Traffic Signal Staff (406-657-8264).

E. Description of Materials and Installation

1. Foundation Concrete

Provide and place Class D concrete and reinforcing in conformance with the latest edition of MDT Standard Specifications for Road and Bridge Construction. If concrete in the foundations has to be increased to accommodate the standard furnished by the manufacturer or if dimensions of the foundation hole are varied or the method and extent of excavation is altered because of soil conditions or any other reason not specifically requested by the Engineer, it will be at the expense of the Contractor. Foundations are shown on the detail drawings for each type of standard. Foundation dimensions are specified on the plans and payment will be based on these dimensions.

Foundations shall allow for PVC conduit entrance, as required by conduit runs on the plan, for the termination of conduit runs.

Allow for electrical bonding and anchor bolts.

Ground luminaires by running green AWG #10 green copper stranded wire from ground to all standards.

Foundations for signal standards shall provide for grounding of the pole through bonding of the conduit and anchor bolts using AWG No. 6 copper wire as shown in the Montana Department of Transportation's (MDT) Electrical Detail Drawings.

Signal foundations shall be reinforced with No. 4 hoops at 1' centers and eight No. 6 bars equally spaced or as shown on the plans. A minimum of 6" at the top of the foundation shall be formed and the exposed concrete edge shall have a 2" bevel. An alternate foundation treatment will allow for a flush finish where new sidewalks are to be poured. This requires the foundation to be left at a depth equal to the sidewalk thickness and the new sidewalk to be poured flush to or over the top of the foundation. Foundations will be wrapped with expansion joint material before any concrete flatwork is poured against the foundation.

Measurement and payment shall be based on cubic yards of concrete as per plan dimensions and shall include all labor, equipment, materials, excavation, placing of reinforcing steel, lacing of concrete, anchor bolts, electrical bonding and grounding per the NEC and as described above, backfill, expansion joint material, surface repair and

restoration to the satisfaction of the Engineer, and all incidentals necessary to provide a complete pole foundation.

2. Conduit

Supply and install Schedule 80 electrical PVC conduit, or continuous length high density polyethylene (HDPE) in accordance with UL 651B, schedule 80, 150 °F (66°C) wire rated, direct bury type, as shown on the plan sheets.

HDPE conduit will only be allowed in locations that require trenchless installation as shown on the plan sheets. All conduit installed by open-cut trench shall be PVC.

Conduit shall protrude 5 inches above anchor pole foundations. Conduit on breakaway foundations shall extend to the shear point of the breakaway portion of the foundation. All conduit shall be installed a minimum of 18 inches below curb grade in sidewalk areas and to a depth of not less than 24 inches below finished grade in all other areas. Conduit under streets, driveways, sidewalks and other designated areas that are not be otherwise disturbed shall be pushed using methods and equipment approved by the Owner.

Schedule 80 PVC shall be installed in all areas indicated on the plan drawings. All conduit fittings shall be solvent welded. Minimum bending radius on PVC shall be 8 inches.

Disturbed areas shall be repaired equal to the existing condition in accordance with applicable provisions of the Standard Specifications and to the satisfaction of the Owner.

Free ends of empty conduits shall be capped to prevent the entry of water, dirt, or rocks. All empty conduit runs, designated to remain so, shall have a standard nylon pulling cord tied off at each end. Install conduit bell end bushings per NEC prior to installing conductor. Connections or splices onto existing conduit shall be made using hot dip galvanized steel coupling devices. All splices shall have uniform threads coated with standard thread coating paste to provide a watertight seal.

Measurement and payment shall be based on the linear feet of conduit pushed or trenched, measured from the center of pull box to the center of pull box, controller or other point of termination and shall include excavation, placing of conduit, insulated bushings, backfill, intercepting and splicing to existing conduit, and repair of surface to the satisfaction of the Owner and all other incidentals necessary to complete this work. Conduit risers in pull boxes or controllers shall not be included in the measurement and the costs for these items shall be included in the Contractor's unit bid price for conduit.

3. Pullbox

Composite pull boxes shall be in conformance with the latest Edition of MDT Standard Specifications for Road and Bridge Construction. Pull boxes shall be Type I, II or III as per the

bid item and standard detail contained in the plan drawings. Supply three sets of key or bolt removing devices with each type of pull box.

Composite pull boxes shall be installed in sidewalks and other areas with potential for load bearing conditions as may be indicated on the plans, and shall be level with the sidewalk or surrounding area.

The pull box shall be placed on a bed of crushed 1” to 1½" diameter stone 18" in depth. Extend steel dowels, equivalent to #4 rebar, from opposite sides of the pull box, a minimum of six inches into existing concrete or newly poured concrete, to prevent uneven settlement. In the case of pull boxes installed adjacent to existing concrete, the existing concrete shall be bored ½" larger than the dowel diameter and the dowels shall be grouted into the bore hole.

Where pull boxes are installed on slopes, place a minimum 4” deep by 12” wide collar of concrete around the lip of the pull box and grade to prevent erosion. Conduit shall enter from the bottom of the box.

Measurement and payment will be per pull box unit and include excavation, placement, bedding stone, ground rods, restoration, and other work or materials incidental to the installation.

4. Copper Cable

Cables shall be installed as shown on the plans and wiring schematics. For proper function of the signals, conductors shall be stranded copper conductors with spade type crimped terminals. Use cable conforming to International Municipal Signal Association IMSA-20-1 or 19-1. For loop lead-in cable, use IMSA Specification No. 50-2.

At the controller cabinet and poles, cable shall be tagged to show their routing. Individual wires shall be tagged with branded type wire markers that conform to the terminal they hook to. There shall be no splices. Cable conductors shall terminate only at terminal blocks. Cables within cabinets, pull boxes, etc., shall be neatly arranged. Leave 2 feet of slack for all cables or conductors in signal standards and pullboxes. Leave 10 feet of slack for all cables or conductors in in the signal cabinet. Prepare cables for connection in the cabinet by removing at least 2 feet of cable sheath. Coil slack cable and conductor neatly inside the cabinet or pullbox.

Powdered soapstone, talc, or other approved lubricants shall be used when inserting cable in conduit. Before proceeding to pull cable in the underground conduit runs, the contractor shall clean all dirt or accumulations of moisture from conduit runs.

Each cable contains individual conductors. The color of the insulation on these conductors is coded per IMSA. In the controller cabinet where these conductors connect to the field

terminal strip, each screw or individual terminal point on the strip shall have connected to it only conductors with one color of insulation. A systematic and easy to understand pattern shall be used to order the conductors along the strip.

The color-coded conductors shall not be used interchangeably. That is, a conductor with specific color insulation shall have continuity of color throughout.

Measurement and payment will be for the linear feet of conductor in place measured along the conduit from the center of pull box to the center of pull box, controller or other point of termination. Payment includes materials, pulling wire through conduits and terminating wire at the appropriate signal hardware location. The length of cable conductors from the base of the signal standard to the end of the mast arm needed for operation shall not be included with this bid item and will be paid with the traffic signal standards. Extra slack in the cable conductors shall not be measured for payment. Payment includes materials, pulling wire through conduits, and terminating wire at the appropriate signal hardware location.

5. Conductor – Copper, 6 AWG, 8 AWG and 10 AWG - 600 Volt

Use 6 AWG conductors as service wires from the electrical service assembly to the signal controller. Use 8 AWG conductors for lighting and green coated 10 AWG for continuous grounding of all electrical circuits.

Use 10 AWG conductors as light drops from the luminaries to the watertight fused connectors in the pole base. Use “Green” 10 AWG conductors as ground wire throughout the signal and lighting system from the services to the controller and to the poles and pull boxes.

Use conductors with stranded copper with Type THWN insulation rated 600 volts. Conductor splices will not be allowed within conduit runs. Splice conductors for lighting only in pole bases or pull boxes using watertight connectors indicated in the wiring diagrams. Make connections readily accessible in pole bases through the hand hole.

Leave 2 feet of slack for all cables or conductors in signal standards and pullboxes. Leave 10 feet of slack for all cables or conductors in in the signal cabinet. Prepare cables for connection in the cabinet by removing at least 2 feet of cable sheath. Coil slack cable and conductor neatly inside the cabinet or pullbox.

Use fused connectors in all pole bases for connecting service wires from the conduit to the wires from the luminaires.

Fuses shall be the midget ferrule type and rated for the luminaires.

Neatly arrange wiring within cabinets, pull boxes, etc. Use powdered soapstone, talc or other approved lubricants when inserting conductors in conduit. Clean all dirt or accumulations of moisture from conduit runs before proceeding to pull wire in the underground conduit runs. Pull lighting and power conductors in conduits separate from other signal cable, wherever multiple conduits are available.

Measurement and payment will be for the linear feet of conductor in place measured along the conduit from the center of pull box to the center of pull box, controller or other point of termination. Payment to include watertight connectors and fuses, and all materials, labor and equipment necessary for a complete and functional installation. The length of cable from the base of the signal standard to the end of the mast arm needed for operation shall not be included with this bid item and will be paid with the traffic signal standards. Extra slack in the cable conductors shall not be measured for payment. Payment includes materials, pulling wire through conduits, and terminating wire at the appropriate signal hardware location.

6. Communication Cable – Cat-5e

Contractor to supply and install the necessary communication cable for the Video Imaging Vehicles Detection and Ethernet radio systems.

Measurement and payment will be for the linear feet of conductor installed measured along the conduit from the center of pullbox to the center of pullbox, controller or other point of termination. Payment to include watertight connectors and fuses, and all materials, labor and equipment necessary for a complete and functional installation. The length of cable from the base of the signal standard to the end of the mast arm needed for operation shall not be included with this bid item and will be paid with the traffic signal standards. Extra slack in the cable conductors shall not be measured for payment. Payment includes materials, pulling wire through conduits, and terminating at the appropriate signal hardware.

7. Signal & Light Standards

Furnish and install signal and light standards with a Powder Coated Black finish. Ensure all bolts and hardware match the pole finish color.

Payment for signal and light standards shall include furnishing and delivering standards to the site, connecting luminaires extensions and mast arms, setting, leveling and attaching the standards to the foundations, and incidental mounting hardware and fasteners. Costs associated with the installation of pedestrian signals, vehicle signals, ped push buttons, luminaires and other pole hardware are to be included in the bid for those particular items and are not part of the costs for installation of signal standards. However, the length of cable conductors from the base of the signal standard to the end of the mast arm needed

for operation shall be included with this bid item and will not be paid separately with other bid items.

8. Traffic Signal Indication

Supply and install traffic signal indicators meeting or exceeding the general specifications and definitions for light-emitting diode (LED) signal heads as specified in the Institute of Traffic Engineers Vehicle Traffic Control Signal Heads (ITE VTCSH). Circular signal modules shall meet or exceed the ITE VTCSH – LED Circular Supplement specifications adopted June 27, 2005, or latest revision thereof, and supplements, or as specified herein. Arrow signal modules shall meet or exceed the ITEVTCSH – LED Vehicle Arrow Traffic Signal Supplement, adopted July 1, 2007, or latest revision thereof, and supplements, or as specified herein.

Mount all mast arm-mounted signals to provide a minimum road clearance of 17 feet to the bottom of the signal back plate.

Use a one piece housing constructed of die cast aluminum, free from flaws, cracks, blow holes, or other imperfections, of sectional construction, interchangeable and adjustable, with holes top and bottom drilled to receive a 1-1/2" fitting, and individually attached. Use signal housing with a black color.

Use 1/2" coarse (13 thread/inch) stainless steel bolts to mount traffic signals to the side of the signal standard. Supply each traffic signal in accordance with the provisions of the latest MDT Standard Specifications.

Furnish indications that are compatible with the traffic signal housing. Seal the lens for the LED traffic signals to the housing making the unit watertight. Provide a one-piece neoprene or EPDM (Ethylene, Propylene, Diene Monomers) gasket around the lens and housing.

Furnish LED indications that work with a conflict monitor utilizing NEMA-plus functions, specifically DUAL INDICATION. Provide LED indications from a manufacturer that guarantees replacement or repair of LED signal indications that fall below minimum I.T.E. intensity levels during the first 60 months of operation.

Affix a permanent label, indicating the date of installation, to the back of each "RED", "YELLOW", and "GREEN" signal indication. The Project Engineer must approve the label and method of attachment.

Supply LED indications as specified above. Three manufacturers that meet this spec are Dialight Corporation, GELcore, and LeoteK.

Supply signal heads each having a tunnel (open bottom) visor for each signal indication of not less than 0.050" aluminum sheet construction with the length of the tunnel visor being

12” for 12” diameter indications. Use colors of flat black for the inside of the visor and flat black for the outside.

Supply back plates as indicated on the signal head arrangements shown in the plans. Use back plates constructed of aluminum, painted with a minimum gloss black synthetic backing enamel. Drill holes for attachment to the signal head supplied. Use a back plate forming a 5” border around the signal heads. Back plates shall also include 2” reflective yellow tape around the border of the back plate.

Supply all trunnions, brackets, and suspensions used for assembling and mounting the traffic control signal faces which are entirely weather tight. Supply all arms with not less than 1½” IPS pipe to permit the traffic signal control wires to be threaded through them.

Fabricate all mounting brackets so that they supply plumb or level support, are symmetrically arranged, so as to be mounted securely attached to the supporting structure. Furnish a terminal compartment with the mounting bracket for each pole shaft mounting as shown on MDT’s Electrical Detail Drawing.

Use the same color for the framework and mounting brackets as used for the signal indication housing.

Use 7 conductor signal cable from the pole shaft mounted terminal block to the end of mast arm signal indication.

Measurement and payment will be for each traffic signal head installed and operable and includes the signal, signal mounting, terminal compartment, back plates, lamps, miscellaneous hardware, AWG No. 14 lead wires from the signals to the terminal compartment as shown on MDT’s Electrical Detail Drawings.

9. Signal Controller Cabinet Pedestal – Type P

Locate the pedestal at the intersection as shown on the plan sheet and as directed by the Engineer. Construct pedestal in conformance to the detail for Controller Cabinet Mounting shown on the Construction detail drawings and as required for providing mounting of a Type “P” controller cabinet. Acquire measurements of the Type “P” cabinet prior to forming and placing the cabinet anchor bolts. Allow for PVC conduits in the concrete pedestals, as indicated on the plan sheets.

Measurement and payment for this item will be for each pedestal in place and includes excavation, concrete, anchor bolts and nuts, backfill and surface repair & restoration to the satisfaction of the Engineer.

10. Signal Cabinet & Controller

Supply and install 8-phase Nema controller and Type "P" controller cabinet. Wire the cabinet for emergency pre-emption and include: 8 channel loop detector amplifiers, 12 load switches, 5 transfer relays, flasher units, heater, fan and all other standard cabinet features necessary for intended operations. Controller shall be Trafficware 980 ATC controller. Contract Steve Ness (406-657-8264) 48 hours prior to installation.

Bolt and seal cabinet on top of the controller pedestal prior to pulling wires from poles and pull boxes through the pedestal. Once wires are pulled into the new cabinet, terminate wires at designated locations within the cabinet's terminal panels using appropriate connectors.

Consult with City traffic signal personnel at least two weeks before the desired signal turn-on date. The date arranged for the signal turn on will be mutually agreed to, and be as close as possible to the contractors desired turn on date.

Measurement and payment will be for each controller cabinet, and controller installed and operable.

11. Emergency Pre-Emption System

Supply and install Opticom or TOMAR brand emergency pre-emption system, or pre-approved equal. The complete system includes detectors and security coded discriminator unit.

The Contractor will be required to mount detectors on mast arms as indicated on the plans and terminate detector cable within the controller cabinet. Contractor shall also assist City personnel in testing the finished system.

Measurement and payment will be for installing the emergency preemption system.

12. EtherNet Radio

Supply and install a radio communication system that includes a broadband radio and a 5-port industrial Ethernet switch. Cambium 5GHz PMP 450i Integrated Subscriber Module, or approved equal. The switch shall be Sixnet Model SLX-5ES-1 or approved equal.

Measurement and payment will be for supplying and installing the Ethernet radio. All mounting hardware and other incidentals shall be included in this bid item. Also include equipment required in cabinet, software, and all necessary items for a complete and functional system. Contractor shall also assist City personnel in testing the finished system.

13. Video Imaging Vehicle Detection System (Gridsmart)

Supply and install a Video Imaging Vehicle Detection System (VIVDS) that monitors vehicles on a roadway via processing of video images and provides detector outputs to a traffic controller or similar device. The VIVDS will be GridSmart (with Performance Module), or pre-approved equal. The system is generally composed of the omni-directional camera, the VIVDS processor, and the field communications link consisting of a single CAT5e cable between the camera and the VIVDS processor.

The system must be able to detect the presence of vehicles in up to 64 detection zones per camera. The VIVDS processor unit must compensate for minor camera movement (up to 2% of the field of view at 400 ft.) without falsely detecting vehicles. The camera movement must be measured on the unprocessed video input to the VIVDS processor.

The video detection system must reliably detect vehicle presence in the design field of view. The design field of view must be defined as the sensor view when the image sensor is mounted 30 feet or higher above the roadway, when the camera is adjacent (within 15 feet) to the edge of the nearest vehicle travel lane, and when the length of the detection area is not greater than 5 times the mounting height of the image sensor. Within this design field of view, the VIVDS processor unit must be capable of setting up a single detection zone for point detection (equivalent to the operation of a 6-foot by 6 foot inductive loop). A single omnidirectional camera, placed at the proper mounting height, must be able to monitor detection zones in all intersection approaches.

The VIVDS processor must be shelf mountable and operate reliably in the adverse environment found in the typical roadside traffic cabinet. It must meet the environmental requirements set forth by the latest NEMA (National Electrical Manufacturers Association) TS1 and TS2 standards as well as the environmental requirements for Type 170, Type 179 and 2070 controllers. Operating temperature must be from -30°F to +165°F at 0% to 95% relative humidity.

The Contractor will be required to mount the camera on the luminaire mast arm indicated on the plans, pull the detector cable from the camera to the control cabinet, and install the processor within the control cabinet. Contractor shall also assist City personnel in testing the finished system.

Measurement and payment will be for furnishing and installing the VIVDS as shown on the plans and all other equipment necessary to complete and operate the system.

14. <u>Dual Power Supply – Type C</u>

Supply and install new electrical service assemblies as shown on the plans and coordinate hook-up with utility company.

Supply and install a service pedestal equivalent to the Millbank front and back meter socket pedestal with a 200 amp main breaker and a Millbank post stabilizing foot.

Supply a cabinet constructed of 16 gauge steel with a side-hinged lockable door, conforming to rain tight standards per NEMA/EEMAC Type 3, 4, 12, and 13, and containing equipment as indicated on the wiring diagram on the plans, equivalent to the Hoffman A20H16ALP enclosure with a A20P16 panel.

Install an AWG No. 6 conductor from the service connection point at the service cabinet to the controller.

Install two grounding rods, separated by 6 feet, as indicated by the National Electric Code and as detailed in the wiring diagram and details, with a AWG No. 6 bare solid copper ground wire.

Supply and install dual meter bases, as approved by utility company, on the service cabinet, as indicated in the plan details.

Install photo-electrical cells equivalent to the Intermatic K-4000C series, according to the manufacturer's specification and as detailed herein and on the plans. Use photo-electric controllers as shown on the wire diagram for service to control luminaires. Use photo-electric controllers rated at a minimum of 1000 watts, 120 volts and wired into the individual lighting power supplies. Turn control on at 1.30 +/- 0.5 foot-candles and off at 6 +/- foot-candles.

Mount the photo-electric control at the bottom of the service cabinet as shown in the plan details. All electrical services will be checked and tagged by the City Electrical Inspector prior to final acceptance.

Measurement and payment will be for new power service installed and complete.

15. Luminaire Assembly - LED

Supply luminaire assemblies with slipfitter type end mounting on a 2-inch pipe tenon. Luminaire assembly shall be 80 LED light unit manufactured by American Electric Lighting Model #ATB0, or pre-approved equal. The LED assembly shall have the following characteristics:

- 80 LED-unit per fixture
- 3000K CCT
- 700mA Drive Current
- Minimum L70 @ 25° degrees C of 100,000 hours
- Black in color
- Operate off a 240-volt service

- IES Type III distribution

Use an assembly with an independent replaceable starting board. Mount luminaires parallel to the road surface in the longitudinal and transverse places. Luminaires will be adjusted at night in the transverse plane to give the light distribution the best cover the roadways as directed by the Owner or the Owner's representative.
Check luminaires on the ground to assure the luminaire for each pole is set for the ASA/IES light distribution pattern requested.

Luminaire assembly includes luminaire, lamp, and integral ballast. Provide photo-electric control at the service and not on individual luminaires. Use luminaire assemblies constructed of welded aluminum sealed tight against weather.

Measurement and payment will be for each luminaire assembly installed and operable.

END OF SECTION

GEOTECHNICAL EVALUATION REPORT

Central Avenue & 48th Street West Intersection Improvements
Billings, Montana
24-4477G

Submitted by

2511 Holman Avenue
P. O. Box 80190
Billings, Montana 59108-0910

Prepared for

Sanbell – Rocky Mountain
1300 N Transtech Way
Billings, Montana 59102

Date
January 17, 2025

2511 Holman Avenue
P. O. Box 80190
Billings, Montana 59108-0190
p: 406.652.3930; f: 406.652.3944
www.skgeotechnical.com

January 17, 2025 Project 24-4477G

Mr. DJ Clark, PE, PTOE
Sanbell – Rocky Mountain
Via Email: dclark@sanbell.com

Dear Mr. Clark:

Re: Geotechnical Evaluation, Central Avenue & 48th Street West Intersection Improvements, Billings, Montana.

We have completed the geotechnical evaluation for the above-referenced project. Our report was completed in general accordance with your Subconsultant Services Agreement, dated November 4, 2024.

The attached report contains the following information.

- Results of the five penetration test borings performed for the proposed intersection improvements.
- Results of laboratory tests performed on various samples.
- Recommendations for the new traffic signal foundations.
- Recommendations for pavement total reconstruction and minor rehabilitation.
- Recommendations for culvert replacement/extension.

Thank you for using SK Geotechnical. If you have any questions regarding this report, please contact Jesse Miller or Greg Staffileno at (406) 652-3930.

Sincerely,

Jesse E. Miller, EIT
Staff Engineer

Gregory T. Staffileno, PE
Reviewing Engineer

Attachment:
Geotechnical Evaluation Report

Table of Contents

Description **Page**

Table of Contents (continued)

A. Introduction

A.1. Project

Yellowstone County is planning improvements to the intersection of Central Avenue and 48th Street West in Billings, Montana. The improvements include widening for turn lanes, new signal poles, and replacing or extending existing irrigation ditch culverts. The intersection is shown on the Site Location Sketch as well as the Boring Location Sketch included in the Appendix of this report.

A.2. Purpose of this Evaluation

The purpose of the evaluation was to assist Sanbell and Yellowstone County in characterizing and evaluating existing pavement, subgrade, and groundwater conditions in the vicinity of the intersection, and to provide alternative pavement sections and related geotechnical design recommendations for the proposed intersection improvements.

A.3. Scope

The desired scope of services was outlined in our proposal to Sanbell, dated October 16, 2024. On November 4, 2024, we received a Subconsultant Agreement for Professional Services to proceed in accordance with the scope of services outlined in our proposal.

Our scope of services was limited to:

- Reconnaissance of the site by a geotechnical engineer and engineering assistant.
- Staking the boring locations with some input from Sanbell related to property access.
- Coordinating the locating of underground utilities near the boring locations.
- Conducting four penetration test borings to a depth of 10 feet in pavement along each intersection leg and one test boring to a depth of 30 feet off existing roadway, but in the vicinity of the intersection improvements.
- Collecting core samples of the existing asphalt pavement for measurement of thickness, number of lifts, and visual stripping analysis.
- Collecting one thin-walled tube sample to provide relatively undisturbed material for time-rate consolidation testing.
- Collecting four bag samples of the potential pavement subgrade soils to provide samples for moisture-density relationship (Proctor), California Bearing Ratio (CBR), and corrosivity testing.
- Returning the samples to our laboratory for visual classification and logging by a geotechnical engineer or geologist.

- Conducting laboratory testing for moisture content, gradation, Atterberg limits, Proctor, CBR, corrosivity, and time-rate consolidation.
- Analyzing the results and formulating recommendations for earthwork, pavement design, culvert replacement/extension, and traffic signal pole foundations.
- Discussing the project with Mr. DJ Clark and Mr. Erin Claunch of Sanbell.
- Submitting a geotechnical evaluation report containing logs of the borings, our analysis of the field and laboratory tests, and recommendations for earthwork, pavements, culverts, and traffic signal pole foundations.

A.4. Documents Provided

The following documents were provided for our use:

- A single-page exhibit of the proposed intersection improvements as an aerial overlay map showing approximate extents of the project, street widening, lanes, and approximate traffic signal pole locations, prepared by Sanbell, but not dated. This aerial map was used as our Boring Location Sketch in the Appendix.
- Pages E1.5 and E1.6 titled "Grand Avenue & 48th Street West – Traffic Signal Improvements" dated December 30, 2022 with the latest revisions made on December 1, 2023, and prepared by Sanderson Stewart, now Sanbell – Rocky Mountain. The plans included, but were not limited to: Signal standards, foundation details, typical signal mountings, and typical pole standard details.

