CITY OF BOULDER, COLORADO

Finance Department/Purchasing Division
1777 Broadway
P.O. BOX 791
Boulder, Colorado 80306

Telephone No.: **303- 441-3054**
Fax No.: **303- 441-4381**
Email: **greyc@bouldercolorado.gov**

BID NO. 41-2015

OPENING DATE: 2:00 PM, OCTOBER 2, 2015

MANDATORY PRE-BID MEETING: 9:00 AM, SEPTEMBER 15, 2015

SPECIFICATIONS
PROPOSAL, CONTRACTS AND BONDS
FOR
GENERAL CONSTRUCTION AND PUBLIC WORKS
FOR
THE CITY OF BOULDER, COLORADO
FOR

Wonderland Creek Greenways Improvement Project (Foothills Parkway to Winding Trail)

FOR INFORMATION CALL:

Kurt Bauer, P.E.
Project Manager
Public Works Department / Utilities Division
TELEPHONE NO. 303-441-4232

CITY OF BOULDER, COLORADO
ADVERTISEMENT FOR BIDS
Wonderland Creek Greenways Improvement Project
Foothills Parkway to Winding Trail

Bid No.41-2015

Sealed bids will be received by the City of Boulder, Colorado, at the office of the Purchasing Coordinator, 1777 Broadway, Boulder, Colorado 80302 until **2:00 P.M. October 2, 2015** for the project called the **Wonderland Creek Greenways Improvement Project Foothills Parkway to Winding Trail**.

A mandatory PRE-BID conference will be held at the 401 Conference Room, 1739 Broadway 4th floor, at 9:00 a.m. on September 15, 2015.

Bids will be in a sealed envelope, plainly marked "**Bid No. 41-2015, Wonderland Creek Greenways Improvement Project Foothills Parkway to Winding Trail**' and addressed to:

Calder Grey
City of Boulder - Purchasing Division
P.O. Box 791
Boulder, Colorado 80306

Hand carried bids and all non USPS deliveries shall be delivered to the Purchasing Division, 1777 Broadway, Boulder, Colorado, 80302.

All bids shall be signed, enclosed in a sealed envelope, and filed as stated in this advertisement. No bidder shall submit more than one bid.

Bid documents will be issued electronically. A copy of the bid and any related materials may be obtained from the Rocky Mountain E-Purchasing (Bidnet) web site at:
www.RockyMountainBidSystem.com

The work for which the bids are requested consists of features related to the Wonderland Creek Greenways Improvement Project. This project is a flood mitigation and multi-use path improvements from Foothills Parkway north and west to Winding Trail including the following items:

- New railroad bridge (by others);
- Relocation of a portion of the Boulder and White Rock irrigation ditch;
- Replacement of an existing culvert crossing at Spring Creek Place;
- Extension of the city's multi-use path system from Foothills Parkway to 30th Street and modifications to the path system north of the Diagonal Highway to Winding Trail (includes substantial walled segments);
- Box culverts under Iris Avenue between 30th and 34th Streets;
- Creek improvements to provide 100-year conveyance capacity from Foothills Parkway to just east of 30th Street and from just north of the Diagonal Highway to Winding Trail;
- New pedestrian bridge just south of Kalmia Avenue; and
- New pedestrian and flood underpasses at Kalmia Avenue and 28th Street.

Bidders shall submit prices on the base bid as provided for in the Bid Form.

The City is not required to take the lowest bid. Bid proposals will be evaluated on a combination of criteria including demonstrated ability to meet bidder qualification and cost.

Each bid shall be accompanied by a money order, certified check, or bid bond payable to the City of Boulder, Colorado, in the amount of not less than five percent (5%) of the total amount of the bid. No bid will be considered unless accompanied by such deposit. Such check or bid bond shall be forfeited to the City if the bid is accepted and the bidder fails to sign a contract within fifteen days of acceptance.

Bids and Qualification Statements shall be prepared at the bidders expense and become a City record and therefore a public record.

The City reserves the right to reject any and all bids and to waive any informality or irregularities therein. The City reserves the right to evaluate the bids including the base bid and any bid alternatives in any combination deemed to be in the best interest of the City.