A.5. Locations

Boring locations were selected by SK Geotechnical. It should be noted that drill rig access for our off-road boring was limited: numerous existing utilities were outlined along the northeast quadrant of the intersection and the property owners at the southeast and southwest quadrant did not grant access. As a result, Boring ST-5 was performed at the northwest quadrant after Sanbell obtained permission from the property owner to access the location from their parking lot. The locations are shown on the Boring Location Sketch in the Appendix. Penetration test borings are designated by the prefix "ST."
SK Geotechnical performed these borings with a Mobile Drill B57 rubber tracked drill rig.

B. Results

B.1. Logs

Log of Boring sheets indicating the depth and identification of the various soil strata, the penetration resistances, laboratory test data, and water level information are attached. It should be noted, the depths shown as boundaries between the strata are only approximate. The actual changes may be transitions and the depths of the changes vary between borings.

Geologic origins presented for each stratum on the Log of Boring sheets are based on the soil types, blows per foot, and available common knowledge of the depositional history of the site. Because of the complex glacial and post-glacial depositional environments, geologic origins are frequently difficult to ascertain. A detailed evaluation of the geologic history of the site was not performed.

B.2. Site Conditions

According to the Montana Bureau of Mines and Geology (MBMG) Geologic Map of the Billings 30' by 60' Quadrangle, Montana, by David A. Lopez, 2000, the project is situated within Level 3 Alluvial terrace deposits (Qat3). The gravels are described as cobbles and pebbles with minor amounts of sand and silt. The gravels and terraces extend about 50 to 90 feet above the Yellowstone River. Our borings generally encountered 1 1/2 to 2 1/2 feet of existing pavement underlain by lean clays and fine-grained sands consistent with alluvial deposits.

B.3. Pavement Condition Observations

To better evaluate the need for pavement reconstruction and rehabilitation, we performed visual field observations of the existing pavement conditions. A summary of our observations is included on the Visual Pavement Condition Sketch in the Appendix. Photographs of the pavement conditions near the soil boring locations are also included in the Appendix. We also obtained pavement core samples from the borings for thickness and stripping analysis in our laboratory.

The roadways and intersection at this site are elevated and appear well drained. Irrigation ditches are present along both sides of the north leg and on the south side of the east leg. The shoulder consisted of vegetated sandy lean clay topsoil. Transverse cracks were observed along all four legs spread about 50 to 200 feet apart. Minor loss of chipseal and rutting were also observed. We did not see any signs of patches or fatigue (alligator) cracking.

In both lanes of both roads, running north-south and east-west, the chip seal surface shows mild aggregate wear in the wheel tracks (subtle rock polishing and vertical migration into layer below). Potential causes of this are the original chip seal construction and the traffic pattern. Construction techniques with various equipment, distribution, construction traffic, timing, and compaction can compromise chip seal consistency and strength. Overall, we judged the existing pavement to be in fair to good condition. Therefore, the pavement is a good candidate for minor rehabilitation (mill and overlay) or total reconstruction.

B.4. Existing Pavement and Soils

B.4.a. Pavement Borings. The existing pavement and subgrade conditions at Borings ST-1 through ST-4 are summarized in Table 1 below. Detailed boring data is included in the Log of Boring Sheets in the Appendix. Borings in the roadway generally encountered 6 to 9 inches of asphalt pavement over 1 1/2 to 5 1/4 inches of crushed base levelling course (CBC) over 1 1/2 to 2 1/2 feet of gravel subbase used to construct embankments over alluvial lean clays and sands. Beneath the existing pavement section, the borings encountered lean clay with sand, poorly graded sand with silt, and sandy lean clay subgrade.

Base and subbase gravels had standard penetration resistances generally ranging from 44 to 17 blows per foot (BPF). These values indicated the base and subbase gravels were dense to medium dense. Penetration resistances recorded in the clayey subgrade soils generally ranged from 18 to 3 BPF, but mostly ranged from 6 to 4 BPF. The values indicated the clay subgrade was very stiff to soft, but mostly medium to rather soft. Penetration resistances recorded in the sandy subgrade soils generally ranged from 17 to 4 BPF, indicating a medium dense to very loose relative density.

Table 1. Existing Pavement and Anticipated Subgrade Conditions

Boring	**ST-1**	**ST-2**	**ST-3**	**ST-4**
Date Drilled	12/3/23	12/3/23	12/3/23	12/3/23
Existing Pavement (PMS)	6”	7”	6”	9”
Existing Base (CAC)	2 1/2”	1 1/2”	5 1/4”	N/E
Existing Subbase	30” (2.5’)	17 1/2” (1.5’)	20” (1.7’)	27” (2.3’)
Total Thickness	**38 1/2” (3.2’)**	**26” (2.2’)**	**31 1/4” (2.6’)**	**36” (3.0’)**
Subgrade[(1)]				
Description	Lean Clay with Sand	Poorly Graded Sand with Silt over Lean Clay	Sandy Lean Clay over Lean Clay	Silty Clayey Sand over Lean Clay with Sand
ASTM Class	CL	SP-SM/CL	CL	SC-SM/CL
Average Moisture Content, %	23.2	13.0/18.5	19.0	15.8/19.9
Optimum Moisture Content, %	15.8	11.0[(2)]/15.2	14.7	12.5[(2)]/15.8
Risk of Subgrade Failure [(3)]	Medium	Low	Medium	Medium

[(1)]Anticipated subgrade that will be present beneath the proposed pavement section.
[(2)]Average value based on engineering judgment.
[(3)]During Total Reconstruction, keeping existing base and subbase aggregates in place.

B.4.b. Off Pavement Boring. As previously mentioned, Boring ST-5 was performed in a grass-covered area at the northwest quadrant due to limited access at the southwest, southeast, and northeast corners of the intersection. Boring ST-5 encountered 6 inches of topsoil at the surface overlying lean clay with sand to a depth of about 15 feet underlain by silty clayey sand extending to the termination depth of the boring at about 30 1/2 feet.

Penetration resistances recorded in the lean clay with sand ranged from 6 to 2 BPF decreasing with depth as groundwater was approached. These values indicate the lean clay was medium to soft. Penetration resistances recorded in the silty clayey sand ranged from weight of hammer (WH) to 4 BPF, indicating a very loose relative density.

B.5. Groundwater Observations

Groundwater was observed in Boring ST-5 at a depth of about 17 1/2 feet below the ground surface and was not observed in Borings ST-1, ST-2, ST-3, and ST-4 to their termination depth of 10 1/2 feet.

In Boring ST-5, the clays became wet below a depth of 8 feet, which could indicate the groundwater level, especially when the irrigation ditches have flowing water. We wish to also point out, it can take several days or longer for groundwater to develop in our boring performed in these clay soils.

B.6. Laboratory Tests

Laboratory test results are summarized in Table 2 below and are also included on the Log of Boring Sheets. Specific laboratory test results are included in the Appendix.

B.6.a. Classification Tests. Classification tests consisting of Atterberg limits and full sieve analysis were performed on select samples obtained from the borings. Table 2 below provides a summary of the classification tests.

Table 2. Summary of Laboratory Tests

Boring	Sample	Depth (feet)	Atterberg Limits			P_{200} (%)	ASTM Classification
			LL	PL	PI		
ST-1	Base	0.5 – 0.7	NP	NP	NP	9.5	GP-GM
ST-1	Subbase	0.7 – 3.2	NP	NP	NP	7.3	GP-GM
ST-1	Bulk Bag Subgrade	4 – 9	29	12	17	62.2	CL
ST-2	Base	0.6 – 0.7	NP	NP	NP	10.2	GP-GM
ST-2	Subbase	0.7 – 2.2	24	15	9	11.9	GW-GC
ST-2	Bulk Bag Subgrade	6 1/2 – 9	30	13	17	66.6	CL
ST-3	Base	0.5 – 0.9	NP	NP	NP	11.3	SP-SM
ST-3	Bulk Bag Subgrade	4 – 9	31	15	16	61.1	CL
ST-4	Base/Subbase	0.8 – 3.0	NP	NP	NP	4.7	GP-GM
ST-5	Thin Wall	8.0 – 9.0	28	17	11	83.6	CL

B.6.b. Consolidation Test. The results of consolidation testing performed on sample thin-walled tube TW-1, Boring ST-5, from 8 to 9 feet, is shown on the graph in the Appendix. The initial moisture content of 22.8 percent and dry density of 96.2 pounds per cubic foot (pcf), which are typical values for lean clay with sand alluvium. Total one-dimensional consolidation was 8.3 percent under a total pressure of 8,000 pounds per square foot (psf), which is a reasonable movement for native, undisturbed, normally consolidated clay. When loaded to 500 psf and inundated with water, the sample collapsed about 1.1 percent.

B.6.c. California Bearing Ratio (CBR) Test. Results of laboratory remolded and submerged CBR tests performed on subgrade sandy clays are shown on graphs in the Appendix. Subgrade CBR values ranged from 3.4 to 6.2.

B.6.d. Corrosion Tests. Four corrosion tests were performed on soil recovered from Borings ST-2, ST-3, and ST-5. The corrosion test results are summarized in Table 3 below. The corrosion tests were performed in general accordance with ASTM G187-18.

Table 3. Summary of Corrosion Test Results

Boring	Depth (feet)	Resistivity (Ω•cm), Soil Box	Conductivity (m.mhos/cm), Calculated	pH	Marble pH	Sulfate (Percent by Weight)
ST-5	8 - 9	1,800	0.556	7.76	7.85	0.0025
ST-5	13 - 14	2,000	0.500	8.01	8.16	0.0023
ST-2	6 1/2 - 9	1,200	0.833	7.86	7.80	0.0076
ST-3	4 - 9	1,400	0.714	7.87	7.92	0.0068

As can be seen above, the corrosion test results indicate the lean clay and lean clay with sand soils are highly corrosive to buried metallic conduits. The designer and materials suppliers should review these results to evaluate the appropriate level of corrosion protection for this project. We wish to point out, the very low sulfate contents indicate the soils are not corrosive to concrete.

B.6.e. Pavement Stripping Analysis. Pavement stripping analysis was performed on four core samples from the pavement borings, and the results are summarized in the Core Evaluation Form in the Appendix. Photographs of the cores are also included. The stripping analysis was performed in accordance with Montana Department of Transportation (MDT) procedures. The cores contained 2 to 4 lifts of dense-graded asphalt pavement. Qualitive stripping rating of each lift ranged from 1.0 to 4.0, but mostly ranged from 2.0 to 3.0. These values indicate the pavement was in severely stripped to good condition, but mostly stripped to moisture damaged condition. The overall average was 2.4, which is greater than the minimum desired 1.0 stripping for rehabilitation projects. Therefore, a mill and overlay can be considered.

C. Analyses and Recommendations

C.1. Proposed Construction

The project includes new improvements to the intersection of Central Avenue and 48th Street West in Billings, Montana. It should be noted, that improvements are still in a “conceptual” phase and are subject to change. It is our understanding left turn lanes will be added to all four approaches with each leg being widened approximately 8 to 9 feet on each side of the streets. The improvements will extend about 400 to 450 feet back from the intersection along each leg. We also understand traffic signal poles will be constructed at the intersection and supported on concrete drilled shaft foundations. It is also our understanding two existing culverts will be extended and/or replaced this winter before the irrigation ditches are opened to water this spring.

We have assumed the new intersection improvements will generally match existing grades at the intersection, although the center may be crowned. If final pavement grades differ by more than 1 foot from existing, we should be informed, as additional analysis and recommendations may be necessary. Numerous assumptions were made for the signal pole foundations as discussed later in this report. If these assumptions are not correct, we should be informed to perform additional analysis.

C.2. Discussion

C.2.a. Signal Poles. The only off-pavement boring, Boring ST-5, encountered relatively soft, wet clay soils below a depth of 8 feet. Groundwater could be present below 8 feet, especially if the irrigation ditches are flowing during drilled shaft installation. The signal pole foundation installer should be prepared to use temporary casing or the slurry method during drilled shaft construction to prevent sidewall sloughing and properly place concrete, which includes a tremie pipe. The method of drilled shaft construction will need to be determined by the contractor based on their experience and equipment. Signal pole foundations are discussed in more detail later in this report.

C.2.b. Pavement Design. Pavement sections with base and subbase courses were developed for 48th Street West and Central Avenue for total reconstruction. We also evaluated minor rehabilitation for a mill and overlay of both streets, as well as including geogrid in the pavement section for unstable subgrades, if encountered during construction. The methods and procedures for this pavement design are described in more detail later in this report.

C.2.c. Culverts. Assuming the culverts are buried about 4 to 5 feet below existing grades, we anticipate the subgrade will be medium to soft clays. In our opinion, these clays are too soft to support the new culverts or extensions, and Type 2 bedding beneath Type 1 bedding is recommended. Culverts are discussed in more detail later in this report.

C.3. Site Preparation

We recommend vegetation, topsoil, and root zone be removed from beneath the proposed embankments of the intersection improvements. On previously developed sites, there is also a risk unsuitable existing fill containing deleterious materials could be encountered. The thickness of topsoil and root zone at Boring ST-5 was up to 6 inches. Actual depth of removal across the site should be determined by observations during stripping. The resulting subgrade should be scarified, moisture conditioned to a moisture content within 3 percent of optimum moisture content (OMC) and compacted to a minimum of 95 percent of its maximum dry density per ASTM D698. Embankment fill placed beneath and alongside proposed base gravels should also be compacted to a minimum of 95 percent.

Outside of new alignments and below the selected pavement section, native or imported clays are recommended for reshaping boundaries, drainage, and irrigation ditches. Gravels should not be used as fill in contact with open channels and ditches to avoid providing a conduit for water. Gravels can be used beneath roadways and to construct embankments 2 feet or more away from ditches. For compaction, fill materials should be moisture conditioned to OMC or up to 2 percent over OMC and compacted to a minimum of 95 percent per ASTM D698.

C.4. Signal Structure Foundations

C.4.a. Proposed Construction. As part of the intersection improvements, four signal structures are being considered at the intersection of Central Avenue and 48th Street West. Based on the plans provided the structures will be 30-foot or 35-foot mast arm structures and will be constructed in accordance with the Montana Department of Transportation (MDT) standard detail drawings. The structures will be supported on a single drilled shaft foundation, and MDT's standard foundations for these mast arms are indicated to be 3-foot diameter drilled shafts with a 12-foot embedment depth. For structures with mast arm lengths of 40 feet or less, 3-foot by 12-foot shafts are used. Specific foundation loading was not available, therefore, based on previous projects, we have estimated the following maximum load conditions for our analysis of these signal poles.

Loading Condition	**35-foot or less, Mast Arm**
Axial Compression	5,000 lbs
Shear	3,000 lbs
Bending Moment	75,000 ft-lbs
Torsion	35,500 ft-lbs

The signal foundation designer should review these loads. If the actual loads exceed these values, we should be informed, additional analysis will be required.

C.4.b. Soil and Groundwater Conditions. Boring ST-5 was performed at the northwest corner of the intersection, near the proposed traffic signal locations, and extended to a depth of about 30 1/2 feet below the ground surface. Based on the depth of the boring and its proximity to the proposed traffic poles, Boring ST-5 was used for our analysis of all signal poles. This boring encountered about 15 feet of medium to soft lean clay with sand overlying very loose silty clayey sands extending to the termination depth at about 30 1/2 feet. Groundwater was encountered at a depth of 17 1/2 feet below existing grade, but moisture contents indicate groundwater could be as shallow as 8 feet, especially if the irrigation ditch water is flowing.

C.4.c. Analysis. The allowable capacities for compression, tension, and torsion were calculated for the 3-foot shaft. The results from the calculations are summarized in Table 4 following this page. A preliminary lateral load analysis was also performed for the proposed signal pole foundations using the L-Pile software program, Version 2019 by ENSOFT, Inc. The results of the analyses are summarized in Table 5 also following this page.

Table 4. Summary of Allowable Capacities for Signal Pole Drilled Shaft Foundations

Signal Structure	Foundation	Axial Compression (kips)	Axial Tension (kips)	Torsion (ft-kips)
2A	3.0' x 12' Shaft	35.4	37.8	87.2

Table 5. Summary of L-PILE Analysis for Signal Pole Drilled Shaft Foundations

Structure	Foundation	Applied Loads			Calculated Reactions		
		Horizontal Shear (kips)	Axial Load (kips)	Bending Moment (ft-kips)	Deflection (inches)	Bending Moment (ft-kips)	Shear (kips)
1	3.0' x 12' Shaft	5	3	75	<1/2	78.5	14.0

The above reactions are ultimate values and have not been factored.

C.4.d. Conclusions. Based on the results of the axial and lateral analysis and the estimated loading, it is our opinion the standard signal pole foundations will be acceptable. However, we recommend the signal foundation designer review the assumed loading and the calculated reactions and deflections to determine if the loads are reasonable and the shaft concrete and reinforcing steel are sufficient to resist the calculated reactions. During construction, the soil profile should also be observed to confirm the actual conditions are as good, or better, than those assumed for our analysis.

Groundwater was encountered in Boring ST-5 at a depth of about 17 1/2 feet, but wet clays were encountered below 8 feet. Groundwater could be present below 8 feet, especially if the irrigation ditches are flowing. If groundwater is encountered during shaft excavations, temporary casing or the slurry method will be needed to maintain an open excavation. Concrete will also need to be placed by tremie to displace the water as concrete is placed. Dewatering of the shafts should not be attempted as the seepage forces will excessively disturb the surrounding clay soils. All signal pole shafts should be constructed in accordance with Montana Department of Transportation Standard Specifications (MDTSS) Section 558.

C.5. Pavement Design and Thickness Recommendations

C.5.a. Method. Sanbell provided the following traffic information:

- Daily ESAL's of 49.5 for 48th Street West, and
- Daily ESAL's of 80.5 for Central Avenue.

Pavement sections for the roadways were evaluated using an Excel spreadsheet based on the *1993 American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures*. The AASHTO Pavement Design Method is based on numerous input parameters, each affecting the required total pavement thickness for the given road(s). The input parameters and traffic information are summarized in the pavement worksheet in the Appendix.

C.5.b. Subgrade. Below the existing pavement sections, our soil borings primarily encountered medium to soft alluvial clays and medium dense to very loose alluvial sands. Based on the results of California Bearing Ratio (CBR) tests, our pavement analysis was based on a CBR value one standard deviation below the mean, resulting in a CBR value of 3.4 and a Resilient Modulus (Mr) of 5130 for design.

C.5.c. Pavement Sections. Tables 6 and Table 7 below, summarize our pavement thickness recommendations for 48th Street West and Central Avenue, respectively.

Table 6. Alternative Pavement Sections for 48th Street West

Material	Typical 1	Typical 2	Typical 3	Typical 4
	Base Section	Subbase Section	Mill and Overlay	Matching Section
Asphalt Pavement	4”	4”	2.4”*	6”
Base Course	12”	4”	---	2”
Subbase Course	---	11”	---	28”
Separation Fabric	Yes	Yes	---	Yes
Total Thickness	**16”**	**19”**	**---**	**36”**

*2.4 inch mill and 2.4 inch overlay recommended due to top-most lift of existing asphalt pavement.

Table 7. Alternative Pavement Sections for Central Avenue

Material	Typical 5	Typical 6	Typical 7	Typical 8
	Base Section	Subbase Section	Mill and Overlay	Matching Section
Asphalt Pavement	4”	4”	2.4”*	6”
Base Course	14”	4”	---	3 1/4”
Subbase Course	---	14”	---	19”
Separation Fabric	Yes	Yes	---	Yes
Total Thickness	**18”**	**22”**	**---**	**28 1/4”**

*2.4 inch mill and 2.4 inch overlay recommended due to top-most lift of existing asphalt pavement.

As indicated above, we recommend separation fabric to reduce contamination of the gravel base with fines over the life of the pavement, and thereby, improve performance.

For total reconstruction, we prefer the thicker subbase sections (Typicals 2 and 6) or matching the existing pavement sections (Typicals 4 and 8). Matching these existing sections will provide a uniform transverse pavement section, thereby reducing the risk of differential frost heave during the winter.

The above sections assume a stable subgrade condition. This will require the contractor to take care to avoid excessively disturbing the clay subgrades, where present, and to scarify, dry, and recompact the subgrade to specification. Construction schedules and methods can sometimes make this difficult.

As described below, if the subgrade is unstable, additional high performance geogrid, subexcavation and base gravel could be required.

C.5.d. Excessively Soft Subgrade. A common problem in roadway construction is encountering unstable subgrades. Unstable subgrades are those subgrade soils that are excessively wet and soft and cannot support heavy rubber-tired construction equipment as well as cannot be compacted to specification. They commonly occur beneath existing roadways having poor surface drainage and where water seeps through cracks saturating the underlying base course and subgrade. Roadways adjacent to irrigation ditches can also encounter wet clays. This water saturates the clay subgrades reducing their shear strength and the clay subgrade becomes too soft and wet to support the heavy rubber-tired construction equipment. Under those conditions, the subgrade cannot be compacted to specification. When this occurs during fast tracked construction projects, it can cause delays, which then results in change orders. A contingency in the project budget should be provided for the risk of soft, unstable clays along the project, primarily due to the existing adjacent irrigation ditches but other sources like snow melt, and rain storms, as well.

As shown previously in Table 1, the subgrades are rated as to their general suitability to support construction equipment. We considered Central Avenue & 48th Street West to have a "low to moderate" risk of subgrade failure during construction due to the presence of medium to soft lean clays and medium dense to very loose sands at depths of about 4 to 6 feet below the asphalt surface.

If unstable areas are encountered, we recommend providing a BX1200 biaxial geogrid or better beneath the base or subbase for Typical Sections 1, 2, 5, and 6. This assumes the subgrade has an in-place CBR strength of at least 1.5. If it is weaker, additional gravel will be needed and subgrade observations should be performed during construction. During the subgrade observations, dynamic cone penetrometer (DCP) tests can be performed to estimate the in-place CBR, which is used to estimate the required gravel over BX1200 to bridge over the excessively soft clays. The geosynthetics must be installed in accordance with the manufacture's specifications and should extend at least 10 feet beyond the limits of the unstable subgrade area.

We recommend all earthwork, subgrade preparation, gravel base, subbase, and asphalt pavement be specified and constructed in accordance with MPWSS. When geosynthetics are utilized, we recommend they be placed and constructed in accordance with MPWSS and manufacturer's recommendations.

C.5.e. Materials and Compaction. We recommend specifying crushed gravel base and sandy gravel subbase courses meeting the requirements of *Montana Public Works Standard Specification*, Seventh Edition, April 2021, Sections 02235 and 02234. We recommend the gravel base and subbase be compacted to a minimum of 95 percent ASTM D698. We recommend the asphaltic concrete meet the requirements of Section 02503. We recommend the asphalt pavement be compacted to an average density of 93 percent ASTM D2041, with no individual sample less than 92 percent.

C.6. Culvert Replacement

C.6.a. General. We understand the project may include extending or replacing the existing culverts at the intersection. Specific details regarding culvert construction were not available at the time of this report. However, we recommend the following specifications for culvert replacement/installation due to the soft nature of the native clayey soils.

C.6.b. Open Excavations. Based on the borings, we anticipate the soils along the culvert alignments can be excavated with a conventional tracked excavator. We recommend however, a **smooth-bladed bucket** be used to avoid disturbing the fine-grained soils at the bottoms of the excavations. Due to the significant utilities along the project and potentially soft conditions, we recommend the soils in the culvert excavation be considered Type C soils under Department of Labor and Occupational Safety and Health Administration (OSHA) Guidelines. **All earthwork and construction should be performed in accordance with OSHA Guidelines**.

C.6.c. Dewatering. Potential groundwater was encountered in Boring ST-5 at a depth below 8 feet. We generally do not anticipate groundwater will be encountered during culvert excavations up to 6 to 7 feet deep.

If culvert excavations are deeper and groundwater is encountered during construction, we recommend immediately pumping the water out and away from the excavation to reduce the risk of creating unstable subgrade. The clays at pipe invert are sensitive to changes in moisture content and could become unstable if water is allowed to infiltrate into trench bottoms. The actual method of dewatering will need to be determined by the contractor based on their experience and available equipment. Clay soils are difficult to dewater, especially if groundwater is seeping in thin layers of sand. We anticipate that vacuum extraction wells, also known as sand points, may be needed for dewatering clayey soils.

C.6.c. Culvert Trench Bottoms and Bedding. In general, the soils encountered by the boring at anticipated pipe invert depths were primarily medium to soft alluvial soils consisting of lean clay with sand and sandy lean clay. It is our opinion these soils are not suitable for pipe bedding. Therefore, we recommend Type 2 bedding be placed beneath Type 1 bedding to provide better culvert support. We recommend providing 18 inches of Type 2 bedding beneath the Type 1 bedding. Type 1 and Type 2 bedding material are discussed in more detail below.

> ***C.6.c.1. Type 1 and Type 2 Pipe Bedding.*** *Montana Public Works Standard Specifications* (MPWSS) has two options for bedding materials. In general, option one is using open-graded material for Type 1 and Type 2 bedding which must be wrapped in a non-woven geotextile fabric to help prevent piping of fines which is critical for culverts having flowing water. Option two is to use well-graded sands and gravels for Type 1 and Type 2 bedding which do not require having to be wrapped in the geotextile fabric. These two options are discussed in more detail below.

C.6.c.2. Option 1-MPWSS Section 02221 Bedding. This section of MPWSS allows Type 1 and Type 2 bedding to be open-graded washed rock material. If Section 02221 is followed for the culvert lines, then we recommend the Type 1 and Type 2 bedding be wrapped in a 6-ounce medium survivability non-woven geotextile fabric. These open-graded bedding materials must be completely wrapped in the fabric to prevent the infiltration of fines, referred to as piping, which can result in settlement. Some contractors prefer to wrap the fabric over the top of the pipe, which is allowable.

C.6.c.3. Option 2-MPWSS Standard Drawing 02221-1. As specified in accordance with Standard Drawing 02221-2, well-graded Type 1 and Type 2 bedding can be provided beneath and around the culvert lines. The advantage of using well-graded Type 1 and Type 2 bedding is that it does not have to be wrapped in fabric because the material is not open-graded. The well-graded material has fine- to coarse-grained sand particles which helps prevent piping of fines. This drawing primarily addresses Type 1 bedding but can also be used for Type 2 bedding in our opinion. If this option is selected, the bedding materials will likely be the same materials and will likely be 3/4-inch minus well-graded crushed base course. Samples will need to be submitted for gradation tests used to determine coefficient of uniformity (C_U) and coefficient of curvature (C_C) if this option is chosen.

C.6.d. Backfill and Compaction. After placement of the bedding material, it is our opinion the on-site soils can be reused as backfill above bedding to provide more uniform conditions. However, to reduce trench settlement, it is critical the backfill be moisture conditioned to a moisture content within 2 percent of optimum moisture content, placed in uncompacted lifts up to 8 inches thick, and compacted to a minimum of 95 percent of its standard Proctor maximum dry density. Some of the on-site soils are well over optimum and will need to be dried out. Drying clays out takes time and sufficient area so the soils can be spread out and exposed to wind and sun. Another option is to replace wet backfill from the trenches with imported drier lean clay soils similar to the on-site clays. Similar soils should be used to provide uniform subgrades beneath the roadways.

The following requirements should be used during the trench backfilling.

- On-site soils can be used as trench backfill. Excavated soils are likely wet and well above optimum moisture content (OMC). It will likely be necessary to spread these soils out and allow them to dry, as well as favorable weather, to achieve a moisture content ±2 percent of OMC.
- Quality Assurance (QA) and Quality Control (QC) testing should be performed within the active backfilling process to monitor compaction. Compaction testing is recommended to confirm equipment and number of passes are consistently being applied to properly compact backfill to specification. Compaction tests in test pits behind the active installation are not recommended, and in our experience, density tests in test pits are not representative of the backfill compaction, i.e., while excavating the test pit, material is compacted by the backhoe.

- Lift thicknesses should not exceed 8 inches loose thickness. Depending on the QA and QC testing described above, thinner lifts may be necessary.
- We recommend all backfill be placed and compacted in accordance with the most recent MPWSS Type A Trench Backfill requirements and those recommendations indicated above.

If imported material is used, it should be similar to the on-site soils, i.e. lean clay should be replaced with imported lean clay and gravel (base and subbase) replaced with imported gravels that can be compacted to specification. Additionally, thicker lifts will generally result in increased settlement.

C.6.e. Trench Settlement. Trench settlement of excavations is a common problem and is often difficult to avoid. Even well compacted backfill (95 percent) will settle, and in our opinion, we anticipate trench settlement will be approximately 1 percent of the total trench depth. For backfill compacted to only 90 percent, we anticipate trench settlement in the range of 3 percent of the trench depth. If the backfill is poorly compacted, excessively thick lifts are placed, large oversize materials are left in place, contains frozen materials, or surface water infiltrates into the trench, several inches or more of settlement could occur.

Full-time inspection during placement of backfill to monitor lift thicknesses and compaction efforts helps reduce the risk of these issues occurring after construction. We have found that sheepsfoot rollers attached to backhoe buckets can only compact 8-inch loose lifts, even though density testing indicated thicker lifts could be used. Settlement due to poor compaction and/or too thick lifts can be several inches or more.

C.6.f. Materials. Clayey soils encountered in the borings were tested in our laboratory for corrosivity, with the results attached in Laboratory Test Results in the Appendix. Conductivities ranged from 0.500 to 0.833 millimhos per centimeter (mmhos/cm), indicating high corrosion potential to metallic conduits. We recommend specifying non-corrosive conduit materials or providing additional corrosion protection.

D. Construction

D.1. Excavation

It is our opinion the soils encountered by the borings can be excavated with a backhoe, front-end loader or scraper. The borings indicate soils in excavations over 5 feet deep will be Type C under Department of Labor Occupational Safety and Health Administration (OSHA) guidelines. All earthwork and construction should be performed in accordance with OSHA guidelines.

D.2. Observations

We recommend excavations and pavement subgrades be observed by a geotechnical engineer or an engineering technician working under the direction of a geotechnical engineer to see if the subgrade soils and aggregates are similar to those encountered by the borings. If excessively soft and unstable subgrades are encountered, we recommend subgrade observations with DCP tests to evaluate bridging with geogrid. We also recommend observations of the signal pole drilled piers, especially if groundwater is encountered.

D.3. Moisture Conditioning

Site soils that may be excavated and reused as backfills and fills appeared to be near and over OMC. We anticipate it will be necessary to allow some of these soils to dry out to achieve a moisture content near OMC.

It should also be anticipated that imported fill and backfill materials will be below optimum moisture content and additional moisture will be necessary to maintain them near or slightly above optimum.

D.4. Subgrade Disturbance

The borings indicated the surficial subgrade will contain sandy lean clays. These fine-grained soils are considered moisture sensitive and are easily disturbed when wet. We therefore recommend good drainage of surface water be provided during construction to help avoid ponding areas. Ponding water will result in saturation of the clay soils, creating soft spots. Construction traffic driving across these soft spots can create large ruts and excessively disturb the areas. It is then very difficult to recompact these areas to specification, and they can result in construction delays.

D.5. Testing

We recommend density tests of fills and backfills placed beneath footings, slabs, and pavements. Density tests should also be performed on foundation wall backfill. We also recommend density testing of the compacted pavement subgrade and gravel base course. We recommend slump, temperature, air content, and strength tests on Portland cement concrete. Samples of proposed backfill and fill materials should be submitted to our testing laboratory at least three days prior to placement on the site for evaluation and determination of their optimum moisture contents and maximum dry densities.

We recommend testing PMS for maximum voidless density per ASTM D2041, lab compaction per the chosen mix design, and field cores for height and density.

D.6. Cold Weather Construction

If site grading and construction is anticipated during cold weather, we recommend good winter construction practices be observed. All snow and ice should be removed from cut and fill areas prior to additional grading. No fill should be placed on soils that have frozen or contain frozen material. No frozen soils should be used as fill.

Concrete delivered to the site should meet the temperature requirements of ASTM C94. Concrete should not be placed on frozen soils or soils that contain frozen material. Concrete should be protected from freezing until the necessary strength is attained. Frost should not be permitted to penetrate below footings bearing on frost-susceptible soil since such freezing could heave and crack the footings and/or foundation walls.

If the earthwork and site preparation is planned during the winter and early spring, additional work will be required due to the inherent wetter ground conditions, increased rain or snow fall, frozen ground, lack of drying weather and shorter work days. This additional work often includes, but is not limited to, subexcavation of unsuitable material, imported suitable fill, geosynthetics, ground heaters, waste of frozen or wet material and higher testing and observation costs. The additional work can delay the contractor's schedule and result in substantial additional costs that are often passed onto the owner.

E. Procedures

E.1. Drilling and Sampling

The penetration test borings were performed on December 2 and December 3, 2024 with our all-terrain vehicle (ATV) mounted drilling rig. Sampling for the borings was conducted in accordance with ASTM D1586, "Penetration Test and Split-Barrel Sampling of Soils." Using this method, we advanced the borehole with hollow-stem auger to the desired test depth. Then a 140-pound hammer falling 30 inches drove a standard, 2-inch OD, split-barrel sampler a total penetration of 1 1/2 feet below the tip of the hollow-stem auger. The blows for the last foot of penetration were recorded and are an index of soil strength characteristics. 3-inch diameter thin-walled tube samples were taken in fine-grained soils in general accordance with ASTM D1587, "Thin-walled Tube Sampling of Soils." The tubes were slowly pushed into undisturbed soils below the hollow-stem auger. After they were withdrawn from the boreholes, the ends of the tubes were sealed and the tubes were carefully transported to our laboratory.

Hollow-stem auger borings were taken in general accordance with ASTM D1452, "Soil Investigation and Sampling by Auger Borings." The soil classification and strata depths were inferred from the cuttings brought to the surface by rotation of the auger. Bag samples were taken of some of the strata.

E.2. Soil Classification

The drill crew chief visually and manually classified the soils encountered in the borings in accordance with ASTM D2488, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedures)." A summary of the ASTM classification system is attached. All samples were then returned to our laboratory for review of the field classifications by a geotechnical engineer. Representative samples will remain in our office for a period of 60 days to be available for your examination.

E.3. Groundwater Observations

About 10 minutes after taking the final sample in the bottom of a boring, the driller probed through the hollow-stem auger to check for the presence of groundwater. Immediately after withdrawal of the auger, the driller again probed the depth to water or cave-in. The borings were then backfilled.

F. General Recommendations

F.1. Basis of Recommendations

The analyses and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated on the attached sketch. Often, variations occur between these borings, the nature and extent of which do not become evident until additional exploration or construction is conducted. A reevaluation of the recommendations in this report should be made after performing on-site observations during construction to note the characteristics of any variations. The variations may result in additional earthwork and construction costs, and it is suggested a contingency be provided for this purpose.

It is recommended we be retained to perform the observation and testing program for the site preparation phase of this project. This will allow correlation of the soil conditions encountered during construction to the soil borings, and will provide continuity of professional responsibility.

F.2. Review of Design

This report is based on the design of the proposed roadway improvements as related to us for preparation of this report. It is recommended we be retained to review the geotechnical aspects of the designs and specifications. With the review, we will evaluate whether any changes in design have affected the validity of the recommendations, and whether our recommendations have been correctly interpreted and implemented in the design and specifications.

F.3. Groundwater Fluctuations

We made water level observations in the borings at the times and under the conditions stated on the boring logs. These data were interpreted in the text of this report. The period of observation was relatively short, and fluctuation in the groundwater level may occur due to rainfall, flooding, irrigation, spring thaw, drainage, and other seasonal and annual factors not evident at the time the observations were made. Design drawings and specifications and construction planning should recognize the possibility of fluctuations.

F.4. Use of Report

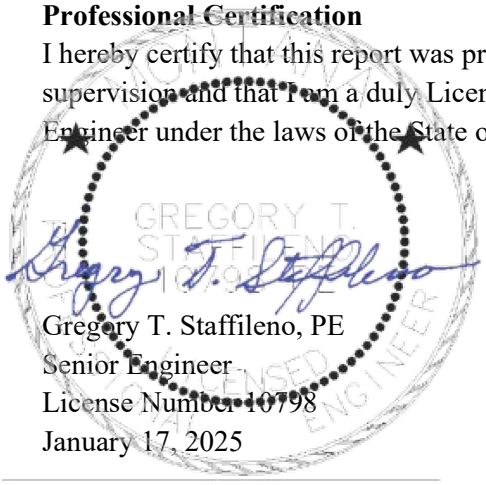
This report is for the exclusive use of Sanbell, Yellowstone County, and the selected contractor to use to design the roadway improvements, prepare construction documents, and construction. In the absence of our written approval, we make no representation and assume no responsibility to other parties regarding this report. The data, analyses, and recommendations may not be appropriate for other structures or purposes. We recommend parties contemplating other structures or purposes contact us.

F.5. Level of Care

Services performed by SK Geotechnical Corporation personnel for this project have been conducted with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar budget and time restraints. No warranty, express or implied, is made.

Professional Certification

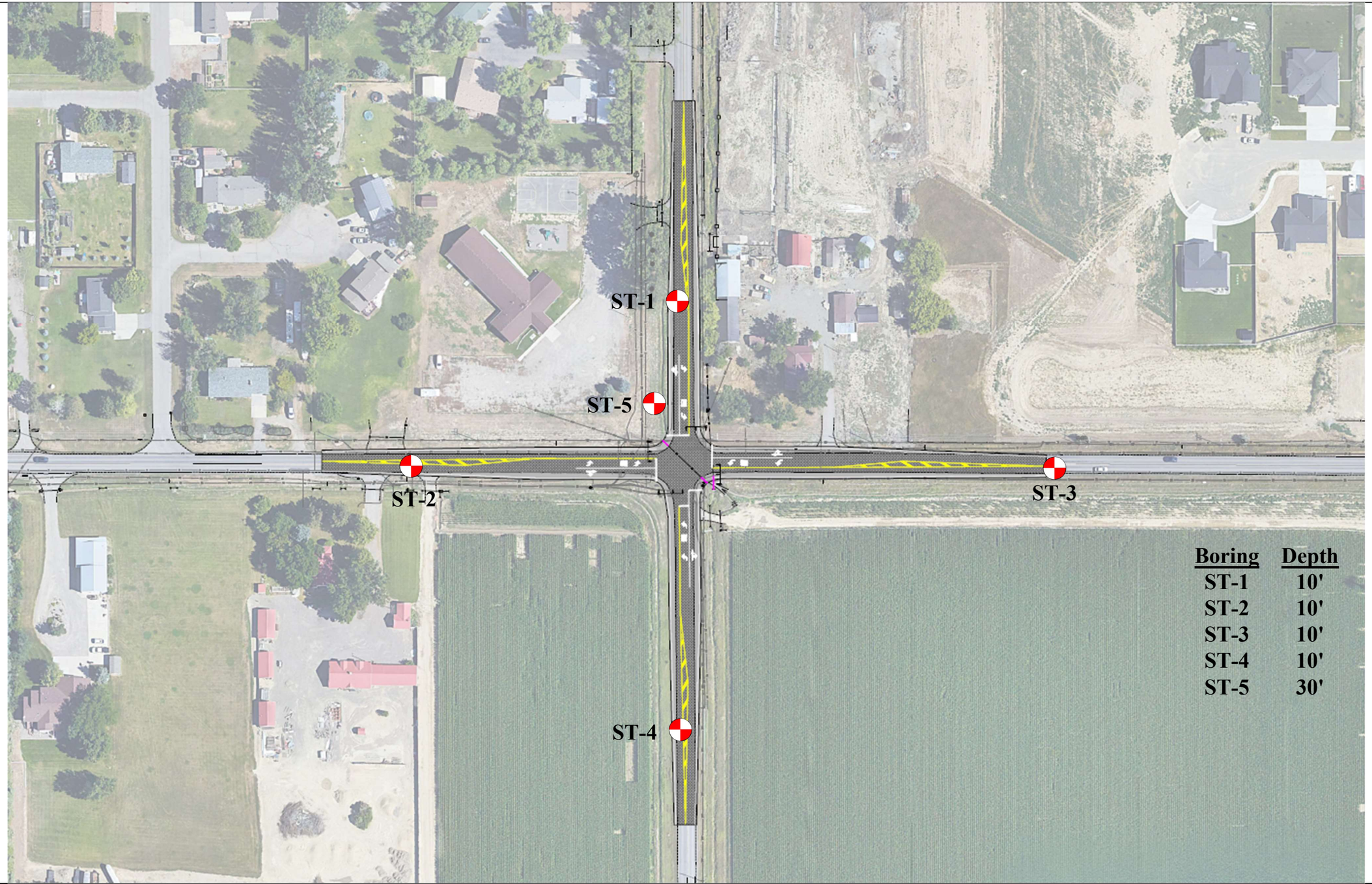
I hereby certify that this report was prepared under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Montana.



Gregory T. Staffileno, PE
Senior Engineer
License Number 10798
January 17, 2025

Appendix

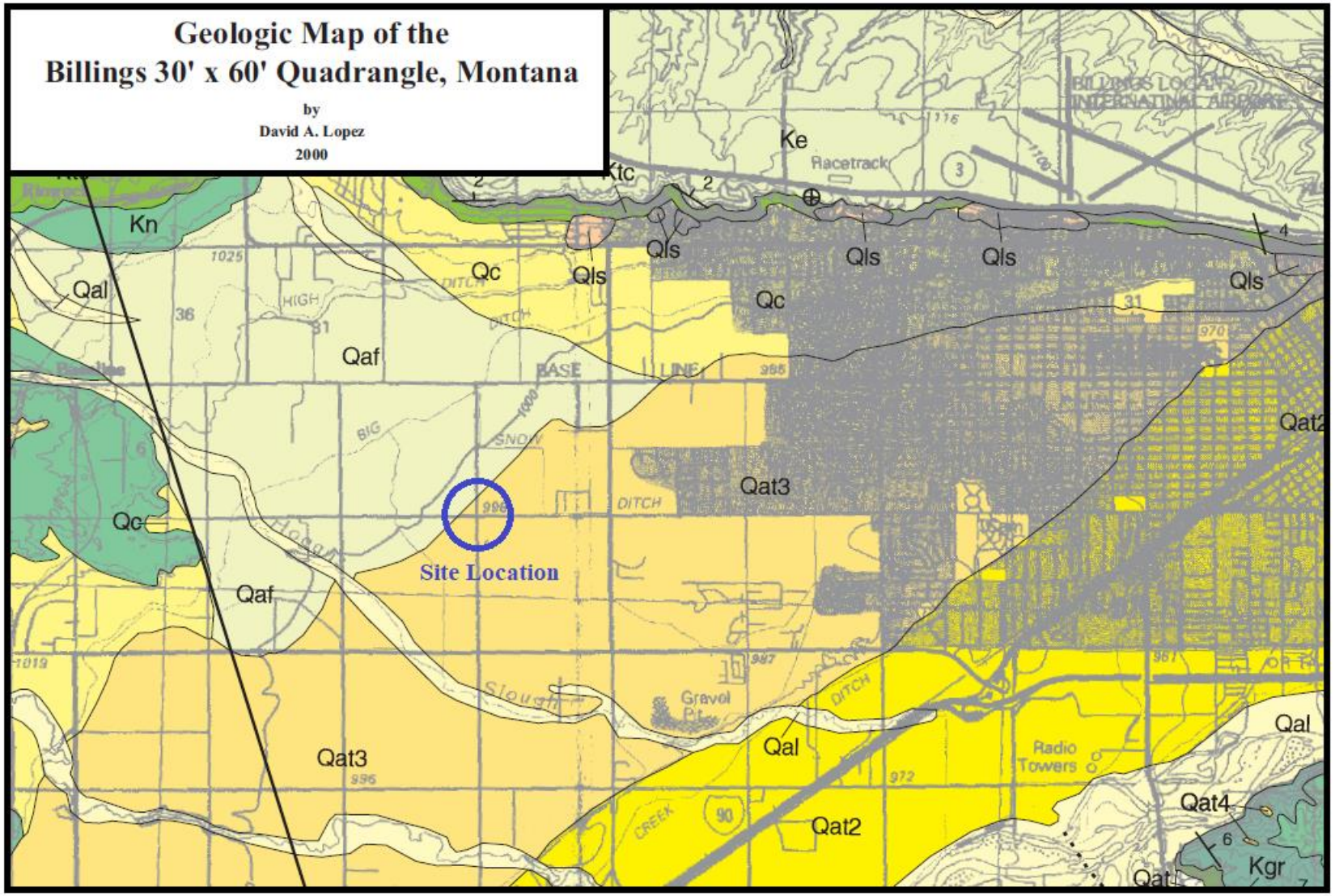
SK GEOTECHNICAL	**SITE LOCATION SKETCH** **Geotechnical Evaluation** Central Avenue & 48th Street West Intersection Improvements Billings, Montana	Drawn by: SKGeo/Google Maps	Date 12/13/24
		Project: 24-4477G	
		Scale: N/a	FIGURE
		Sheet 1 of 1	



SK GEOTECHNICAL

BORING LOCATION SKETCH
Geotechnical Evaluation
Central Avenue & 48th Street West
Intersection Improvements Billings, Montana

Drawn by:	SKGeo/Sanbell – Rocky Mountain	Date	12/17/2024
Project:	24-4477G		
Scale:	NTS	FIGURE	
Sheet	1 Of 1		



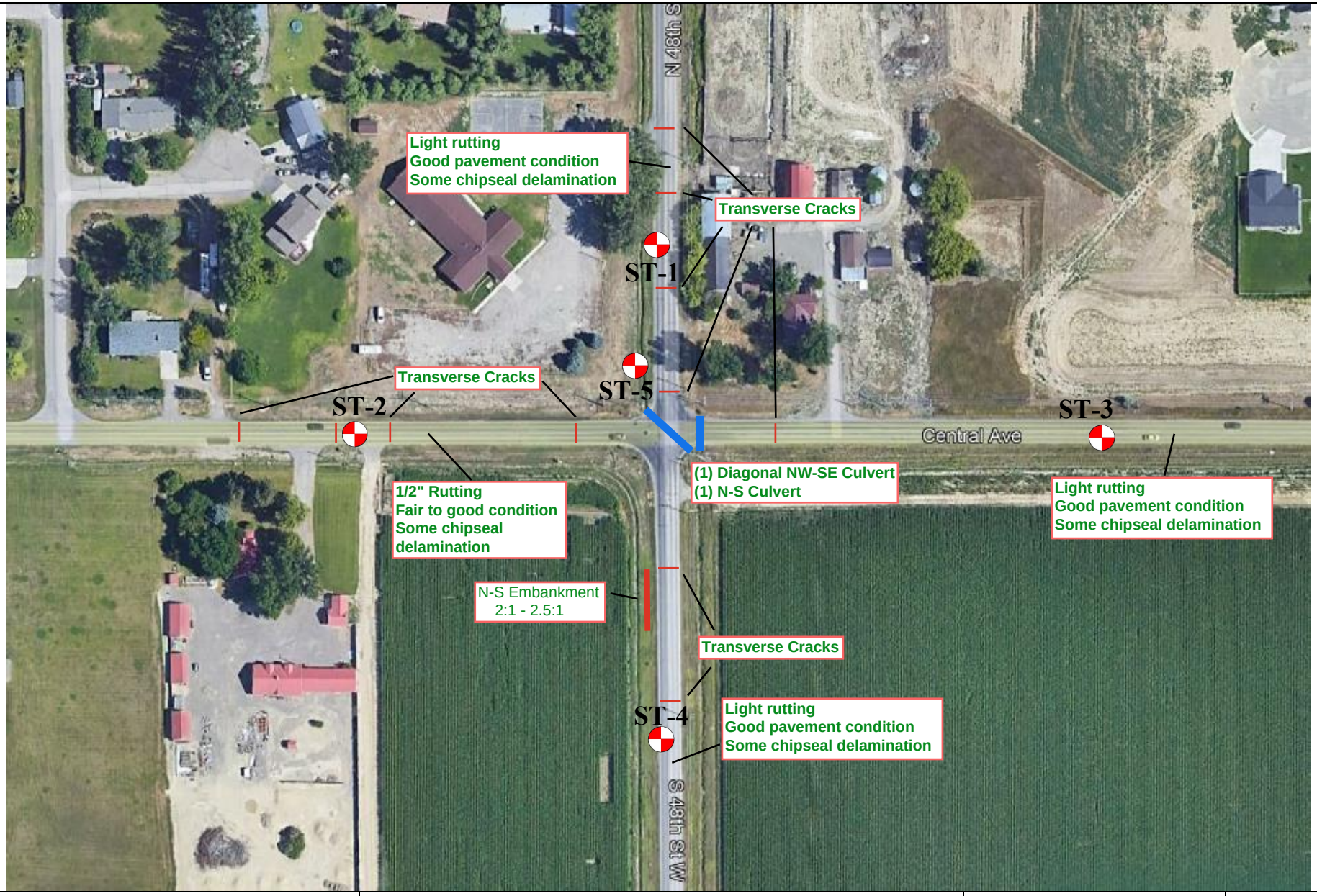
Qaf — **Alluvial fan deposits** (Holocene and Pleistocene): Gravel, sand, silt, and clay deposited in fans being formed by modern streams along major valley margins.

Qat3 — **Alluvial gravel, terrace level 3** (Pleistocene): Gravel underlying terraces about 50 to 90 feet above present altitude of Yellowstone River.