Bids not submitted by the required deadline are ineligible for consideration and will not be opened, but the City may change the deadline at any time.

Bidders may inspect the bids after they are opened in accordance with provisions of the Colorado Public Records Act. However, if the City determines that all bids should be rejected and a rebid may be necessary, the manager may hold the bid in confidence until the rebid has been completed.

Confidential data, if identified as such, will be held confidential upon request, if the request is made as part of the bid and if the City Attorney determines the data meets the requirements of the Colorado Public Records Act.

The City may reject any and all bids but otherwise shall accept the lowest bid satisfying the minimum bid requirements and qualification criteria prescribed below. If the City determines the lowest bidder does not meet the minimum bid requirements the bid may be rejected.

Responsibility criteria include the following:

- Bidders integrity
- Financial responsibility
- Skill
- Relevant technical expertise
- Ability to complete the contract promptly and satisfactorily
- Whether the bidder maintains a permanent place of business
- Whether the bidder has adequate plant, equipment, and support services to perform the contract
- Whether the bidder has previously perform similar work satisfactorily
- Whether the bidder is likely to be engaged in work that may impair the ability to finance the work covered by the bid or provide equipment for its proper execution
- Whether the bidder proposed a reasonable approach to achieve the objectives of the project
- Whether there have been or are presently any claims raising a substantial question about the bidders ability to perform the contract.

Bidders/General Contractors (including all parties of a joint venture, each completing a separate Qualification Statement, but submitting all forms together) are required to submit evidence that they have a practical knowledge of and the financial resources to complete the Work by completing Form 2, Contractor Qualification Statement.

No bids may be withdrawn within a period of forty five (45) days after the date set for opening bids, but a bid may be withdrawn up to twenty four (24) hours prior to expiration of the deadline for submitting bids.

Technical irregularities in the bid requirements may be waived if the City determines that such a waiver does not compromise the integrity of the bidding process.

The bidder shall furnish the City a completed copy of the Proposed Subcontractors Form 20 with the bid proposal. The bidder shall furnish the City a completed copy of Proposed Manufacturers and Suppliers Form 21 with the bid proposal. The project is federally funded and all bids must include the following forms:

- Form 606 – Anti-Collusion Affidavit
- Form 1413 – Bidders List
- Form 1414 – Anticipated DBE Participation Plan

There is 7.5% DBE participation goal on this project.

Projects on CDOT right of way require contractors to be on CDOT's prequalified list.

The CDOT Form 347, Certification of EEO Compliance, is no longer required to be submitted in the bid package. This form certified that the contractor/proposed subcontractors were in compliance with the Joint Reporting Committee EEO-1 form requirements. The EEO-1 Report must still be submitted to the Joint Reporting Committee if the contractors and subcontractors meet the eligibility requirements (29CFR 1602.7); we will, however, no longer require certification. For additional information regarding these federal requirements, please refer to: http://www.eeoc.gov/stats/jobpat/e1instruct.html.

The bidder to whom a contract is awarded will be required to furnish a separate "Performance Bond" and "Labor and Material Bond" to the City of Boulder, Colorado. The Performance Bond and the Labor and Material Bond shall be furnished in the amount of one hundred percent (100%) of the Contract, in conformity with the requirements of the Contract Documents.

CITY OF BOULDER, COLORADO
A MUNICIPAL CORPORATION

By

_____
City Clerk

CITY OF BOULDER, COLORADO

CONSTRUCTION CONTRACT

GENERAL CONDITIONS
July 2006

GENERAL CONDITIONS

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ARTICLE I. DEFINITIONS AND INTRODUCTORY PROVISIONS

101. USE OF THIS DOCUMENT

These general contract conditions consist of requirements concerning the construction contracts of the city. They are applicable to all contracts of the city in which reference is made to "city of Boulder General Conditions."

102. CONTRACT

The "contract" is the entire agreement between the contractor and the city and includes, without limitation, these general conditions and other contract documents in their entirety. The term is used generally and does not refer to any particular document.