SK GEOTECHNICAL

PARTIAL GEOLOGIC SKETCH
Geotechnical Evaluation
Central Avenue & 48th Street West Intersection Improvements
Billings, Montana

Drawn by:	SKGeo/MBMG	Date	12/13/2024
Project:	24-4477G		
Scale:	N/a		FIGURE
Sheet	1 of 1		



SK GEOTECHNICAL

VISUAL PAVEMENT CONDITION SKETCH
Geotechnical Evaluation
Central Avenue & 48th Street West Intersection Improvements
Billings, Montana

Drawn by:	SKGeo/Google Earth	Date	12/17/2024
Project:	24-4477G		
Scale:	N/a		FIGURE
Sheet	1 of 1		

Descriptive Terminology

Standard D 2487
Classification of Soils for Engineering Purposes
(Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines [C]	$C_U \geq 4$ and $1 \leq C_C \leq 3$ [E]	GW	Well graded gravel [F]
			$C_U < 4$ and/or $1 > C_C > 3$ [E]	GP	Poorly graded gravel [F]
		Gravels with Fines More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines [D]	$C_U \geq 6$ and $1 \leq C_C \leq 3$ [E]	SW	Well graded sand [I]
			$C_U < 6$ and/or $1 > C_C > 3$ [E]	SP	Poorly graded sand [I]
		Sands with Fines More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid Limit less than 50	Inorganic	PI > 7 and plots on or above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic	Liquid limit – oven dried / Liquid limit – not dried < 0.75	OL	Organic clay [K, L, M, N] Organic silt [K, L, M, O]
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic silt [K, L, M]
		Organic	Liquid limit – oven dried / Liquid limit – not dried < 0.75	OH	Organic clay [K, L, M, P] Organic silt [K, L, M, Q]
Highly Organic Soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

[A] Based on the material passing the 3" (75 mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols.
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E] $C_U = D_{60} / D_{10}$
$C_C = (D_{30})^2 / (D_{10} \times D_{60})$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

[M] If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.

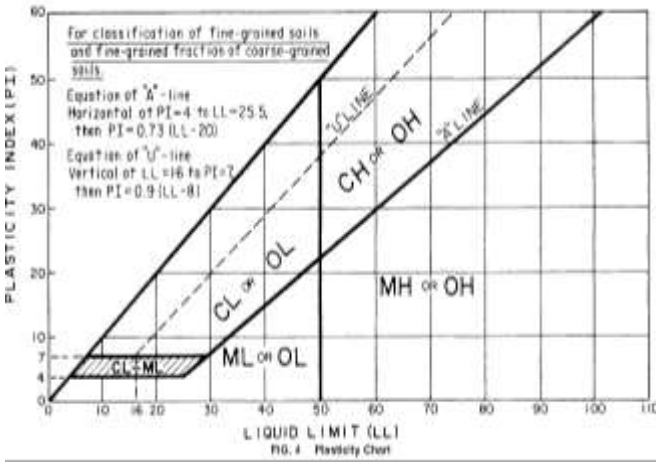


FIG. 1 Plasticity Chart

Laboratory Tests

DD	Dry density, pcf	WD	Wet density, pcf	OC	Organic content, %
LL	Liquid limit	PL	Plastic limit	PI	Plasticity index
P_{200}	% passing 200 sieve	MC	Natural moisture content, %		
MDD	Maximum dry density (Proctor), pcf			OMC	Optimum moisture content (Proctor), %
qu	Unconfined compressive strength, psf			UCS	Unconfined compressive strength, psi
qp	Pocket penetrometer strength, tsf				

Particle Size Identification

Boulders	over 12"
Cobbles	3" to 12"
Gravel	
coarse	3/4" to 3"
fine	No. 4 to 3/4"
Sand	
coarse	No. 4 to No. 10
medium	No. 10 to No. 40
fine	No. 40 to No. 200
Silt	No. 200 to .005 mm
Clay	less than .005 mm

Relative Density of Cohesionless Soils

very loose	0 to 4 BPF
loose	5 to 10 BPF
medium dense	11 to 30 BPF
dense	31 to 50 BPF
very dense	over 50 BPF

Consistency of Cohesive Soils

very soft	0 to 1 BPF
soft	2 to 3 BPF
rather soft	4 to 5 BPF
medium	6 to 8 BPF
rather stiff	9 to 12 BPF
stiff	13 to 16 BPF
very stiff	17 to 30 BPF
hard	over 30 BPF

Moisture Content (MC) Description

rather dry	MC less than 5%, absence of moisture, dusty
moist	MC below optimum, but no visible water
wet	Soil is over optimum MC
waterbearing	Granular, cohesionless or low plasticity soil with free water, typically near or below groundwater table
very wet	Cohesive soil well over OMC, typically near or below groundwater table

Drilling Notes

Standard penetration test borings were advanced by 3¼" or 4¼" ID hollow-stem augers, unless noted otherwise. Standard penetration test borings are designated by the prefix "ST" (split tube). Hand auger borings were advanced manually with a 2 to 3" diameter auger to the depths indicated. Hand auger borings are indicated by the prefix "HA."

Sampling. All samples were taken with the standard 2" OD split-tube sampler, except where noted. TW indicates thin-walled tube sample. CS indicates California tube sample. BS indicates bulk sample.

BPF. Numbers indicate blows per foot recorded in standard penetration test, also known as "N" value. The sampler was set 6" into undisturbed soil below the hollow-stem auger. Driving resistances were then counted for second and third 6" increments and added to get BPF. Where they differed significantly, they were separated by backslash (/). In very dense/hard strata, the depth driven in 50 blows is indicated.

WH. WH indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

Note. All tests were run in general accordance with applicable ASTM standards.

October 30, 2018

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

LOG OF BORING

PROJECT: 24-4477G
GEOTECHNICAL EVALUATION
Central & 48th Street West LTL
Billings, Montana

BORING: **ST-1**
LOCATION:
See Attached Sketch

DRILLED BY: C. Binstock | METHOD: Mobile B57 | DATE: 12/3/24 | SCALE: 1" = 2'

Elev.	Depth	Symbol	Description of Materials	BPF	WL MC	qp (tsf)	Remarks
	0.0		Asphalt Pavement: (0"-6")				
	0.5	GP GM	Gravel Base: (6"-8½"): Poorly Graded Gravel with Silt and Sand, fine- to coarse-grained, brown, moist, subangular.		3.2		LL=NP, PL=NP, PI=NP P_{200}= 9.5%
	0.7		Gravel Subbase: (8½"-38½"): Poorly Graded Gravel with Silt and Sand, fine- to coarse-grained, brown, moist, dense to medium dense, subangular.	40	8.7		
		GP GM			2.8		LL=NP, PL=NP, PI=NP P_{200}= 7.3%
	3.2		SANDY LEAN CLAY, low plasticity, brown, moist to wet, rather soft to medium. (Alluvium)	20	13.3		
		CL		5	23.2		Bulk Bag Sample: (4'-9') MDD: 116.4 pcf OMC: 15.8% CBR: 3.4% LL=29, PL=12, PI=17 P_{200}= 62.2%
	7.5		SILTY SAND, fine-grained, brown, moist, loose to very loose. (Alluvium)	6	12.8		
		SM		4	15.3		
	10.5		END OF BORING Water not observed to dry cave-in depth of 3.4' immediately after withdrawal of auger. Boring then backfilled.				

BORING BPF WL-MC QP ELEV ~ 4477.GPJ LAGNNN06.GDT 1/17/25

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

LOG OF BORING

PROJECT: 24-4477G
GEOTECHNICAL EVALUATION
Central & 48th Street West LTL
Billings, Montana

BORING: **ST-2**
LOCATION:
See Attached Sketch

DRILLED BY: C. Binstock | METHOD: Mobile B57 | DATE: 12/3/24 | SCALE: 1" = 2'

Elev.	Depth	Symbol	Description of Materials	BPF	WL MC	qp (tsf)	Remarks
	0.0		Asphalt Pavement: (0"-7")				
	0.6	GP			3.3		LL=NP, PL=NP, PI=NP P_{200}= 10.2%
	0.7	GM	Gravel Base: (7"-8½"): Poorly Graded Gravel with Silt and Sand, fine- to coarse-grained, brown, moist, subangular.		3.5		LL=24, PL=15, PI=9 P_{200}= 11.9%
		GW GC	Gravel Subbase: (8½"-26"): Well Graded Gravel with Clay and Sand, fine- to coarse-grained, moist, dense, subangular.	42	6.3		
	2.2		POORLY GRADED SAND with SILT, fine-grained, brown, moist, medium dense. (Alluvium or Possible Fill)	16	13.0		
		SP SM					
	4.0		SANDY LEAN CLAY with sand seams, low plasticity, brown, wet, medium to rather soft. (Alluvium)	7	20.7		
							Bulk Bag Sample: (6½'-9') MDD: 117.2 pcf OMC: 15.2% CBR: 5.5% LL=30, PL=13, PI=17 P_{200}= 66.6%
		CL		6	14.8		
				5	19.9		
	10.5		END OF BORING Water not observed with 9' of hollow-stem auger in the ground. Boring then backfilled.				

BORING BPF WL-MC QP ELEV ~ 4477.GPJ LAGNNN06.GDT 1/17/25

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

LOG OF BORING

PROJECT: 24-4477G
GEOTECHNICAL EVALUATION
Central & 48th Street West LTL
Billings, Montana

BORING: **ST-3**
LOCATION:
See Attached Sketch

DRILLED BY: C. Binstock | METHOD: Mobile B57 | DATE: 12/3/24 | SCALE: 1" = 2'

Elev.	Depth	Symbol	Description of Materials	BPF	WL MC	qp (tsf)	Remarks
	0.0		Asphalt Pavement: (0"-6")				
	0.5	SP SM	Gravel Base: (6"-11¼"): Poorly Graded Sand with Silt and Gravel, fine- to coarse-grained, brown, moist.		3.6		LL=NP, PL=NP, PI=NP P_{200}= 11.3%
	0.9	GP GM	Gravel Subbase: (11¼"-31¼"): Poorly Graded Gravel with Silt and Sand, fine- to coarse-grained, brown, moist, dense to medium dense, subangular.	44	7.6		
	2.6	CL	SANDY LEAN CLAY, low plasticity, gray, moist to wet, very stiff. (Alluvium)	18	15.1		
	3.5	CL	SANDY LEAN CLAY with sand seams, low plasticity, brown, wet, soft to rather soft. (Alluvium)	3	16.5		Bulk Bag Sample: (4'-9') MDD: 116.1 pcf OMC: 14.7% CBR: 4.0% LL=31, PL=15, PI=16 P_{200}= 61.1%
				4	22.0		
				5	18.5		
	10.5		END OF BORING Water not observed with 9' of hollow-stem auger in the ground. Boring then backfilled.				

BORING BPF WL-MC QP ELEV ~ 4477.GPJ LAGNNN06.GDT 1/17/25

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

LOG OF BORING

PROJECT: 24-4477G
GEOTECHNICAL EVALUATION
Central & 48th Street West LTL
Billings, Montana

BORING: **ST-4**
LOCATION:
See Attached Sketch

DRILLED BY: C. Binstock | METHOD: Mobile B57 | DATE: 12/3/24 | SCALE: 1" = 2'

Elev.	Depth	Symbol	Description of Materials	BPF	WL MC	qp (tsf)	Remarks
	0.0		Asphalt Pavement: (0"-9")				
	0.8	GP GM	Gravel Base/Subbase: (9"-36"): Poorly Graded Gravel with Silt and Sand, fine- to coarse-grained, brown, moist, subangular.	21	16.6 1.8		LL=NP, PL=NP, PI=NP P_{200}= 4.7%
	3.0	SC SM	SILTY CLAYEY SAND, slightly plastic, fine-grained, brown, moist, medium dense to very loose. (Alluvium)	17	11.8		
	5.0	CL	LEAN CLAY with SAND, medium plasticity, brown, wet, rather soft to medium. (Alluvium)	4	19.8		Bulk Bag Sample: (5½'-9')
				6	12.1		
				4	27.9		
	10.5		END OF BORING Water not observed with 9' of hollow-stem auger in the ground. Boring then backfilled.				

BORING BPF WL-MC QP ELEV ~ 4477.GPJ LAGNNN06.GDT 1/17/25

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

LOG OF BORING

PROJECT: 24-4477G
GEOTECHNICAL EVALUATION
Central & 48th Street West LTL
Billings, Montana

BORING: **ST-5**
LOCATION:
See Attached Sketch

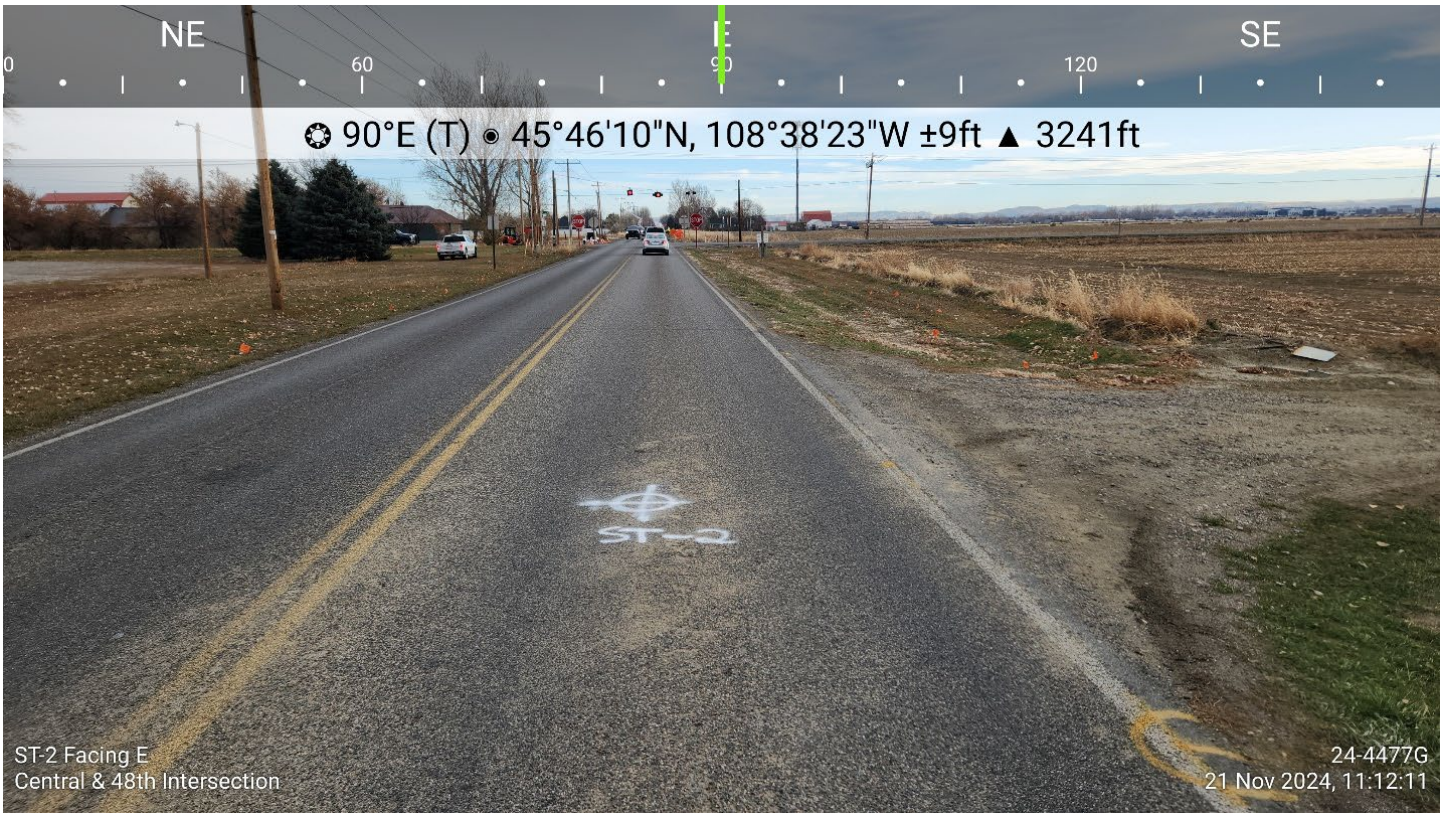
DRILLED BY: C. Binstock | METHOD: Mobile B57 | DATE: 12/2/24 | SCALE: 1" = 4'

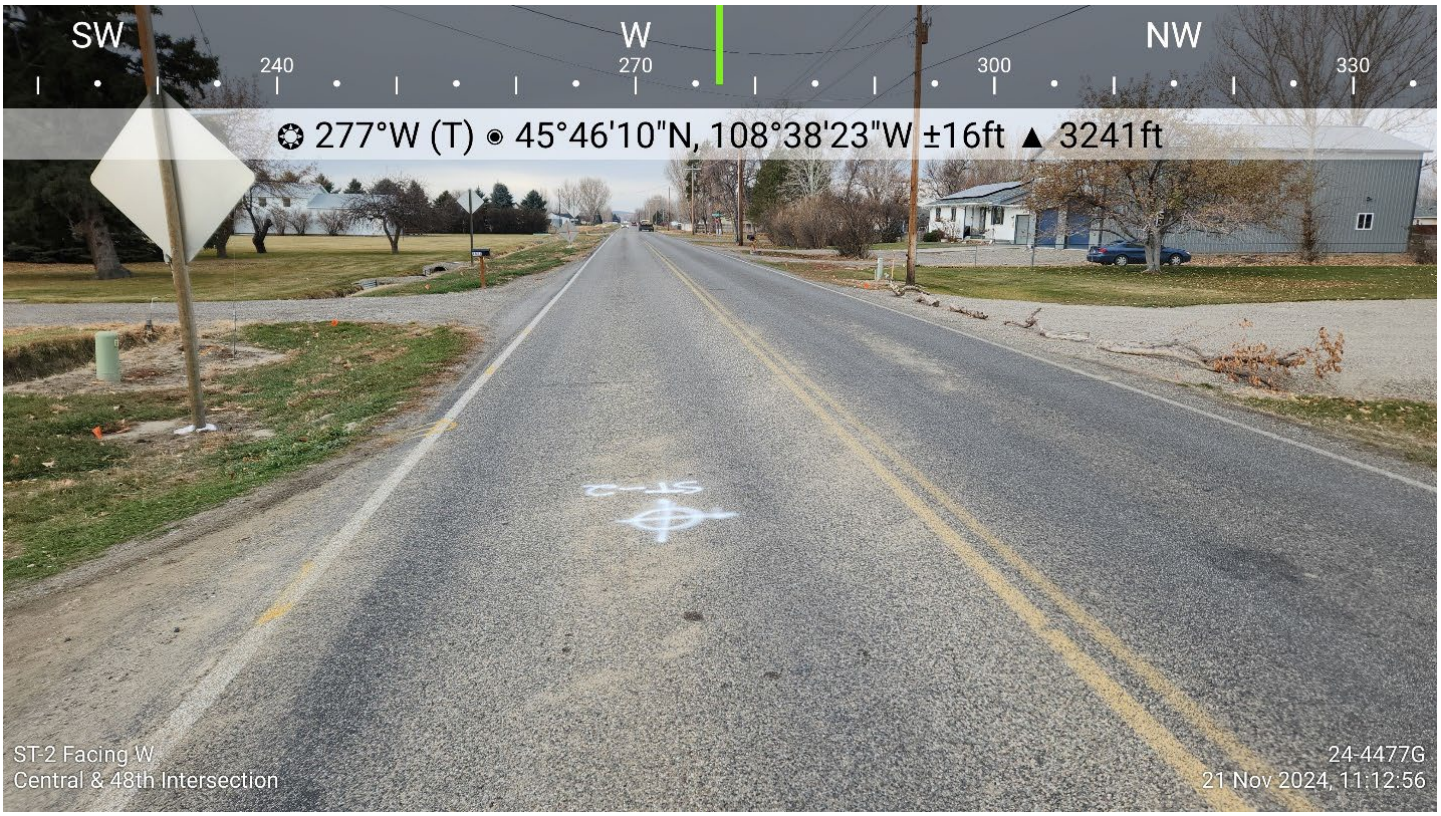
Elev.	Depth	Symbol	Description of Materials	BPF	WL MC	qp (tsf)	Remarks
	0.0						
	0.5		TOPSOIL: (6")				
		CL	LEAN CLAY with SAND, medium plasticity, brown, moist to wet, medium. (Alluvium)	4	13.0		
				6	14.1		
				6	12.7		Sand seam at 4.5'
				6	▼ 16.2		
	8.0				22.8		Thin-Wall Tube Sample: (8'-9') LL=28, PL=17, PI=11 P_{200}= 83.6%
		CL	LEAN CLAY with SAND, medium plasticity, brown, wet, soft. (Alluvium)	2	17.6		Sand seam at 10.5'
				3	18.7		
					29.2		Thin-Wall Tube Sample: (13'-14')
	15.0			3	21.2		
		SC SM	SILTY CLAYEY SAND, slightly plastic, fine-grained, brown, wet to waterbearing, very loose. (Alluvium)		▽		
				WH	33.1		Moisture content tests indicate possible groundwater below 8 feet.
				4	20.6		A solid triangle in the water level (WL) column indicates the depth water was observed on the date indicated.
				3	22.3		Water observed at a depth of 17.4' with 19' of hollow-stem auger in the ground. Water not observed to dry cave-in depth of 7.8' immediately after withdrawal of auger. Boring then backfilled.
	30.5		END OF BORING				

BORING BPF WL-MC QP ELEV ~ 4477.GPJ LAGNNN06.GDT 1/17/25

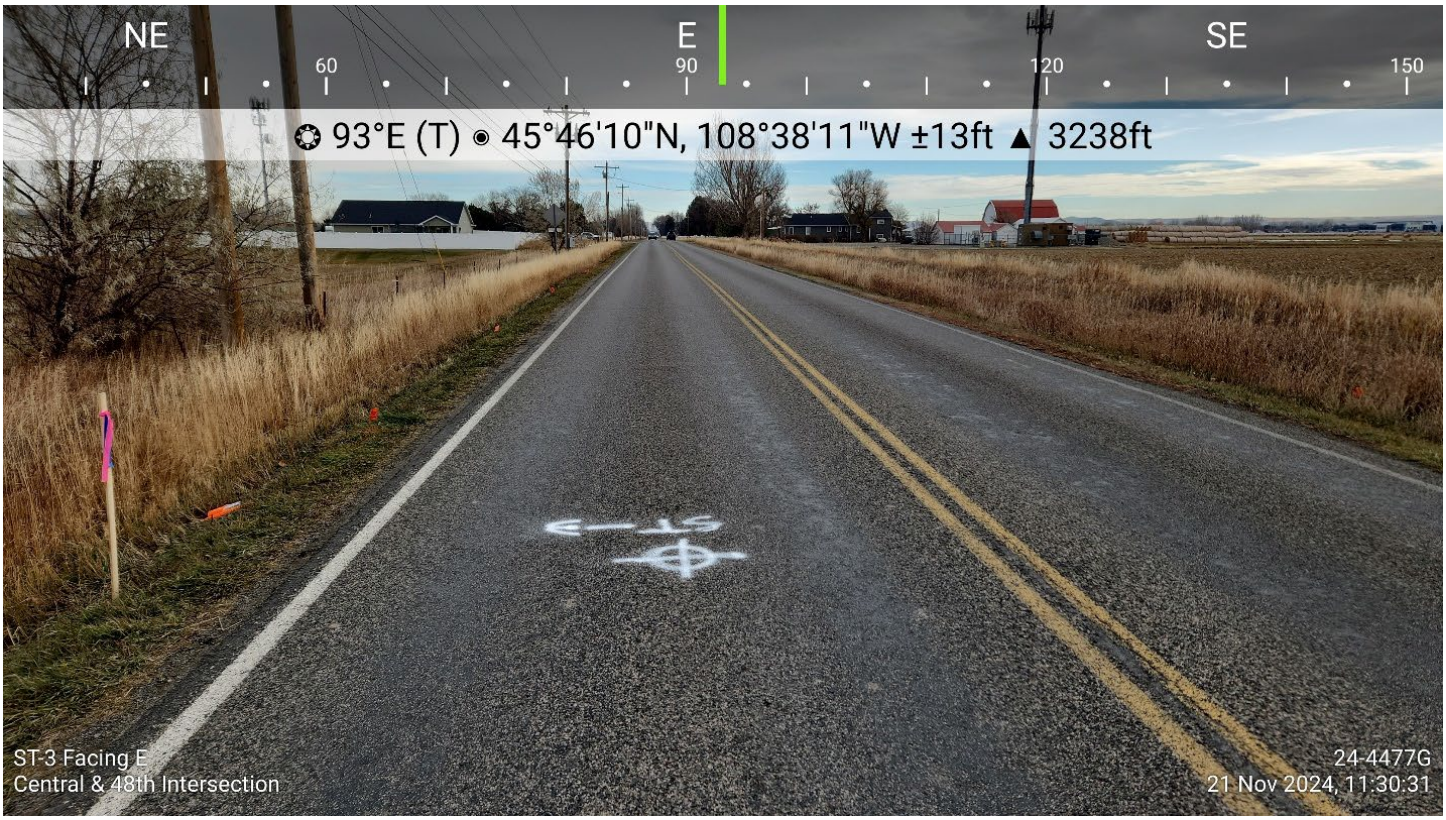

SE
S
SW
150
180
210
240
188°S (T) 45°46'13"N, 108°38'17"W ±36ft ▲ 3241ft
ST-1
ST-1 Facing S
Central & 48th Intersection
24-4477G
21 Nov 2024, 11:01:51

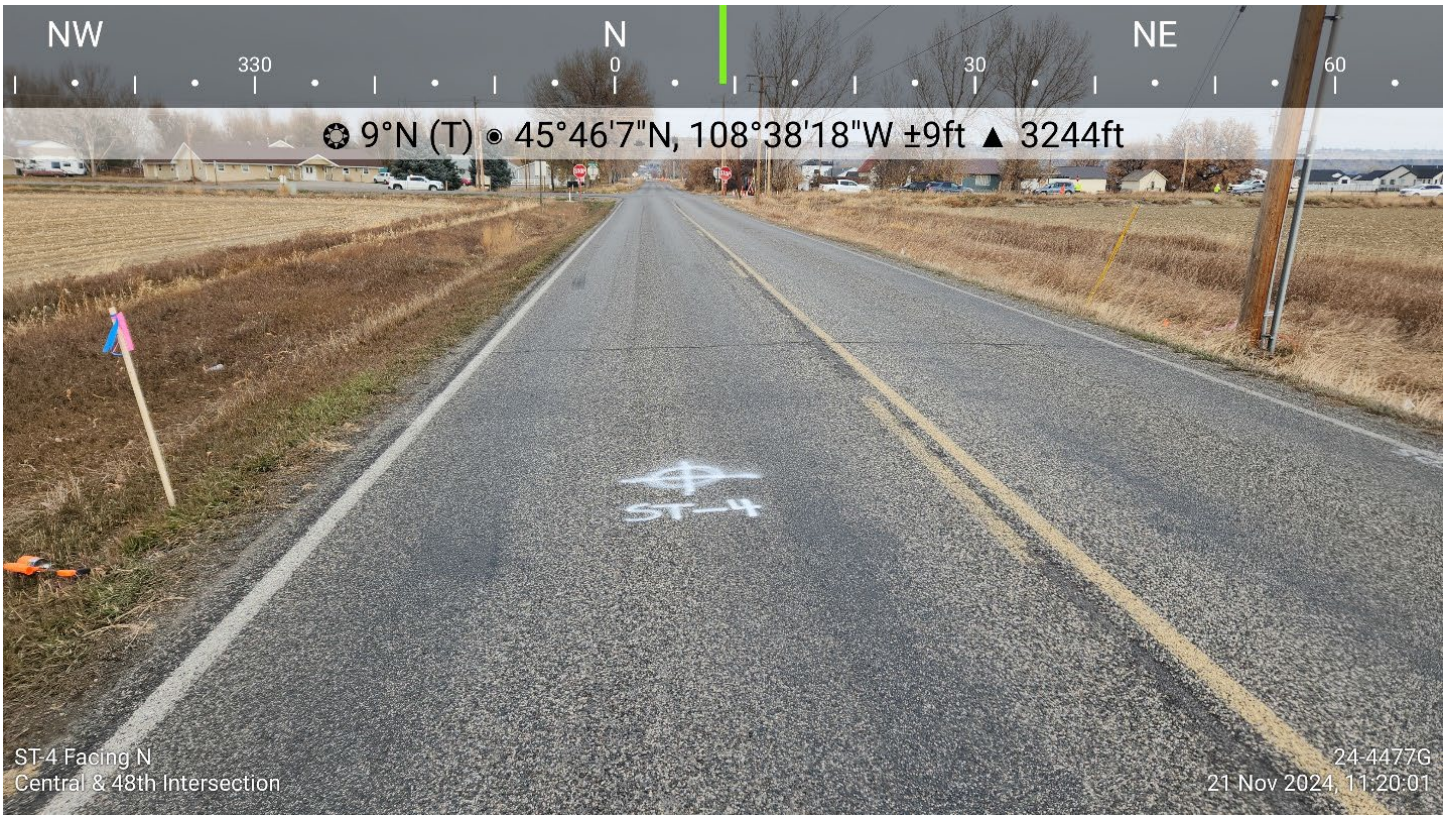

NW
N
NE
330
0
30
60
6°N (T) 45°46'12"N, 108°38'18"W ±9ft ▲ 3241ft
ST-1 Facing N
Central & 48th Intersection
24-4477G
21 Nov 2024, 11:39:49

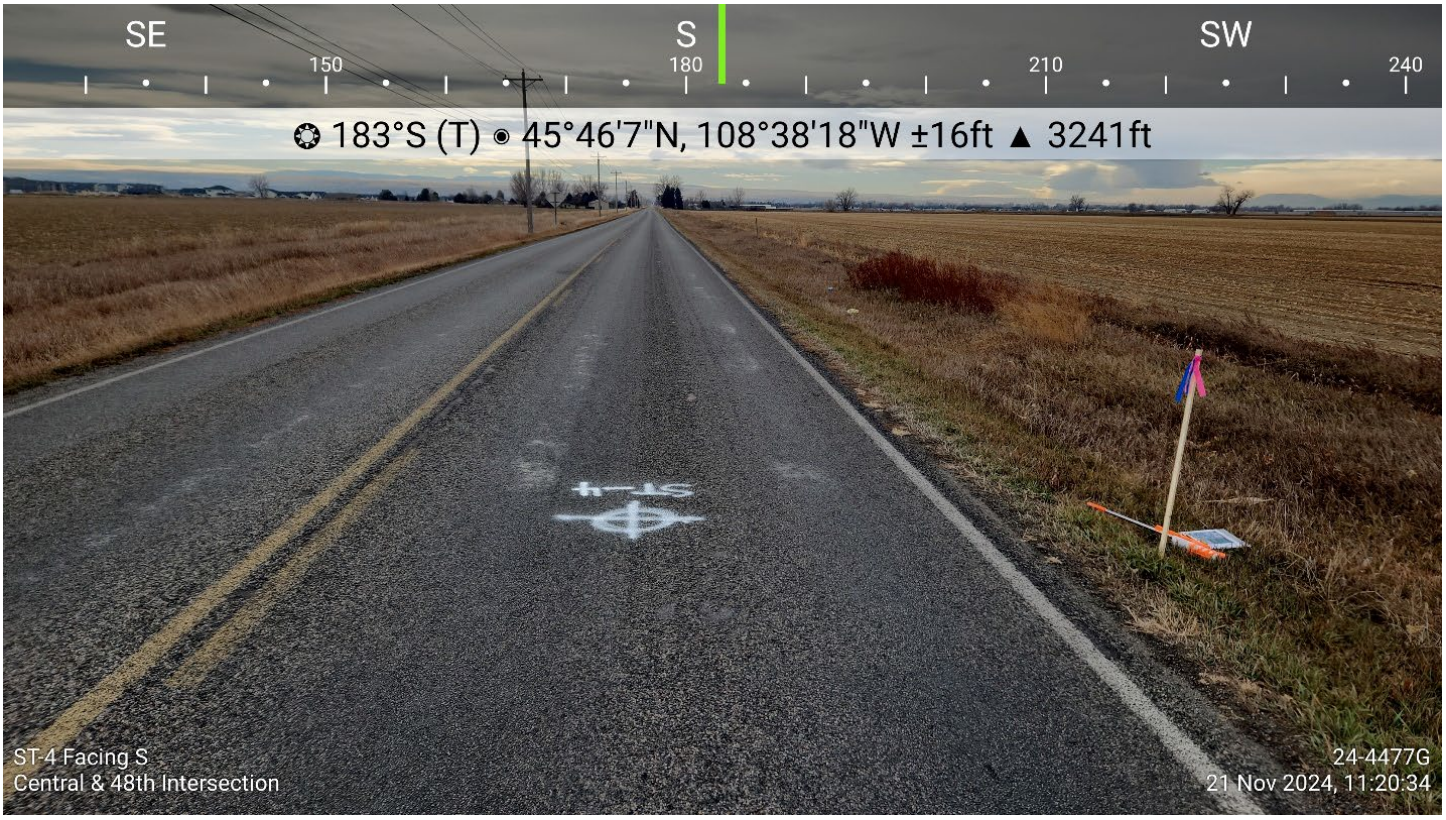

NE
E
SE
60
90
120
90°E (T) • 45°46'10"N, 108°38'23"W ±9ft ▲ 3241ft
ST-2
ST-2 Facing E
Central & 48th Intersection
24-4477G
21 Nov 2024, 11:12:11


SW
W
NW
240
270
300
330
277°W (T) • 45°46'10"N, 108°38'23"W ±16ft ▲ 3241ft
ST-2
ST-2 Facing W
Central & 48th Intersection
24-4477G
21 Nov 2024, 11:12:56


SW
W
NW
240
270
300
330
280°W (T) 45°46'10"N, 108°38'11"W ±9ft ▲ 3238ft
ST-3
ST-3 Facing W
Central & 48th Intersection
24-4477G
21 Nov 2024, 11:29:55

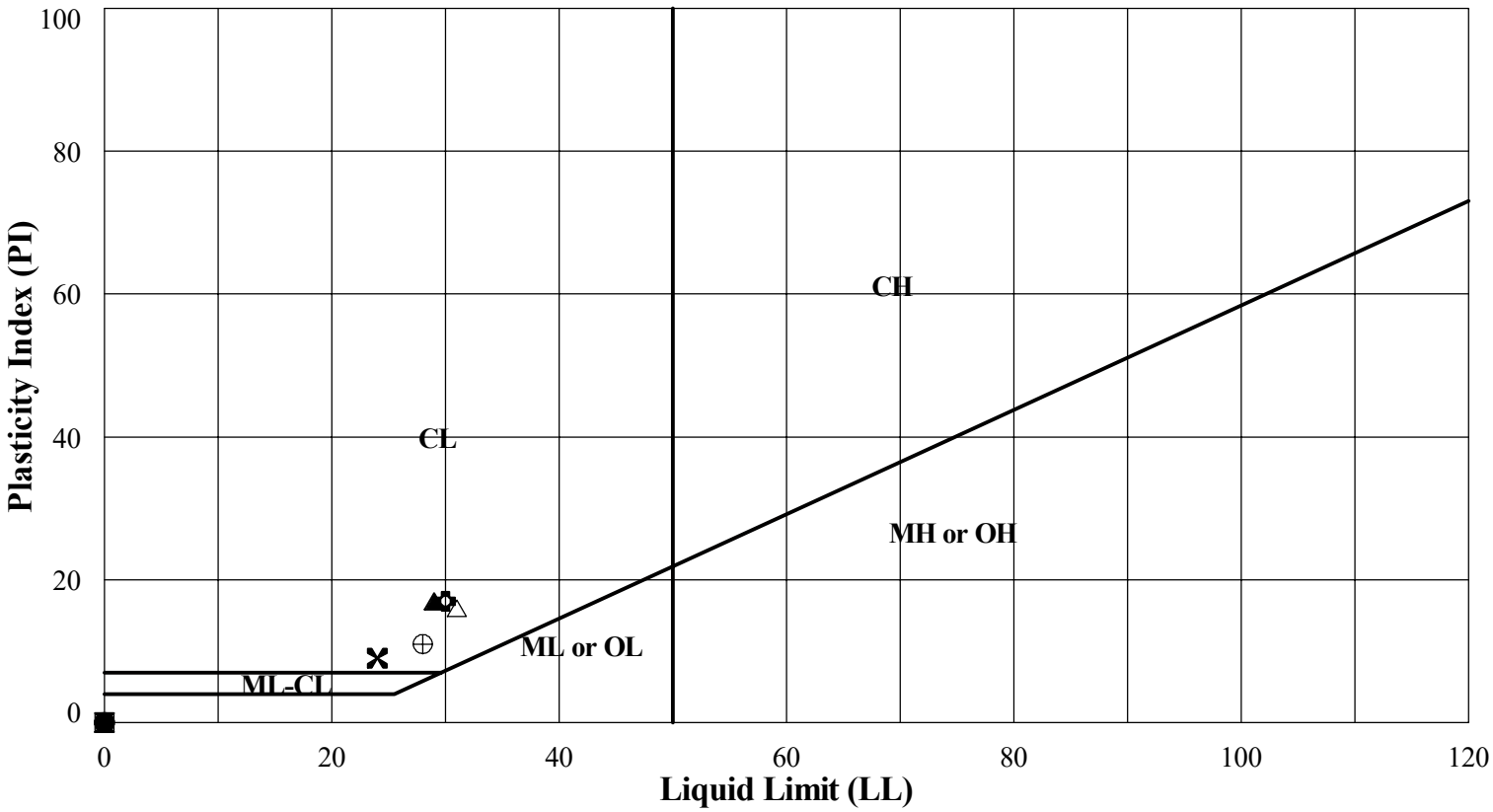

NE
E
SE
60
90
120
150
93°E (T) 45°46'10"N, 108°38'11"W ±13ft ▲ 3238ft
ST-3
ST-3 Facing E
Central & 48th Intersection
24-4477G
21 Nov 2024, 11:30:31


NW
N
NE
330
0
30
60
9°N (T) 45°46'7"N, 108°38'18"W ±9ft ▲ 3244ft
ST-4
ST-4 Facing N
Central & 48th Intersection
24-4477G
21 Nov 2024, 11:20:01


SE
S
SW
150
180
210
240
183°S (T) 45°46'7"N, 108°38'18"W ±16ft ▲ 3241ft
ST-4
ST-4 Facing S
Central & 48th Intersection
24-4477G
21 Nov 2024, 11:20:34


SE
S
SV
120
150
180
210
166°SE (T) • 45°46'11"N, 108°38'18"W ±9ft ▲ 3238ft
STOP
ALL WAY
ST-5 Facing Intersection
Central & 48th Intersection
24-4477G
21 Nov 2024, 10:50:27


NE
E
SE
60
90
120
90°E (T) • 45°46'11"N, 108°38'18"W ±13ft ▲ 3238ft
STOP
ALL WAY
ST-5 Facing East
Central & 48th Intersection
24-4477G
21 Nov 2024, 10:51:12



Legend	Boring	Sample No.	Depth	LL	PL	PI	P 200, %	MC	Classification
●	ST-1	Base	---	NP	NP	NP	9.5	3.2%	GP-GM
⊠	ST-1	Subbase	---	NP	NP	NP	7.3	2.8%	GP-GM
▲	ST-1	Bulk	4'-9'	29	12	17	62.2	16.1%	CL
★	ST-2	Base	---	NP	NP	NP	10.2	3.3%	GP-GM
✕	ST-2	Subbase	---	24	15	9	11.9	3.5%	GW-GC
✿	ST-2	Bulk	6½'-9'	30	13	17	66.6	16.5%	CL
○	ST-3	Base	---	NP	NP	NP	11.3	3.6%	SP-SM
△	ST-3	Bulk	4'-9'	31	15	16	61.1	14.7%	CL
⊗	ST-4	Base/Subbase	---	NP	NP	NP	4.7	1.8%	GP-GM
⊕	ST-5	TW	8'-9'	28	17	11	83.6	22.8%	CL

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

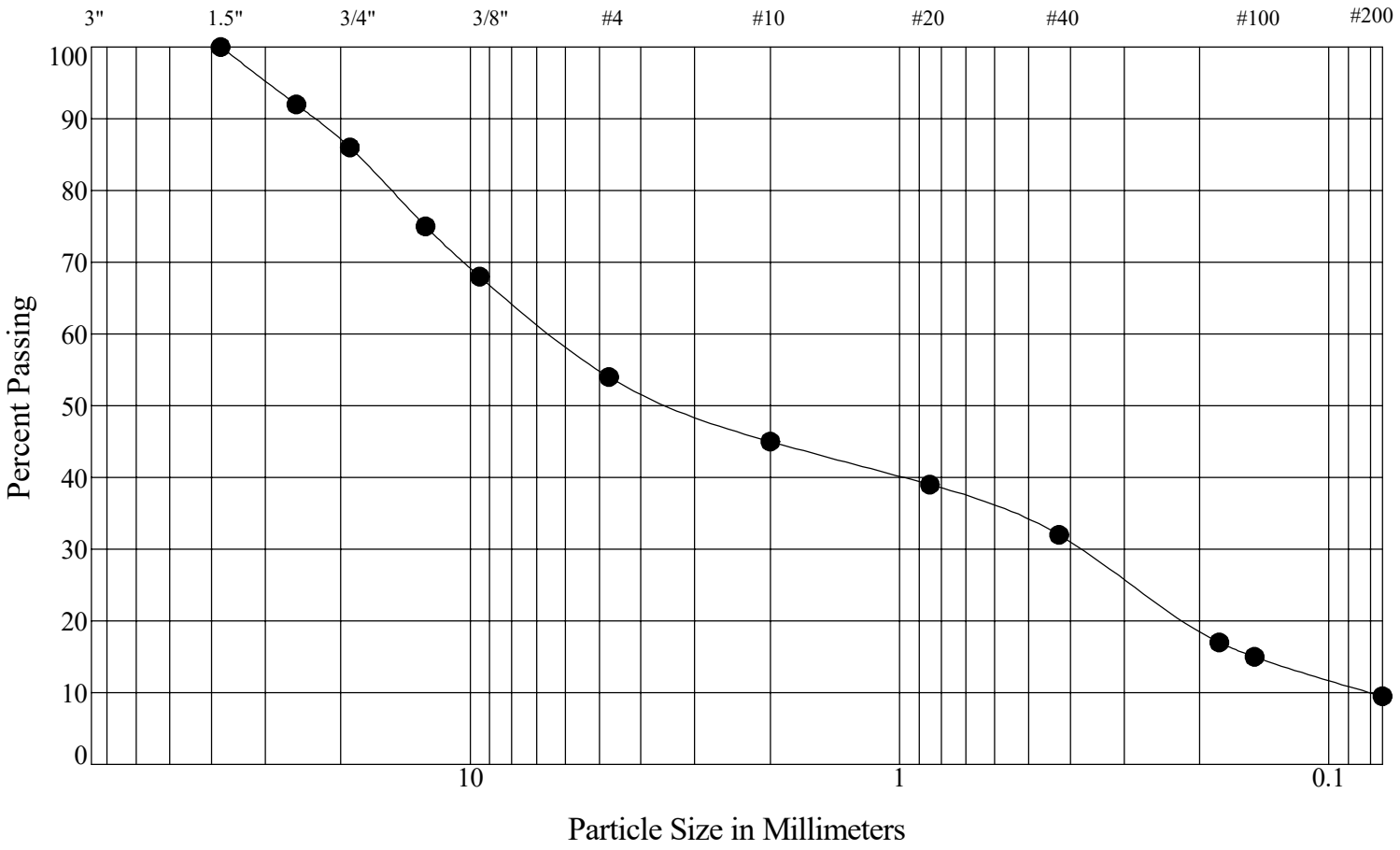
Atterberg Limits Tests

Project Number: 24-4477G

Central Avenue & North 48th Street West
Billings, Montana

1/16/25

Sieve Size



Particle Size in Millimeters

Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
	100	86	68	54	45	39	32	17	15	9.5

Sample: ST-1
Sample No.: Base
Depth: ---

Date Received: 12/4/24

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Classification:	GP-GM
Moisture Content:	3.2%

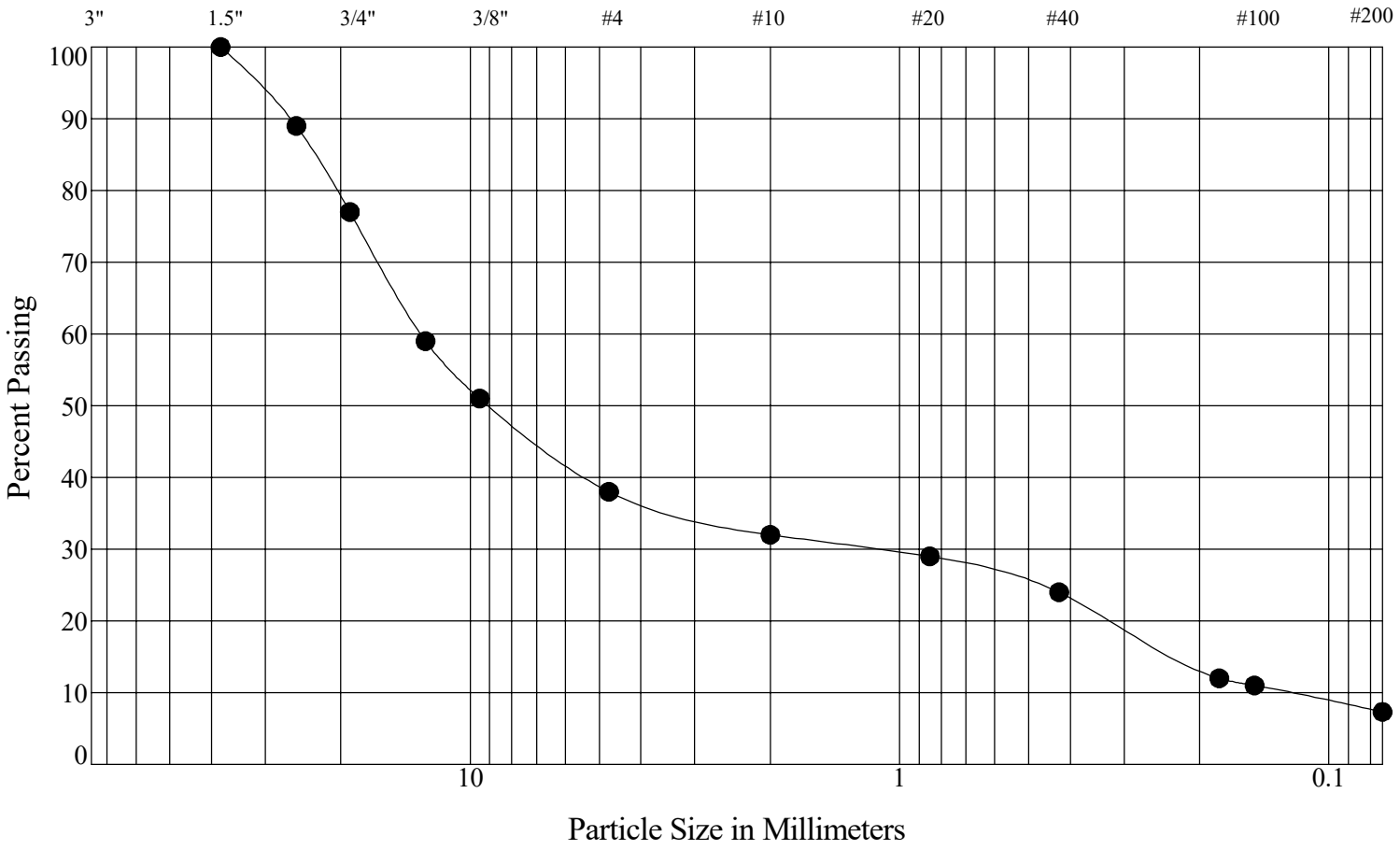
Percent Gravel: 46.0
Percent Sand: 44.5
Percent Silt + Clay: 9.5
ASTM Group Name: POORLY GRADED GRAVEL with SILT and SAND

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

1/16/25



Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
	100	77	51	38	32	29	24	12	11	7.3

Sample: ST-1
Sample No.: Subbase
Depth: ---

Date Received: 12/4/24

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Classification:	GP-GM
Moisture Content:	2.8%

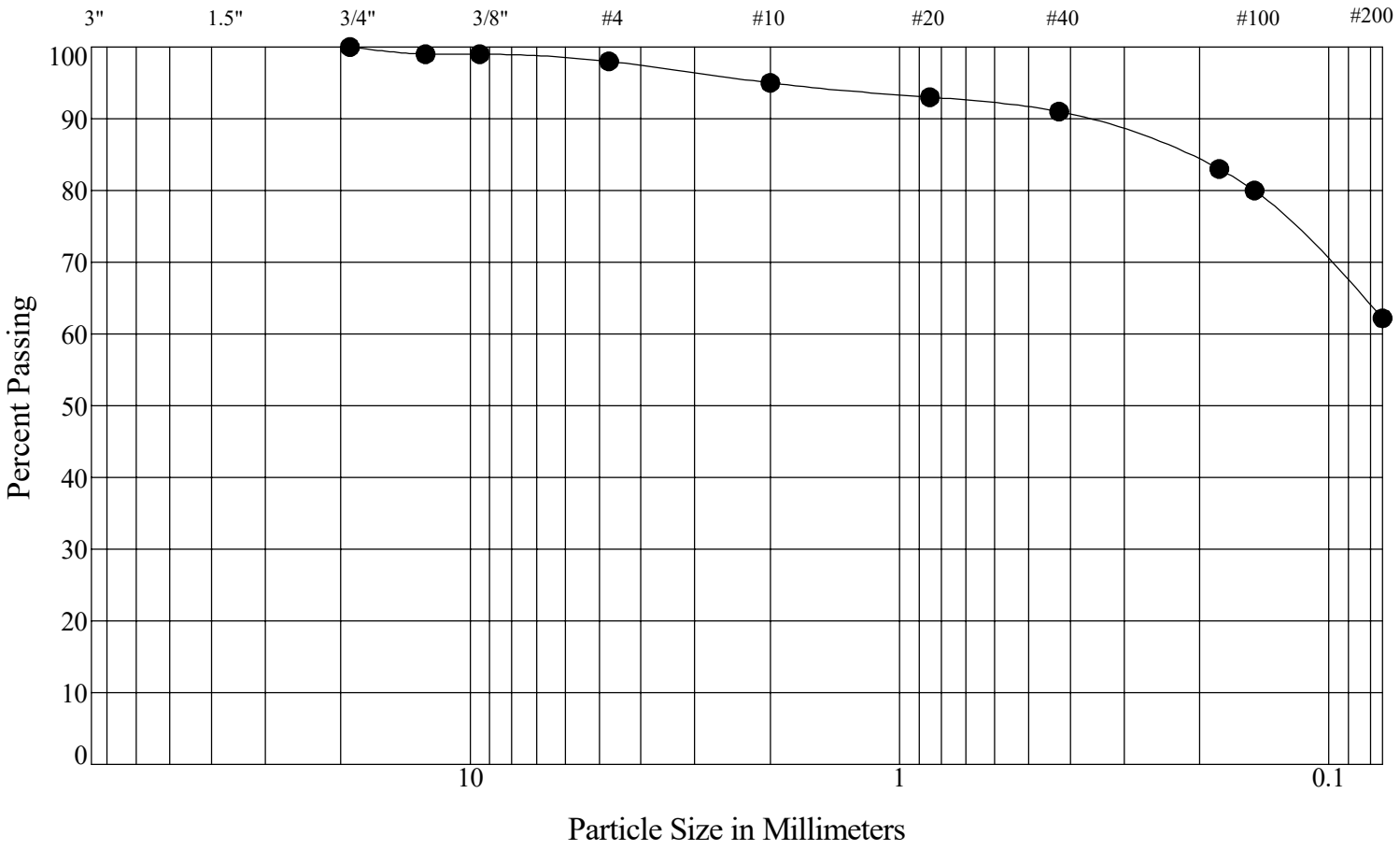
Percent Gravel: 62.0
Percent Sand: 30.7
Percent Silt + Clay: 7.3
ASTM Group Name: POORLY GRADED GRAVEL with SILT and SAND

SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

1/16/25



Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
		100	99	98	95	93	91	83	80	62.2

Sample: ST-1
Sample No.: Bulk
Depth: 4'-9'

Date Received: 12/4/24

Liquid Limit:	29
Plastic Limit:	12
Plasticity Index:	17
Classification:	CL
Moisture Content:	16.1%

Percent Gravel: 2.0
Percent Sand: 35.8
Percent Silt + Clay: 62.2
ASTM Group Name: SANDY LEAN CLAY

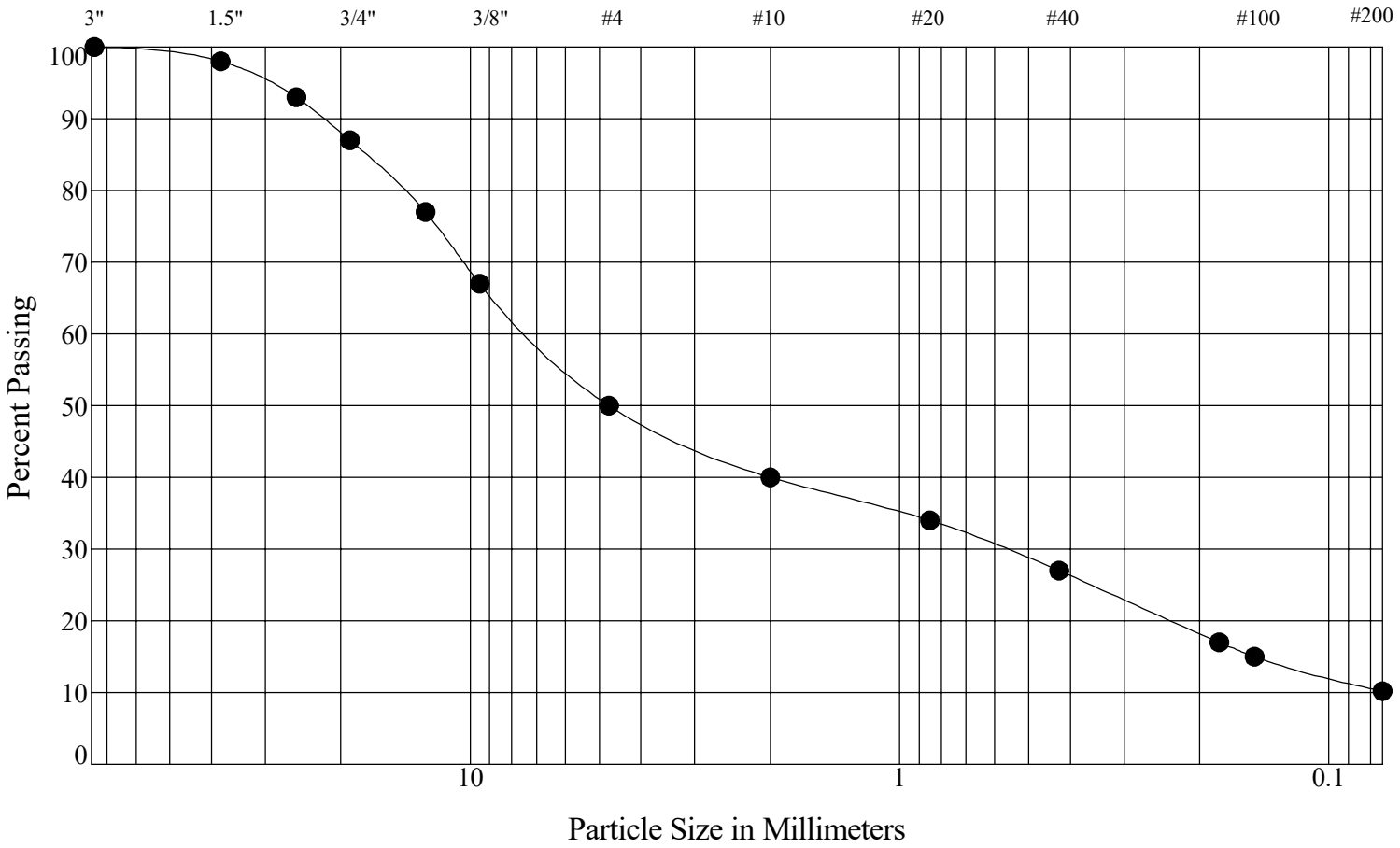
SK GEOTECHNICAL
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

1/16/25

Sieve Size



Particle Size in Millimeters

Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
100	98	87	67	50	40	34	27	17	15	10.2

Sample: ST-2
Sample No.: Base
Depth: ---

Date Received: 12/4/24

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Classification:	GP-GM
Moisture Content:	3.3%

Percent Gravel: 50.0
Percent Sand: 39.8
Percent Silt + Clay: 10.2
ASTM Group Name: POORLY GRADED GRAVEL with SILT and SAND

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2511 Holman Avenue
P. O. Box 80190
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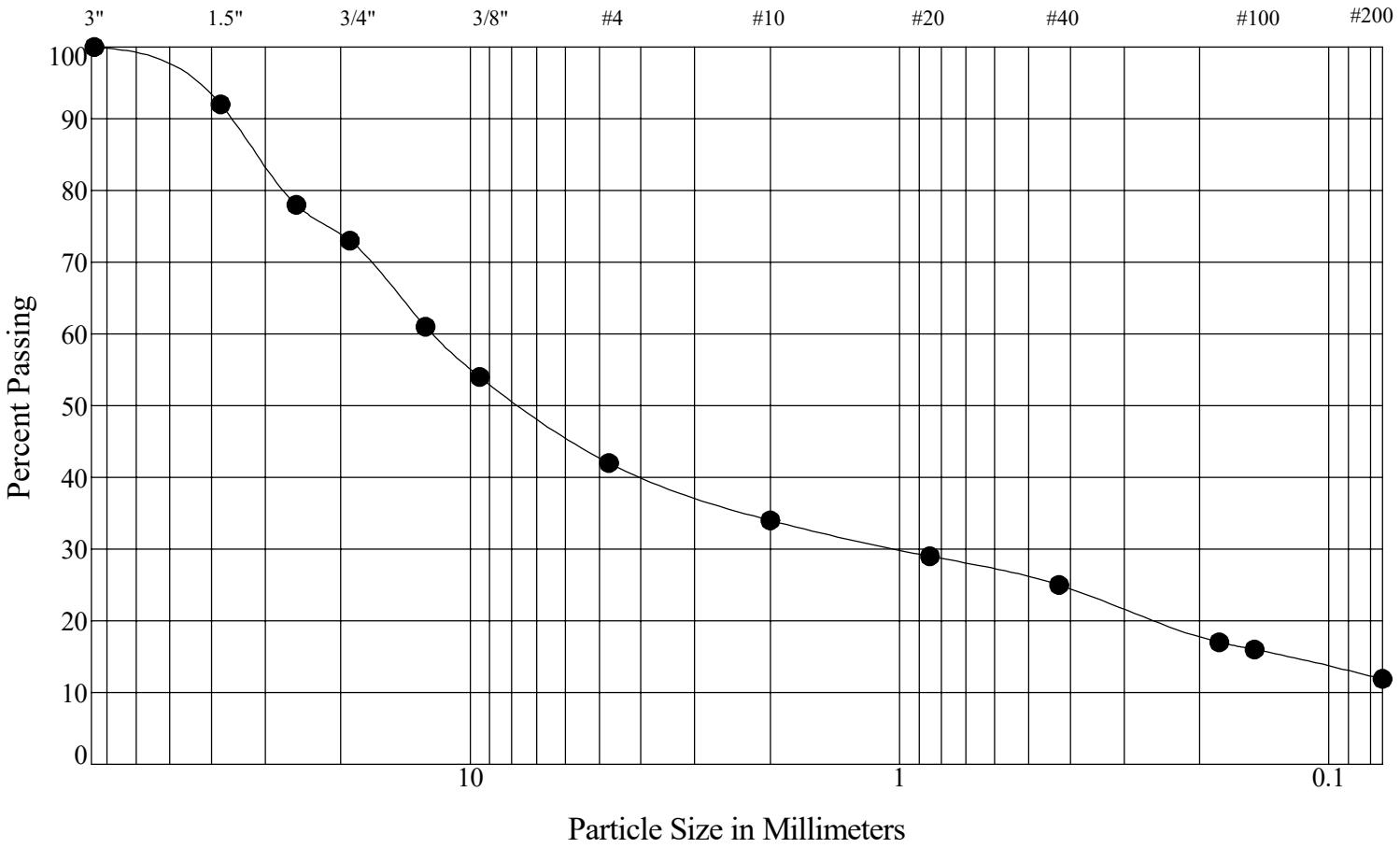
Fax: 406.652.3944

Sieve Analysis

Project Number: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

1/16/25

Sieve Size



Particle Size in Millimeters

Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
100	92	73	54	42	34	29	25	17	16	11.9

Sample: ST-2
Sample No.: Subbase
Depth: ---

Date Received: 12/4/24

Liquid Limit:	24
Plastic Limit:	15
Plasticity Index:	9
Classification:	GW-GC
Moisture Content:	3.5%

Percent Gravel: 58.0
Percent Sand: 30.1
Percent Silt + Clay: 11.9
ASTM Group Name: WELL-GRADED GRAVEL with CLAY and SAND

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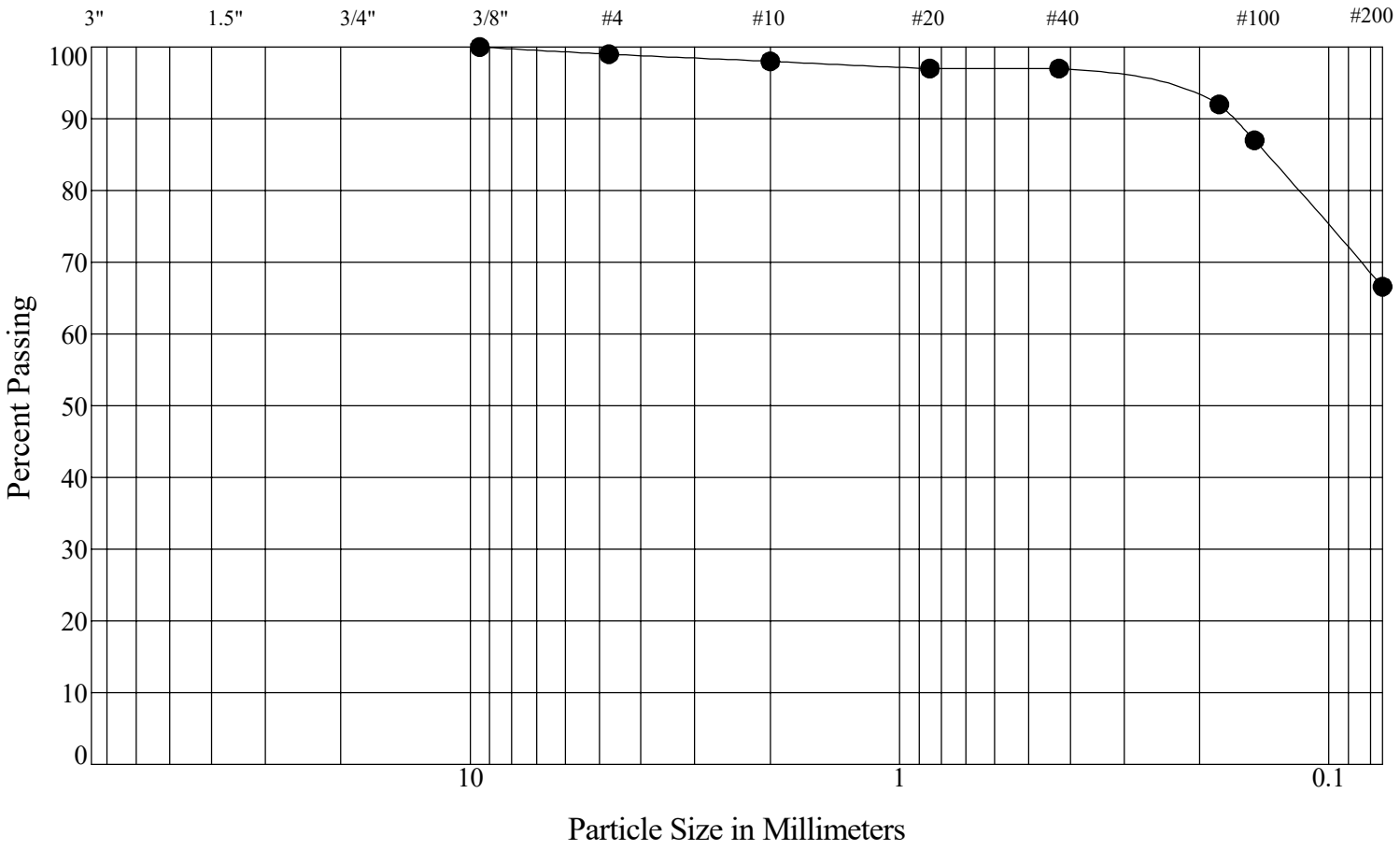
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

1/16/25



Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
			100	99	98	97	97	92	87	66.6

Sample: ST-2
Sample No.: Bulk
Depth: 6½'-9'

Date Received: 12/4/24

Liquid Limit:	30
Plastic Limit:	13
Plasticity Index:	17
Classification:	CL
Moisture Content:	16.5%

Percent Gravel: 1.0
Percent Sand: 32.4
Percent Silt + Clay: 66.6
ASTM Group Name: SANDY LEAN CLAY

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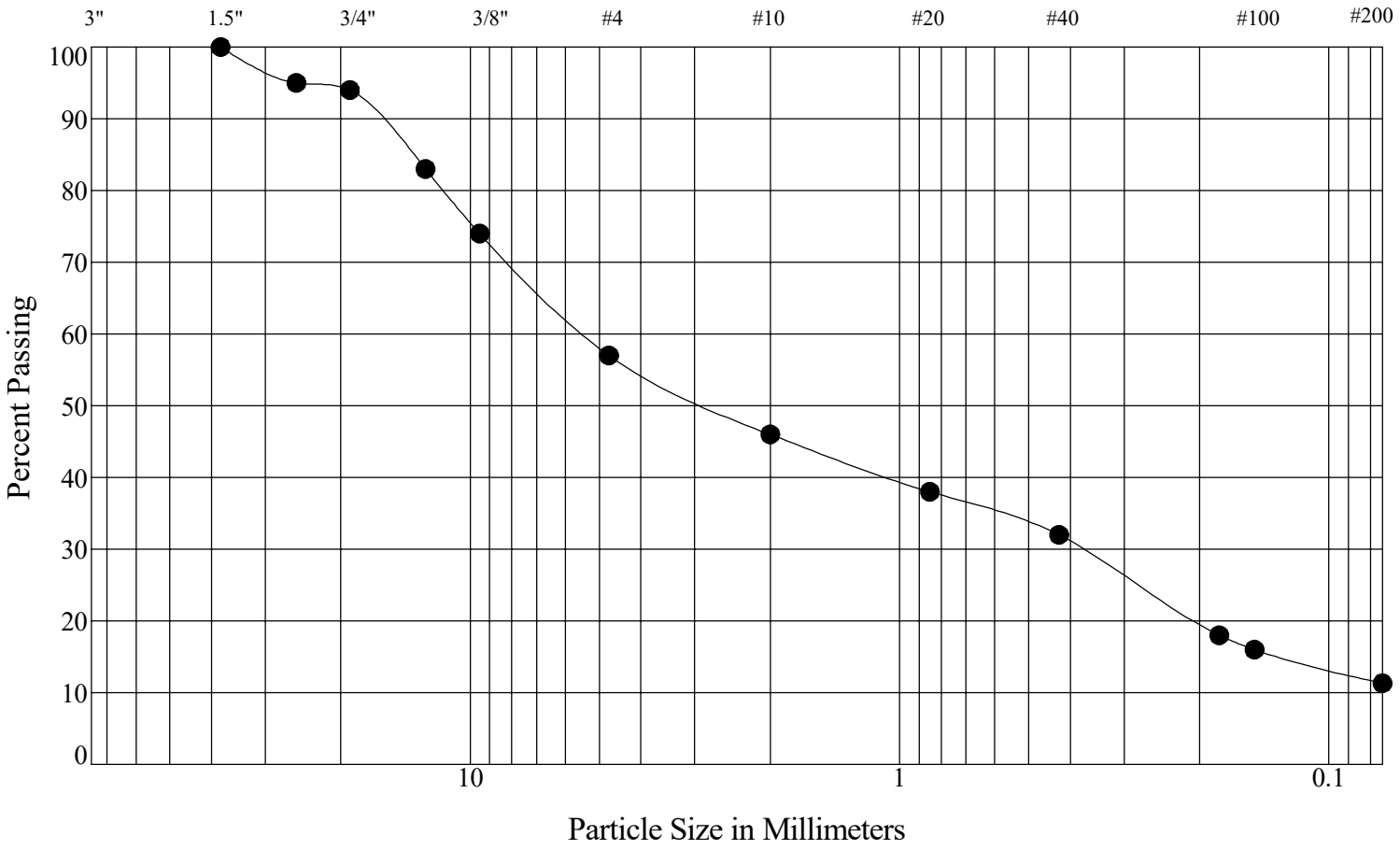
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

1/16/25

Sieve Size



Particle Size in Millimeters

Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
	100	94	74	57	46	38	32	18	16	11.3

Sample: ST-3
Sample No.: Base
Depth: ---

Date Received: 12/4/24

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Classification:	SP-SM
Moisture Content:	3.6%

Percent Gravel: 43.0
Percent Sand: 45.7
Percent Silt + Clay: 11.3
ASTM Group Name: POORLY GRADED SAND with SILT and GRAVEL

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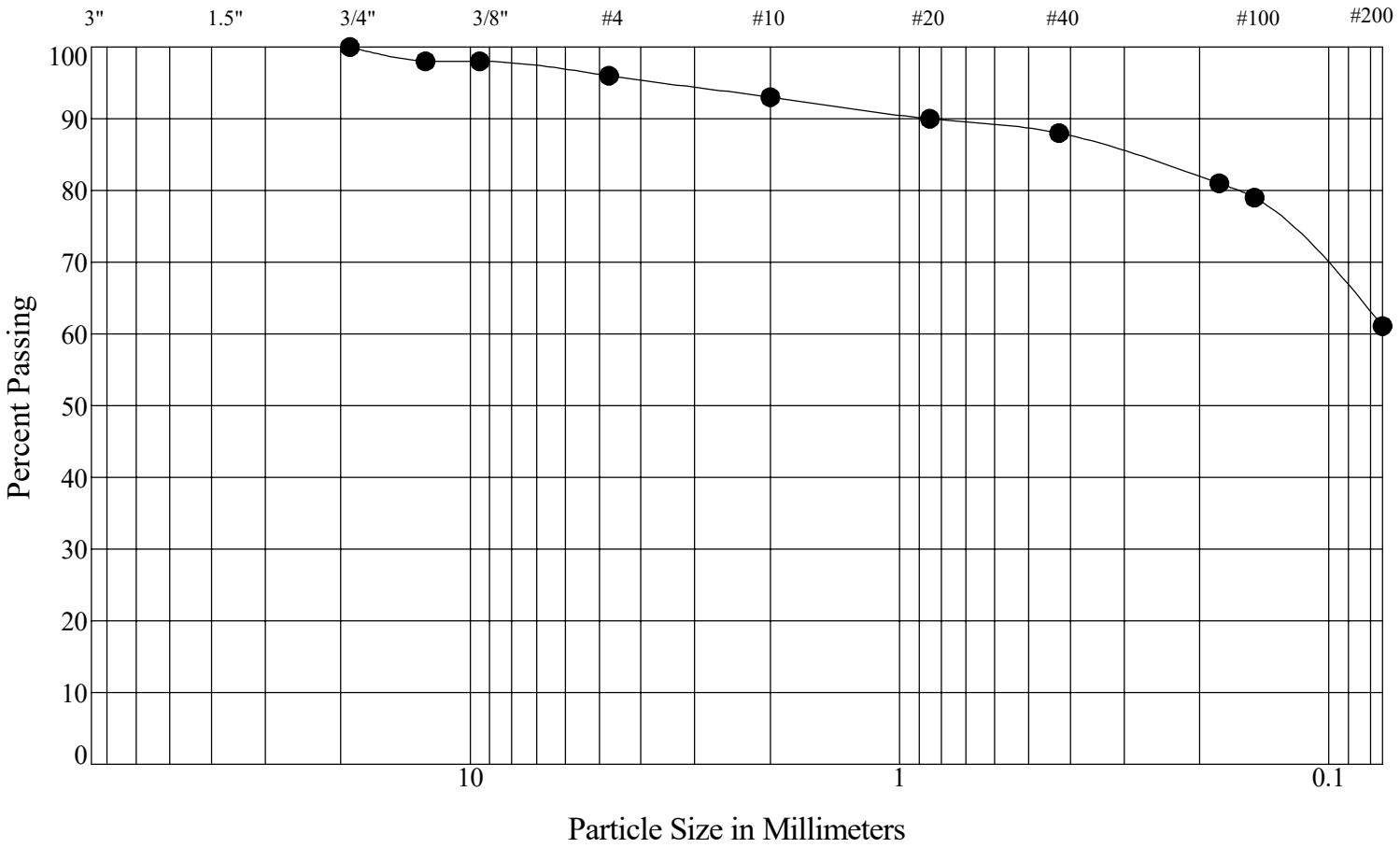
2511 Holman Avenue
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

1/16/25

Sieve Size



Particle Size in Millimeters

Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
		100	98	96	93	90	88	81	79	61.1

Sample: ST-3
Sample No.: Bulk
Depth: 4'-9'

Date Received: 12/4/24

Liquid Limit:	31
Plastic Limit:	15
Plasticity Index:	16
Classification:	CL
Moisture Content:	14.7%

Percent Gravel: 4.0
Percent Sand: 34.9
Percent Silt + Clay: 61.1
ASTM Group Name: SANDY LEAN CLAY