103. CONTRACT DOCUMENTS

The "contract documents" are all written documents which define the construction work and the obligations of the contractor in performing the work and the city in providing compensation for the work. The contract documents include the following:

A. General conditions (this document);

B. Special conditions;

C. Bid documents;

D. Contract agreement (Form 5);

E. Drawings and specifications;

F. Payment and performance bonds; and

G. Change orders, work directives, field orders, addenda and other documents which may be required or specified. When a form number is referenced herein, it refers to the forms provided in the Appendix to this document, these are the city's preferred forms, but similar forms may be used at the discretion of the project manager.

104. GENERAL CONDITIONS

The "general conditions" are the sections set forth in articles 1 through 10 herein.

105. SPECIAL CONDITIONS

The special conditions are additions and revisions to the general conditions which refer to aspects of particular contracts. In the event that there are inconsistencies between the general conditions and the special conditions of a particular contract, special conditions supersede general conditions.

106. BID DOCUMENTS

The "bid documents" include the bidding instructions, and inform contractors of the bidding procedures of a particular contract. The bid proposal is the document upon which the contractor submits a bid, the bid bond, and any addenda to any of the other contract documents which are effective prior to submission of the bid proposal and the advertisement for bids.

107. DRAWINGS AND SPECIFICATIONS

The "drawings and specifications" consist of all documents, excluding shop drawings, approved by the city for the purpose of describing the work to be performed under the contract. The city shall retain ownership of all drawings and specifications prepared or used in connection with the contract, whether prepared by or on behalf of the contractor or the city. Copies of the drawings and specifications may be obtained at the location specified in the advertisement for bids. The drawings show the character and the scope of the work to be performed. Figure dimensions shall in all cases be used in preference to scale dimensions. The specifications consist of written technical descriptions of materials, equipment, construction systems, processes, standards, and workmanship. If work is shown on drawings, but dimensions for such work are not indicated, then the contractor shall not execute such work unless the contractor is able to determine the unspecified dimensions from the dimensions which are specified. Whenever the contractor is unable to determine unspecified dimensions, the contractor shall proceed as provided in section 120.

108. OWNERSHIP OF UNIQUE DRAWINGS AND SPECIFICATIONS

The city may hire an artist, architect, or engineer to prepare drawings or specifications for a unique design, logo, or structure, as will be set forth in the special conditions. The city hereby reserves complete property rights to such drawings and specifications. This section is not intended to include common drawings or specifications or manufacturer's specifications which are commonly used in the construction industry, or which are used by the artist, architect, or engineer who prepared such drawings or specifications. The contractor and all subcontractors are prohibited from using such drawings or specifications or selling or otherwise transferring such drawings or specifications to any other person or entity, except as required for the work, unless the project manager waives this condition in writing.

109. PARTIES TO THE CONTRACT

There are only two parties to the contract: the city and the contractor.

110. THE CITY

The City of Boulder, Colorado, shall be referred to in these documents as the "city." As used herein, the city also refers to each city department, division or other agency, board or commission or project manager set forth in the contract documents as having some responsibility for supervising the implementation of the contract.

111. PROJECT MANAGER

The city shall designate a "project manager" to be responsible for supervising the implementation of the contract and to represent the city in all matters and questions arising under the contract. The project manager shall be the judge of the performance of the contract as it relates to compliance with drawings and specifications and other contract documents, quality of workmanship and materials and implementation of the contract according to its letter and intent. The project manager shall have full access to the work at all times. The project manager alone shall have the authority to issue change orders. All correspondence to the city relating to the contract shall be directed to the project manager. The project manager's duties are defined further in other sections of the general conditions. The project manager's decisions on all matters of the contract shall be final and conclusive, subject to contractor's right to dispute such decision.

112. PROJECT INSPECTOR

The "project inspector" is an employee of the city or of the A/E (defined below). The city has delegated its authority to the project inspector to make initial decisions regarding technical questions which may arise as to the quality or acceptability of materials furnished and work performed and as to the manner of performance and rate of progress of the work under the contract. The project inspector shall interpret the intent and meaning of the contract, including drawings and specifications, and make initial decisions with respect to quality, workmanship and materials and the contractor's fulfillment of the contract and the contractor's entitlement to compensation. The contractor shall consult with the project inspector in all matters relating to the contract where any questions arise regarding technical aspects of the contract. The project inspector's decisions are subject to review by the project manager.