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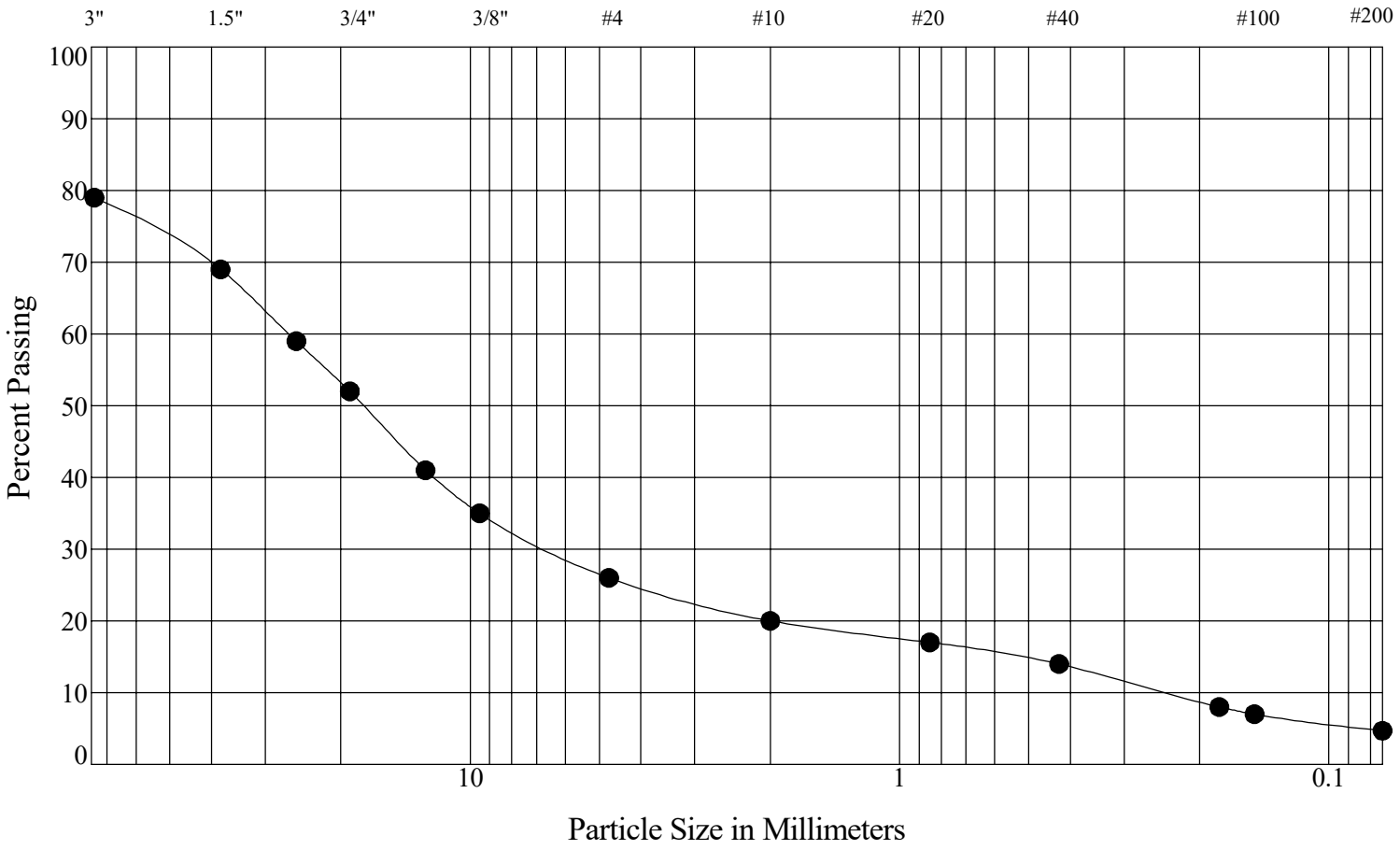
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

1/16/25



Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
79	69	52	35	26	20	17	14	8	7	4.7

Sample: ST-4
Sample No.: Base/Subbase
Depth: ---

Date Received: 12/4/24

Liquid Limit:	NP
Plastic Limit:	NP
Plasticity Index:	NP
Classification:	GP-GM
Moisture Content:	1.8%

Percent Gravel: 53.0
Percent Sand: 21.3
Percent Silt + Clay: 4.7
ASTM Group Name: POORLY GRADED GRAVEL with SILT and SAND

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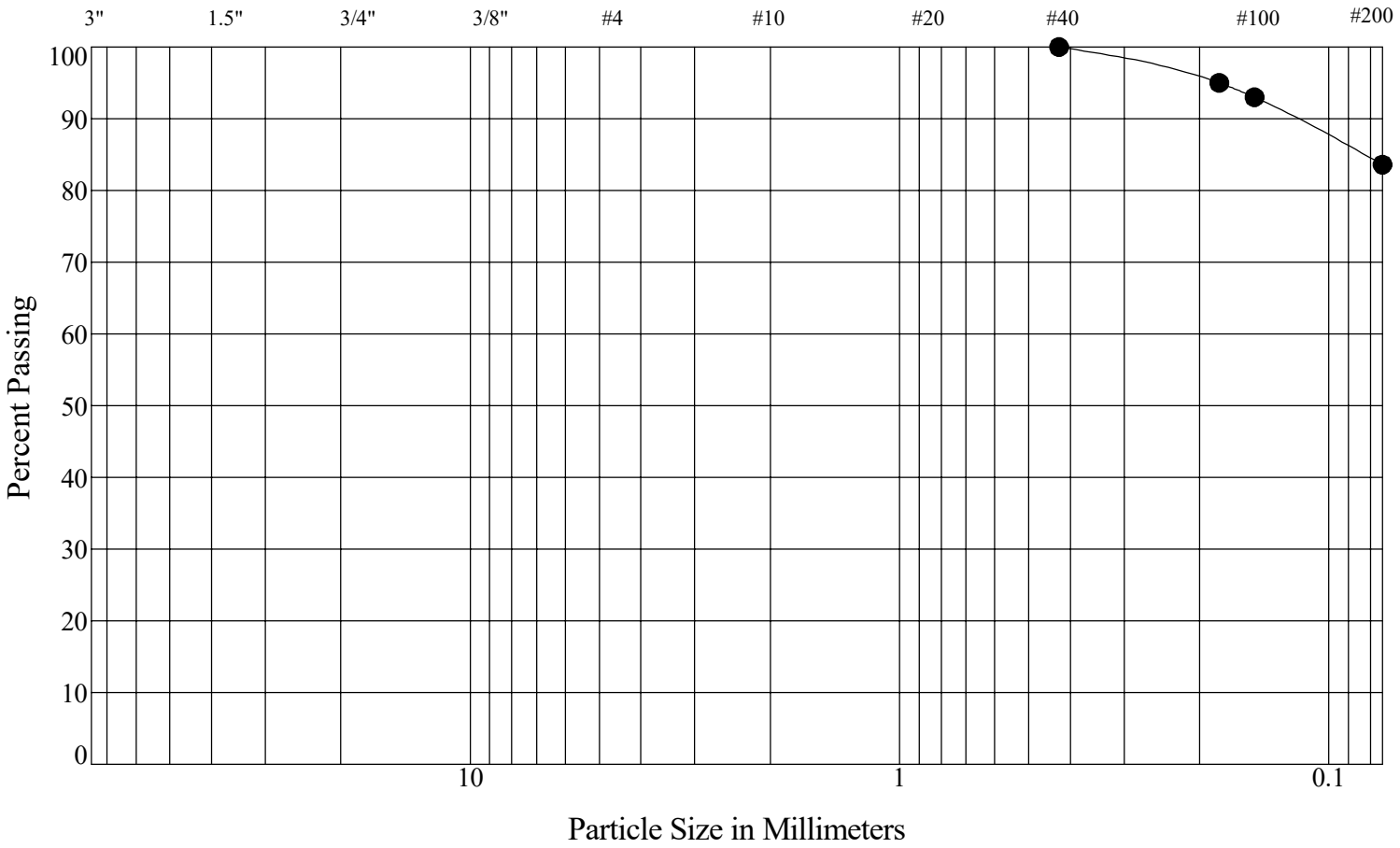
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

1/16/25

Sieve Size



Particle Size in Millimeters

Gravel		Sand		
coarse	fine	coarse	medium	fine

Percent Passing U.S. Standard Sieve Size

3"	1 1/2"	3/4"	3/8"	#4	#10	#20	#40	#80	#100	#200
							100	95	93	83.6

Sample: ST-5
Sample No.: TW
Depth: 8'-9'

Date Received: 12/4/24

Liquid Limit:	28
Plastic Limit:	17
Plasticity Index:	11
Classification:	CL
Moisture Content:	22.8%

Percent Gravel: 0.0
Percent Sand: 16.4
Percent Silt + Clay: 83.6
ASTM Group Name: LEAN CLAY with SAND

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Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

Sieve Analysis

Project Number: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

1/16/25

California Bearing Ratio

ASTM D 1883 /AASHTO T 193

Project: 24-4477G Central Avenue & North 48th Street West
Billings, Montana

Date: 01/17/25

Boring: ST-1 Sample: Bulk Bag Depth: 4 ' - 9 '

Description: Sandy lean clay (CL)

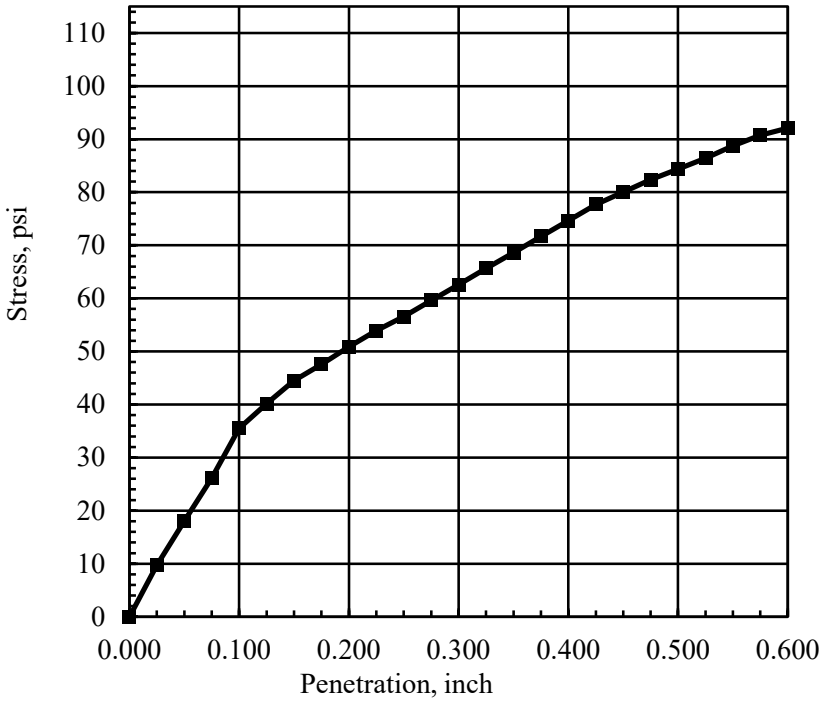
MDD, pcf	OMC, %	Method
116.4	15.8	D 698

Compaction

Initial				Final			
Weight, g	**MC%**	**Dry, pcf**	**Comp%**	**Weight, g**	**MC%**	**Dry, pcf**	**Comp%**
4359.0	16.1%	110.4	94.8%	4509.1	20.1%	110.2	94.7%

Swell **CBR**

Surcharge		Initial	Final	Swell	Surcharge	CBR @	CBR @
Weight, lbs	**Press, psf**	**Dial, "**	**Dial, "**	**%**	**Press, psf**	**0.1 in.**	**0.2 in.**
22.7	119.5	0.4775	0.4848	0.2%	119.8	3.5	3.4



Design Values:

CBR @ 0.1 inch **3.5**

CBR @ 0.2 inch **3.4**

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California Bearing Ratio

ASTM D 1883 /AASHTO T 193

Project: 24-4477G Central Avenue & North 48th Street West
Billings, Montana

Date: 01/17/25

Boring: ST-2 Sample: Bulk Bag Depth: 6½ ' - 9 '

Description: Sandy lean clay (CL)

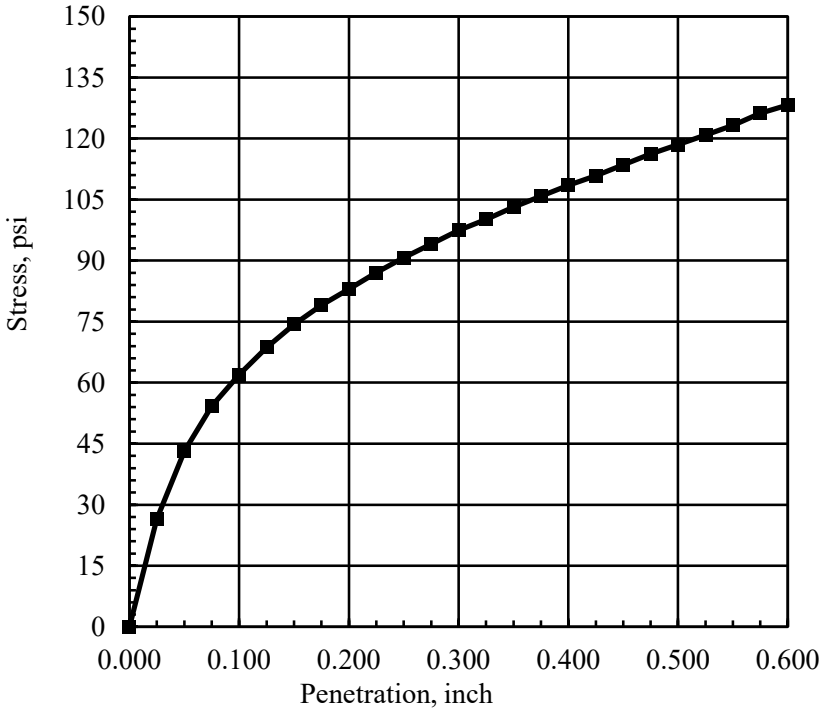
MDD, pcf	OMC, %	Method
117.2	15.2	D 698

Compaction

Initial				Final			
Weight, g	MC%	Dry, pcf	Comp%	Weight, g	MC%	Dry, pcf	Comp%
4369.0	15.0%	111.6	95.2%	4579.8	20.6%	111.1	94.8%

Swell **CBR**

Surcharge		Initial	Final	Swell	Surcharge	CBR @	CBR @
Weight, lbs	Press, psf	Dial, "	Dial, "	%	Press, psf	0.1 in.	0.2 in.
22.6	118.9	0.6251	0.6451	0.4%	119.1	6.2	5.5



Design Values:

CBR @ 0.1 inch **6.2**

CBR @ 0.2 inch **5.5**

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California Bearing Ratio

ASTM D 1883 /AASHTO T 193

Project: 24-4477G Central Avenue & North 48th Street West
Billings, Montana

Date: 01/17/25

Boring: ST-3 Sample: Bulk Bag Depth: 4 ' - 9 '

Description: Sandy lean clay (CL)

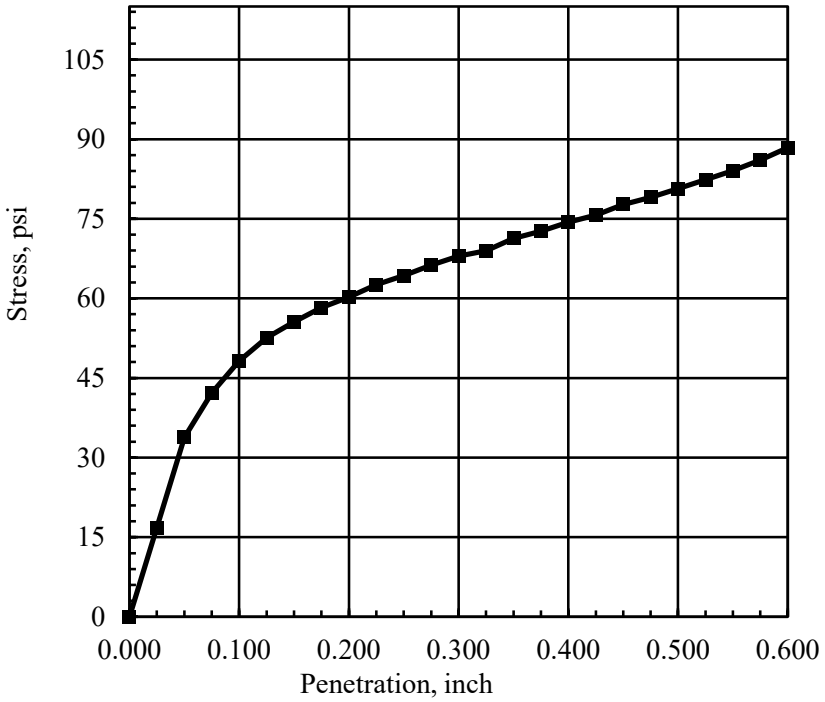
MDD, pcf	OMC, %	Method
116.1	14.7	D 698

Compaction

Initial				Final			
Weight, g	**MC%**	**Dry, pcf**	**Comp%**	**Weight, g**	**MC%**	**Dry, pcf**	**Comp%**
4310.0	14.9%	110.3	95.0%	4537.5	21.0%	110.1	94.8%

Swell **CBR**

Surcharge		Initial	Final	Swell	Surcharge	CBR @	CBR @
Weight, lbs	**Press, psf**	**Dial, "**	**Dial, "**	**%**	**Press, psf**	**0.1 in.**	**0.2 in.**
22.7	119.6	0.3703	0.3791	0.2%	119.9	4.8	4.0



Design Values:

CBR @ 0.1 inch **4.8**

CBR @ 0.2 inch **4.0**

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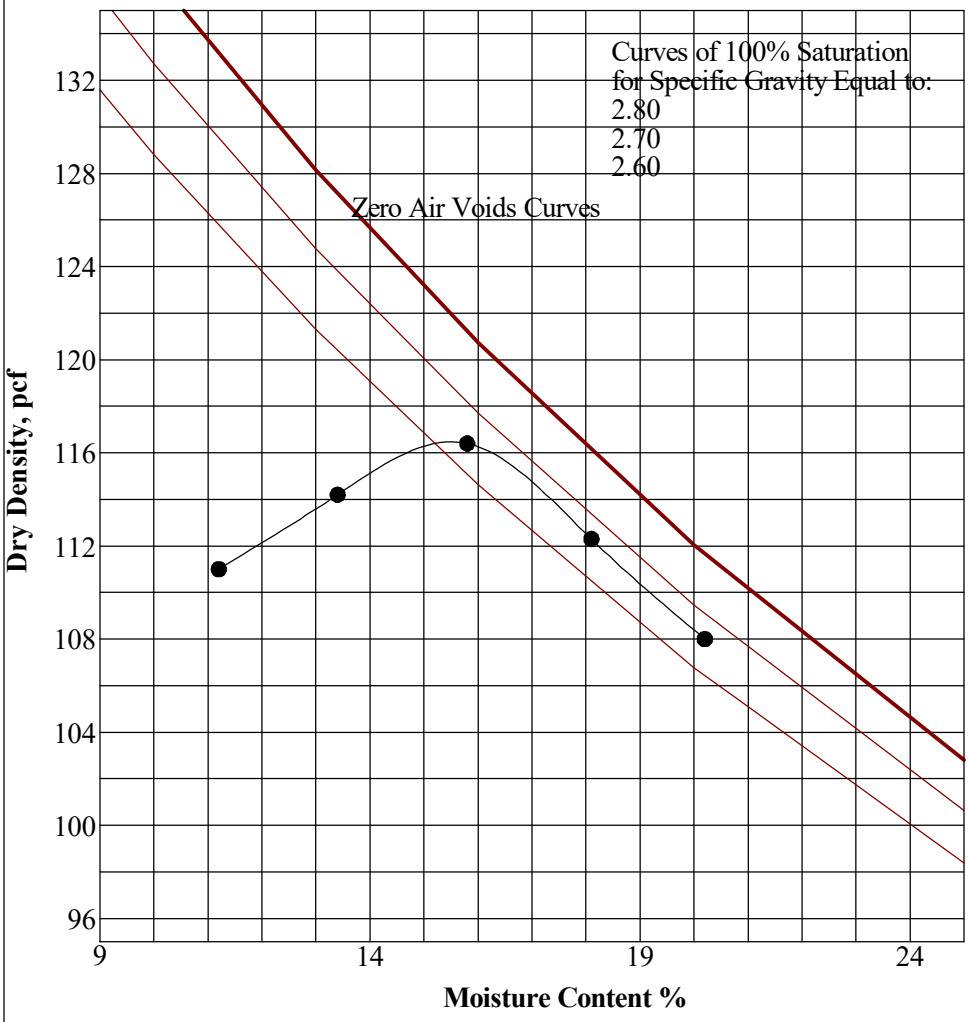


ASTM D 698 Method A

Maximum Dry Density, pcf	Optimum Moisture Content %
116.4	**15.8**

Rammer Type: Mechanical
Preparation Method: Moist

Soil Description (Visual-Manual)

Sandy lean clay [CL]

Sieve Size	% Retained
1 1/2"	
3/4"	
3/8"	1
#4	2

Sample No: ST-1 Bulk Bag
Lab Sample No: P-1
Date Sampled: 12/3/24
Sampled By: Drill Crew
Date Received: 12/4/24
Sampled From: ST-1

Depth: 4'-9'
Performed by: SKG Lab
Date Performed: 12/5/24

Comments

SK GEOTECHNICAL
2611 Gabel Road
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
Fax: 406.652.3944

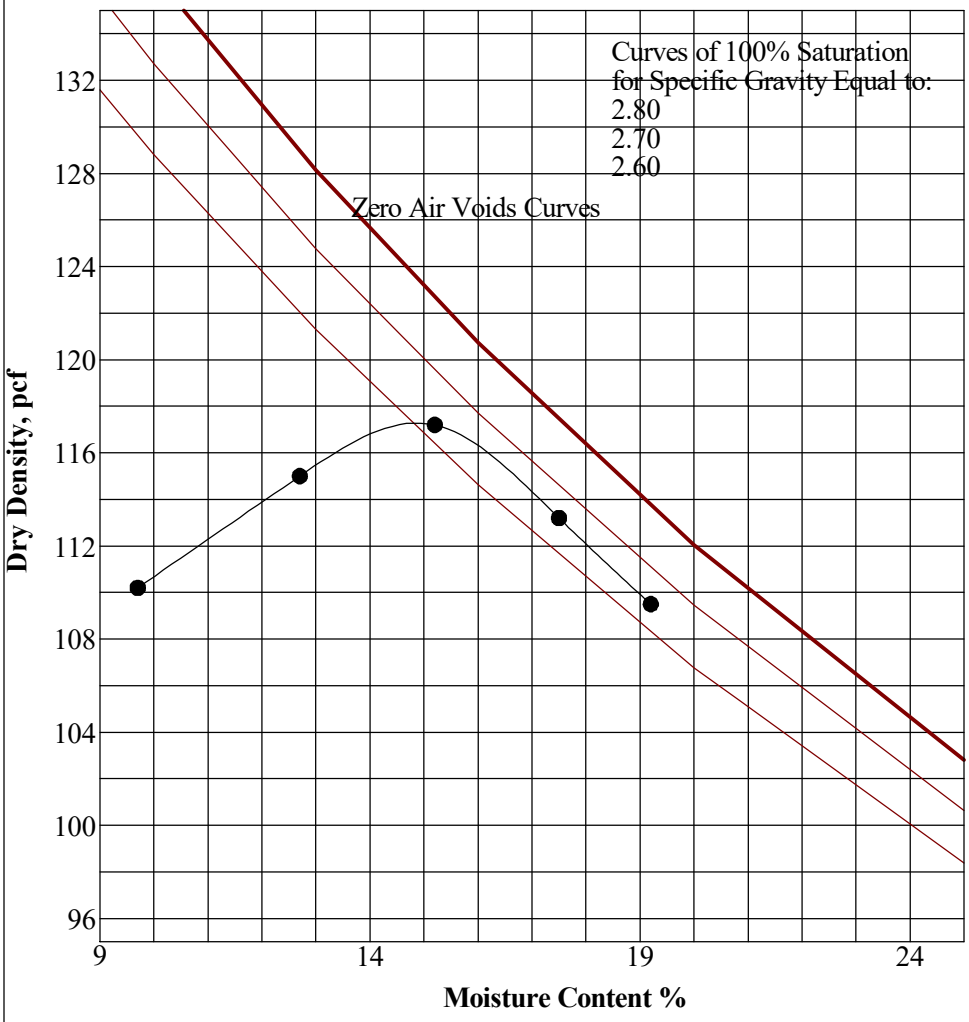
Laboratory Compaction Characteristics of Soil (Proctor)

Project No.: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

PROCTOR

P-1

12/9/24



ASTM D 698 Method A

Maximum Dry Density, pcf	Optimum Moisture Content %
117.2	**15.2**

Rammer Type: Mechanical
Preparation Method: Moist

Soil Description (Visual-Manual)

Sandy lean clay [CL]

Sieve Size	% Retained
1 1/2"	
3/4"	
3/8"	
#4	1

Sample No:	ST-2 Bulk Bag
Lab Sample No:	P-2
Date Sampled:	12/3/24
Sampled By:	Drill Crew
Date Received:	12/4/24
Sampled From:	ST-2
Depth:	6½'-9'
Performed by:	SKG Lab
Date Performed:	12/5/24