113. THE ARCHITECT/ENGINEER

The city may contract for the services of an architect or engineer, referred to as an "A/E," to aid the project manager in administering the contract. The A/E will consult with the project manager concerning the performance and acceptance of the work. The A/E will participate in the preparation and approval of progress and final payment estimates, and participate in inspections while the work is in progress and prior to final acceptance by the city.

114. THE CONTRACTOR

The word "contractor" as used herein refers to the person, partnership, corporation or joint venture which has contracted with the city to perform the work specified by the contract documents. The term "contractor" shall also be deemed to include any subsidiaries which are at least 80% owned by the contractor. The contractor shall supervise and direct the work, using the contractor's best skill and attention. The contractor shall be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the work under the contract, and shall perform all the work in a workmanlike manner. The contractor shall be responsible to the city for all acts and omissions of the contractor's agents and employees, subcontractors and their agents and employees, and other persons performing any of the work under contract with the contractor or any of its agents, employees, or subcontractors. The contractor shall

not be relieved from any obligations under the contract documents by inspections, tests, or approvals required or performed pursuant to the contract by persons other than the contractor.

115. SUBCONTRACTORS

The contractor shall list on its bid proposal any proposed subcontractor or supplier (other than employees) whom the contractor plans to hire to perform the work on the bid proposal. By executing the contract with the contractor, the city agrees to approve such subcontractors and suppliers, unless the city has a reasonable objection to any such subcontractor or supplier, and so notifies the contractor in writing within a reasonable time of discovering such objection. If the city has a reasonable objection to any such proposed subcontractor or supplier, the contractor shall propose a substitute to whom the city has no reasonable objection. If the contractor plans to hire any subcontractor or supplier not listed on the bid proposal, the project manager must give written approval before such subcontractor or supplier may perform any work or supply any materials under the contract. No agreement between the contractor and a subcontractor or supplier shall in any way affect the contract between the city and the contractor. The contractor shall review the qualifications of all subcontractors and their supervisors and assure that all subcontractors satisfy all applicable insurance requirements set forth in article 3 herein. The contractor shall require each subcontractor to sign an agreement in which the subcontractor agrees to be bound by all applicable terms and conditions of the contract documents for the benefit of the city. The contractor shall be fully responsible for all acts and omissions of its subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that the contractor is responsible for the acts and omissions of persons directly employed by the contractor. Nothing in the contract documents nor in the city's acceptance of a subcontractor shall create any contractual relationship between the city and any subcontractor or other person or organization having a direct contract with the contractor, nor shall it create any obligation on the part of the city to pay or to see to the payment of any moneys due any subcontractor or other person or organization.

116. THIRD PARTY BENEFICIARIES

The contract is not intended to create any right in or for the public or any member thereof, any subcontractor or supplier, nor any other third party, nor to authorize anyone not a party to the contract to maintain a suit to enforce its terms. The duties, obligations, and responsibilities of the parties to the contract, with respect to third parties, shall remain as imposed by law. This section shall not apply to any surety to the extent it is acting under any labor and materials bond or performance bond entered into by the contractor.

117. INTEGRATION

The contract documents represent the entire integrated agreement between the city and the contractor and supersede all prior negotiations, representations, or agreements, whether written or oral. No modification, amendment, waiver or novation shall be valid unless incorporated in a written amendment or change order signed by both the project manager and the contractor.

118. SEVERABILITY

To the extent that the performance of the parties' obligations may be accomplished within the intent of the contract, the terms of the contract are severable, and should any term or provision of the contract be declared invalid or become inoperative for any reason, such invalidity or failure shall not affect the validity of any other contract term or provision.

119. WAIVER

If the city fails to enforce any term of the contract for any period, this shall not act as a waiver. No waiver of any breach of any term hereof shall be effective unless set forth in a writing signed by both the project manager and the contractor. The waiver of any breach of a term hereof shall not be construed as waiver of any other term.