Comments

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2611 Gabel Road
P. O. Box 80190
Billings, MT 59108-0190
Phone: 406.652.3930
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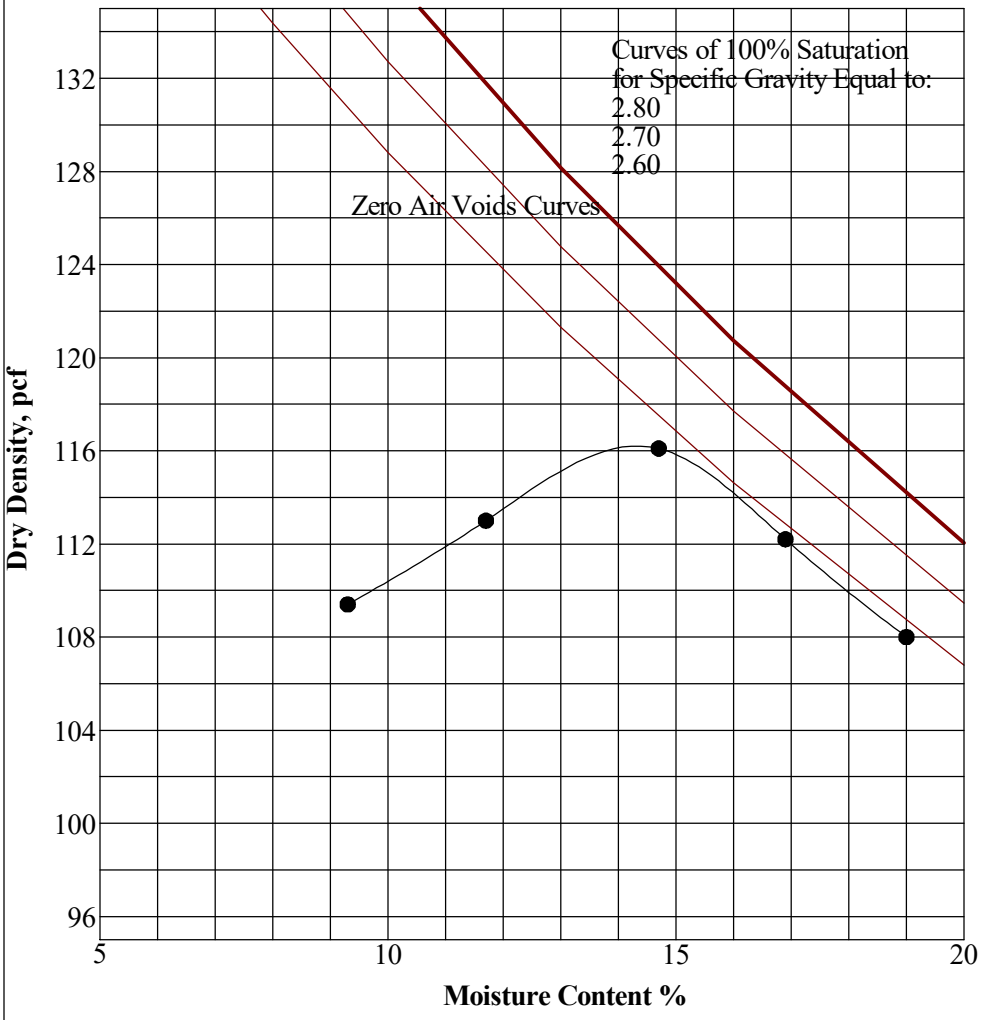
Laboratory Compaction Characteristics of Soil (Proctor)

Project No.: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

PROCTOR

P-2

12/9/24



ASTM D 698 Method A

Maximum Dry Density, pcf	Optimum Moisture Content %
116.1	**14.7**

Rammer Type: Mechanical
Preparation Method: Moist

Soil Description (Visual-Manual)

Sandy lean clay [CL]

Sieve Size	% Retained
1 1/2"	
3/4"	
3/8"	2
#4	4

Sample No: ST-3 Bulk Bag
Lab Sample No: P-3
Date Sampled: 12/3/24
Sampled By: Drill Crew
Date Received: 12/4/24
Sampled From: ST-3

Depth: 4'-9'
Performed by: SKG Lab
Date Performed: 12/5/24

Comments

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2611 Gabel Road
P. O. Box 80190
Billings, MT 59108-0190
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Fax: 406.652.3944

Laboratory Compaction Characteristics of Soil (Proctor)

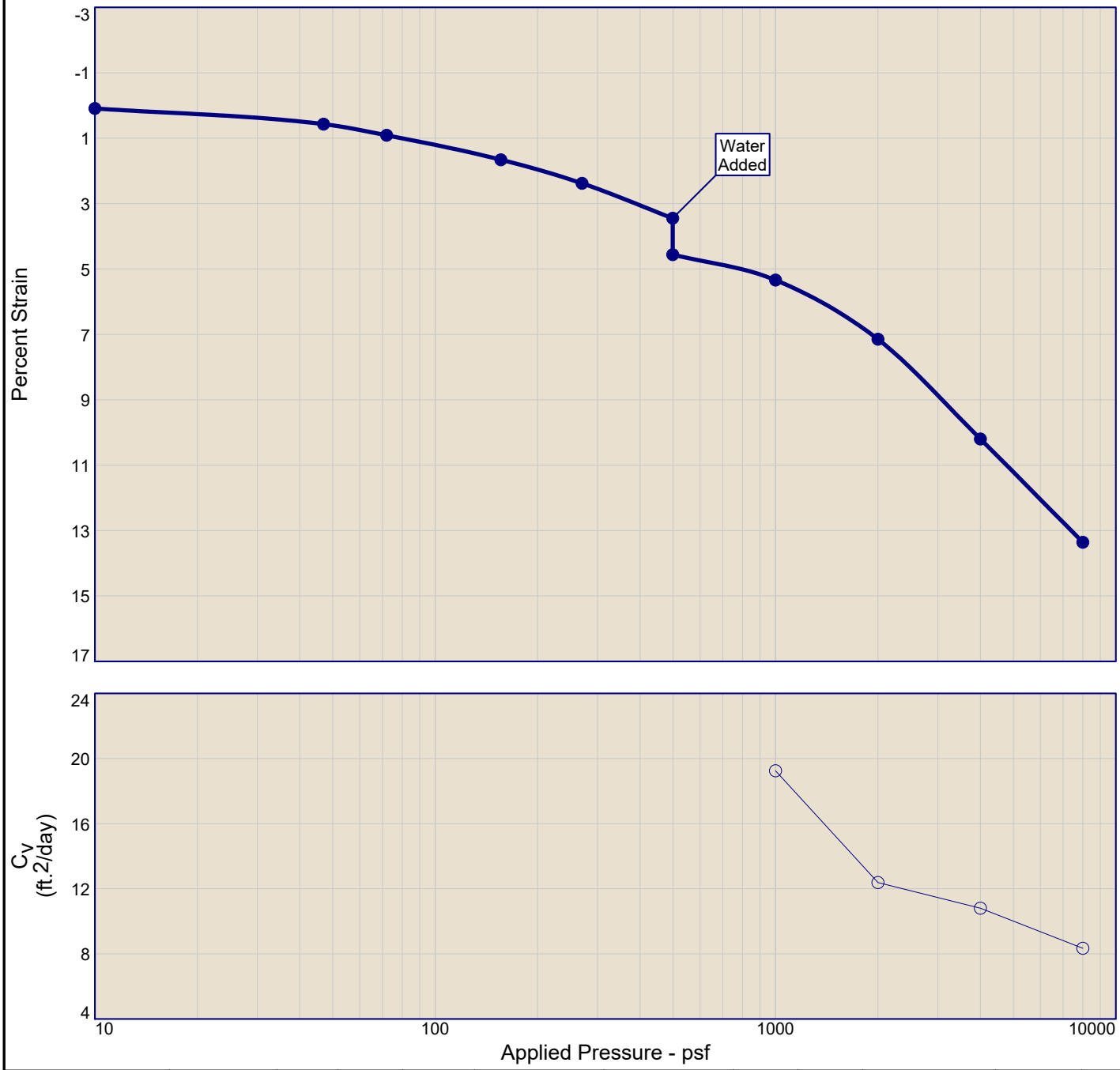
Project No.: 24-4477G
Central Avenue & North 48th Street West
Billings, Montana

PROCTOR

P-3

12/9/24

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Swell Press. (psf)	Clpse. %	e_o
Sat.	Moist.											
83.9 %	22.8 %	96.2	28	11	2.65	1063	1311	0.19			1.1	0.720

MATERIAL DESCRIPTION	USCS	AASHTO
Lean clay (CL) with sand, low plasticity, trace roots and pinholes, brown, moist, medium	CL	A-6

Project No. 24-4477G **Client:** Sanbell

Project: Central Avenue & North 48th Street West
Billings, Montana

Location: ST-5 **Depth:** 8 ' - 9 ' **Sample Number:** TW

Remarks:

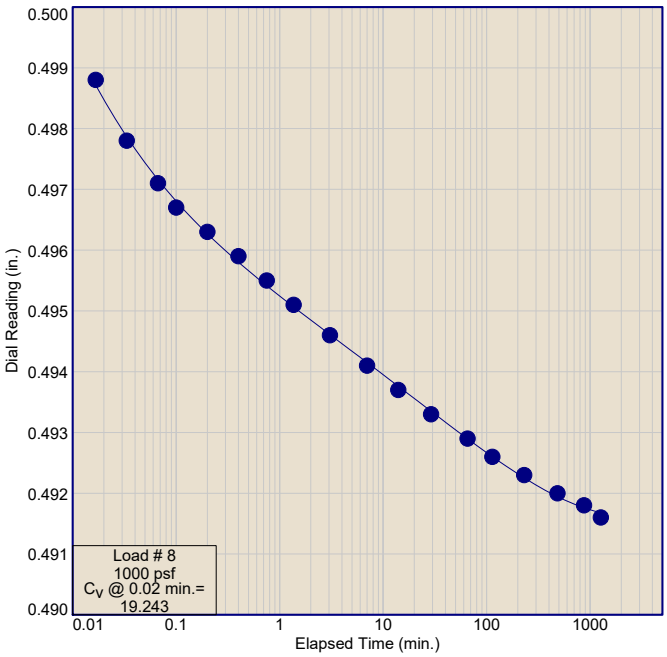
SK GEOTECHNICAL CORP.

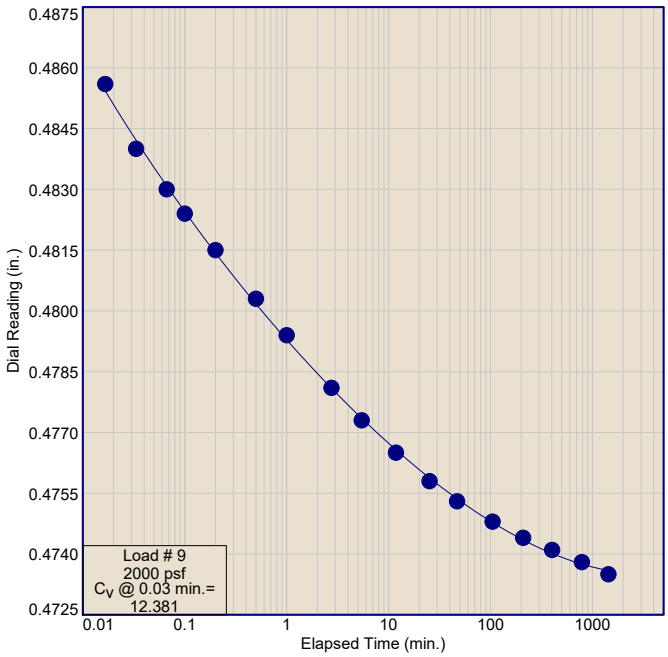
Figure

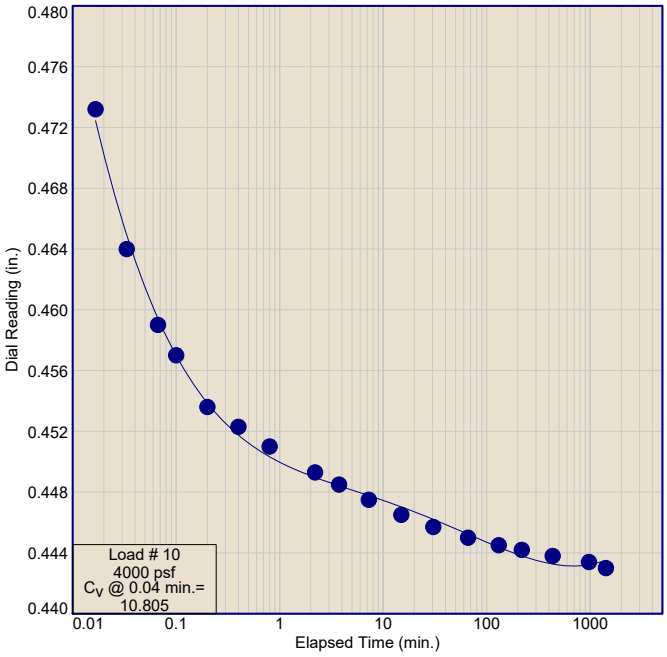
Dial Reading vs. Time

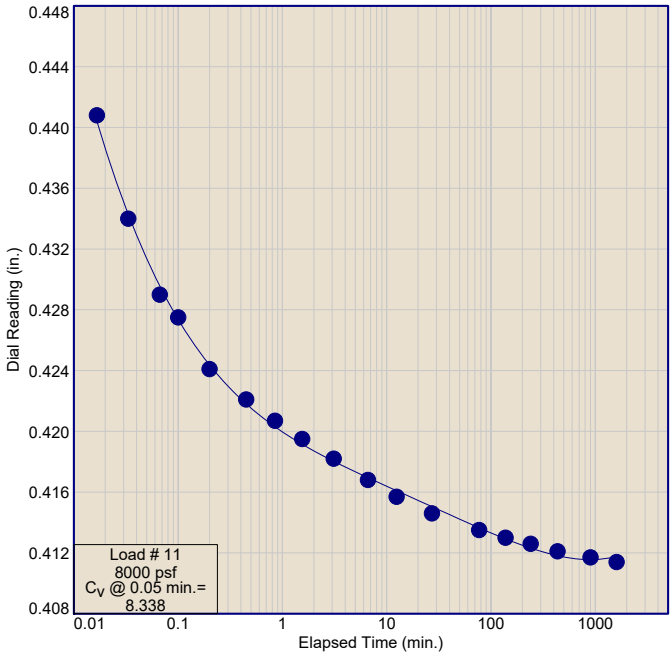
Project No.: 24-4477G
Project: Central Avenue & North 48th Street West

Location: ST-5 Depth: 8 ' - 9 ' Sample Number: TW









SK GEOTECHNICAL CORP.

Figure

2511 Holman Avenue
P. O. Box 80190
Billings, Montana 59108-0190
p: 406.652.3930; f: 406.652.3944
www.skgeotechnical.com

Corrosivity of Soil
ASTM G162/G187, AASHTO T 88

Date: January 17, 2025

Project: **24-4477G Geotechnical Evaluation**
Central Avenue & North 48th Street West
Billings, Montana

Client:
Sanbell

Date sampled: 12/2-12/3/24
Sampled by: Drill Crew

Date tested: 12/6/24
Tested by: AB

Boring	Depth (feet)	Resistivity (Ω•cm) Soil Box	Conductivity (m.mhos/cm) Calculated	pH	Marble pH	Sulfate (wt %)	Sulfide (mg/kg)	Oxid-Reduc (mV)
ST-5	8-9	1800	0.556	7.76	7.85	0.0025	NT	NT
ST-5	13-14	2000	0.500	8.01	8.16	0.0023	NT	NT
ST-2	6½-9	1200	0.833	7.86	7.80	0.0076	NT	NT
ST-3	4-9	1400	0.714	7.87	7.92	0.0068	NT	NT

Remarks: ND = non-detect
NT = not tested
Sulfate result is E300.0 water soluble method from Energy Labs.

Montana Department of Transportation - Core Evaluation Form

Project: 24-4477G **Lab#:** SK Geotechnical **Date:** 12/5/2024

Limits: N/A **Evaluated By:** AAB

Sample#	Description	Overall	Core Length (.01 Ft)					Rating				Tensile Strength
	Location-MP		Chip	Top	2nd	3rd	4th	Top	2nd	3rd	4th	lbs
ST-1	SAS	0.40	0.01	0.26	0.13			4	3			4191
ST-2	SAS	0.56	0.01	0.22	0.15	0.19		3	2	1		4725
ST-3	SAS	0.40	0.01	0.26	0.13			3	2			4400
ST-4	SAS	0.77	0.01	0.11	0.32	0.16	0.17	4	3	2	2	5745
	Minimum	0.40	0.01	0.11	0.13	0.16	0.17	3.00	2.00	1.00	2.00	
	Maximum	0.77	0.01	0.26	0.32	0.19	0.17	4.00	3.00	2.00	2.00	
	Average	**0.53**	**0.01**	**0.20**	**0.19**	**0.17**	**0.17**	**3.50**	**2.50**	**1.50**	**2.00**	

Core Rating: **Description:**

NT-Not Tested

4) Good: - Face shiny, black all aggregate particles are coated.

3) Moisture Damaged: - Loss of sheen, dull appearance some smaller (-10m) aggregate is uncoated.

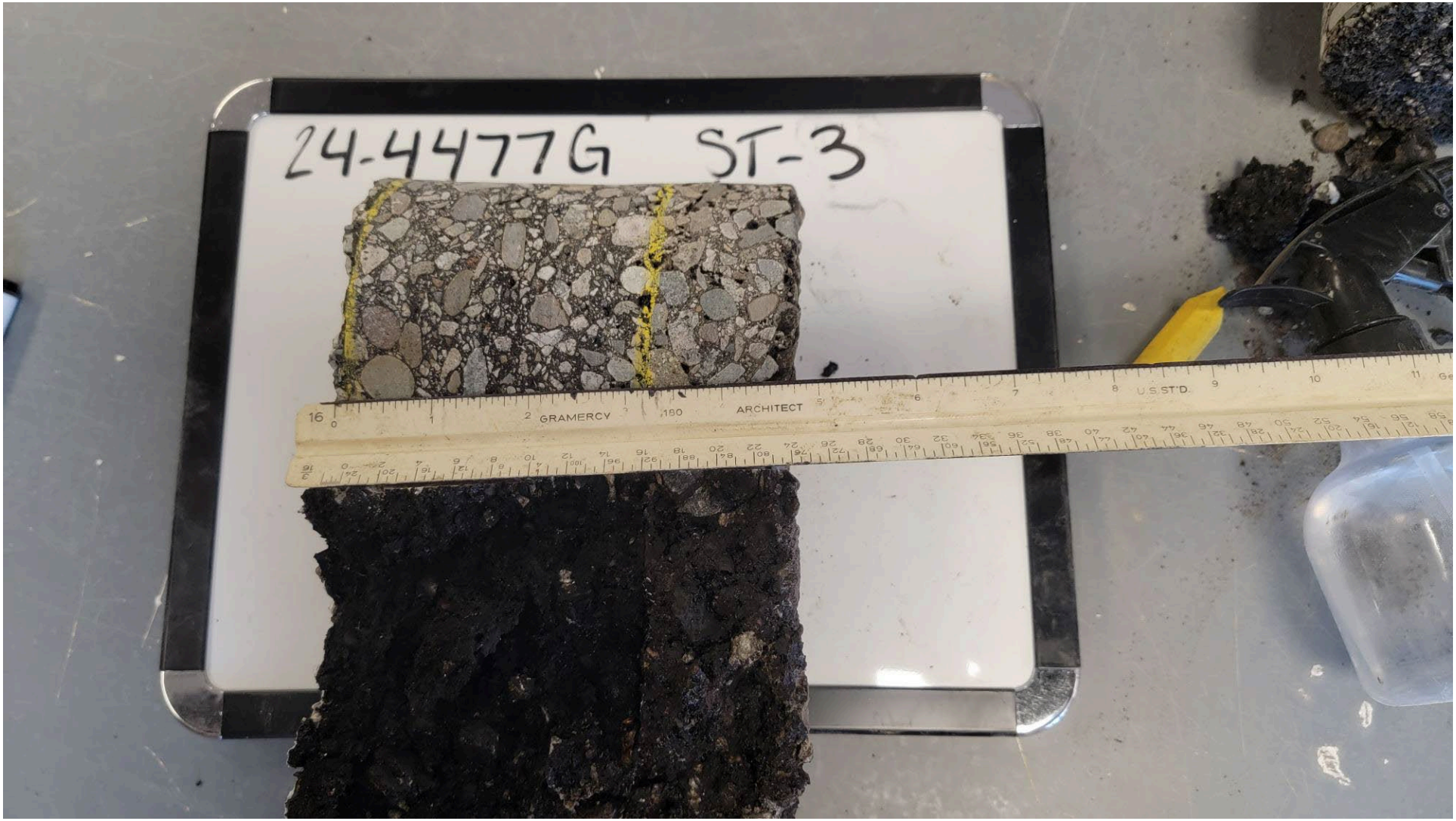
2) Stripping: - In addition to moisture damage some large aggregate is not coated.

1) Severely Stripped: - Most of the aggregate is so clean the colors of the rock are easily seen.

0) No Core: - Asphalt is mostly gone from all size of aggregate. The core has disintegrated.

ST-1 Pavement Core, exterior sidewall and interior stripping.

ST-2 Pavement Core, exterior sidewall and interior stripping.



ST-3 Pavement Core, exterior sidewall and interior stripping.

ST-4 Pavement Core, exterior sidewall and interior stripping.

Route	Central Avenue & 48th LTL								
Name	**Central Avenue & 48th Intersection Improvements (GE) - Billings, Montana**								
Date of Run	12/11/2024								
Typical Section	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Description	**48th Street Base Course Section**	**48th Street Subbase**	**48th Street 0.2' Mill and Overlay Exist AC Pvmt = 6" Exist Base = 2" Exist Subbase = 28"**	**48th Street Matching Existing Section to avoid transverse differential movement**	**Central Ave Base Course Section**	**Central Ave Subbase**	**Central Ave 0.2' Mill and Overlay Exist AC Pvmt = 6" Exist Base = 3 1/4" Exist Subbase = 19"**	**Central Ave Matching Existing Section to avoid transverse differential movement**	
Daily ESAL	49.5	49.5	49.5	49.5	80.5	80.5	80.5	80.5	
Yearly ESAL	18050	18050	18050	18050	29375	29375	29375	29375	
20 Year ESAL	361000	361000	361000	361000	587500	587500	587500	587500	
Demand									
Note	CBR = 3.4	CBR = 3.4	CBR = 3.4	CBR = 3.4	CBR = 3.4	CBR = 3.4	CBR = 3.4	CBR = 3.4	
Reliability	85	85	85	85	85	85	85	85	
So	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	
DeltaPSI	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
Mr	5130	5130	5130	5130	5130	5130	5130	5130	
SNDES	**3.26**	**3.26**	**3.26**	**3.26**	**3.53**	**3.53**	**3.53**	**3.53**	
W18	*361000*	*361000*	*361000*	*361000*	*587500*	*587500*	*587500*	*587500*	
Zr	*-1.037*	*-1.037*	*-1.037*	*-1.037*	*-1.037*	*-1.037*	*-1.037*	*-1.037*	
ESAL	*49*	*49*	*49*	*49*	*80*	*80*	*80*	*80*	
Life	*20.0*	*20.0*	*20.0*	*20.0*	*20.0*	*20.0*	*20.0*	*20.0*	
Capacity									
a1	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	Layer 1
D1 (in)	**4**	**4**	**2.4**	**6**	**4**	**4**	**2.4**	**6**	a1 = 0.41
SN1	1.6	1.6	1.0	2.5	1.6	1.6	1.0	2.5	
a2	**0.14**	**0.14**	**0.24**	**0.14**	**0.14**	**0.14**	**0.24**	**0.14**	Layer 2
m2	1	1	1	1	1	1	1	1	a2 = 0.14 for CAC
D2 (in)	**12.0**	**4.0**	**3.6**	**2.0**	**14.0**	**4.0**	**3.6**	**3.3**	a2 = 0.20 for CTB
SN2	1.7	0.6	0.9	0.3	2.0	0.6	0.9	0.5	
a3		**0.10**	**0.12**	**0.10**		**0.10**	**0.12**	**0.10**	Layer 3
m3	1	1	1	1	1	1	1	1	a3 = 0.07 for
D3 (in)		**11.0**	**2.0**	**28.0**		**14.0**	**3.3**	**19.0**	Special Borrow
SN3	0.0	1.1	0.2	2.8	0.0	1.4	0.4	1.9	
a4			**0.07**				**0.10**		Layer 4
m4	1	1	1	1	1	1	1	1	a4 = 0.07 for
D4 (in)			**28.0**				**19.0**		Special Borrow
SN4	0.0	0.0	2.0	0.0	0.0	0.0	1.9	0.0	
Sntot = SN1+SN2+SN3+SN4	**3.32**	**3.30**	**4.05**	**5.54**	**3.60**	**3.60**	**4.14**	**4.82**	
Traffic Chk W18=20 Yr ESAL	OK	OK	OK	OK	OK	OK	OK	OK	
SN Check	OK	OK	OK	OK	OK	OK	OK	OK	
Design Check	**DESIGN OK**	**DESIGN OK**	**DESIGN OK**	**DESIGN OK**	**DESIGN OK**	**DESIGN OK**	**DESIGN OK**	**DESIGN OK**	
Layer 1 (ft)	0.33	0.33	0.20	0.50	0.33	0.33	0.20	0.50	
Layer 2 (ft)	1.00	0.33	0.30	0.17	1.17	0.33	0.30	0.27	
Layer 3 (ft)	0.00	0.92	0.17	2.33	0.00	1.17	0.27	1.58	
Layer 4 (ft)	0.00	0.00	2.33	0.00	0.00	0.00	1.58	0.00	
Total	1.33	1.58	3.00	3.00	1.50	1.83	2.35	2.35	

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