120. INCONSISTENCIES IN CONTRACT DOCUMENTS

The contract documents are complementary, and what is called for by one document is binding as if called for by all contract documents. If the contractor notices a conflict, error or discrepancy in the contract documents, the contractor shall notify the project manager in writing immediately. The contractor shall not proceed with any part of the work affected by such conflict, error or discrepancy until the project manager has authorized the contractor to proceed in writing. The city shall decide which of the provisions in the contract documents shall be followed in the event of a conflict, error or discrepancy. If the city selects an interpretation which costs more or less than a version on which the contractor reasonably relied in preparing its bid, the contract price shall be increased or decreased by an appropriate change order. The adjustment in the contract price shall be calculated according to the provisions of article 8 herein, except that increases shall be granted only to the extent that the project manager finds that the contractor's interpretation which formed the basis of its bid was reasonable. If the contractor disputes the contract price adjustment made by the project manager, the contractor may appeal pursuant to section 25. The contractor shall report to the project manager all errors the contractor discovers in the contract documents. The contractor shall not be liable for damages resulting from conflicts, errors, or discrepancies in the contract unless the contractor caused the conflict, error, or discrepancy or if the contractor knew in the exercise of reasonable diligence of the conflict, error or discrepancy and failed to call it to the city's attention.

121. COMPLIANCE WITH LAWS

At all times during the performance of the contract, the contractor shall strictly adhere to all applicable federal, state, county and city laws that have been or may hereafter be established. This shall include, without limitation, the United States Department of Health, Occupational Safety and Health Administration (OSHA) standards. As used in this section, and hereafter, the term "laws" shall include, without limitation, all federal, state and city codes, charters, ordinances, laws, standards, rules, regulations and permits.

122. CHOICE OF LAW

In all litigation arising out of the contract, the statutory and common law of the State of Colorado shall be controlling, unless federal funds are expended on the contract and governing federal

requirements specify that federal law must prevail. Unless federal law governs, venue shall be in the District Court in and for Boulder County, State of Colorado.

123. FEDERAL AID PROVISIONS

Whenever federal funds are used on the work, the special conditions shall set forth the federal funding provisions. In such event the rules and regulations promulgated by the federal department or agency disbursing the funds shall be among the terms and conditions of the contract and shall be observed by the contractor, and shall be taken into account by the contractor in preparing and submitting its bid proposal. In the event of an inconsistency between the contract documents and federal aid requirements, the latter shall govern. When the United States of America provides funds, it may assign inspectors to insure that the purposes for which the funds were provided are achieved. However, such activity by the United States does not make it a party to the contract and shall not modify the rights or obligations of either the city or the contractor hereunder.

124. PAYMENT OF INTEREST

In the event that any payment of interest is to be made pursuant to any provision of the contract, interest shall be paid at the average rate earned by the city on its invested funds during the quarterly fiscal period prior to the period during which the interest was accrued.

125. CONTRACT GRIEVANCE APPEAL PROCEDURE

If the contractor disputes any decision made by the project manager, the contractor may appeal such decision informally to the city manager. If the city manager denies such appeal, or does not respond to the appeal within fifteen (15) days after receiving it, the contractor shall be required to submit a formal notice of intent to claim pursuant to section 809.

126. CITY AFFIRMATIVE ACTION REQUIREMENTS

Pursuant to Section 2-l-10, B.R.C. 1981, the contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, sexual orientation, gender variance, marital status, religion, ancestry, mental or physical handicap, or age, except when sex or age or absence of mental or physical handicap is a bona fide occupational qualification, and, in the instance of a handicap, no reasonable accommodation can be made. The contractor shall take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to the above mentioned characteristics. Such action shall include, without limitation, the following: employment, upgrading, demotion, transfer, recruitment and recruitment advertising, lay-off and termination, rate of pay and other forms of compensation, and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places on the work site notices setting forth this non-discrimination clause. In the event of the contractor's non-compliance with the foregoing non-discrimination clause, this contract may be canceled, terminated, or suspended in whole or in part, and the contractor may be declared ineligible for future city contracts.

127. ATTORNEYS' FEES

If the City is reasonably required to engage an attorney to assist it in connection with any claim, dispute, or other disagreement with the contractor, including without limitation engagement in connection with any litigation or arbitration proceedings under this contract, and the city substantially prevails in such proceeding, the contractor shall reimburse the city for its reasonable attorneys' fees, costs, and other expenses including without limitation the expenses of consultants and other experts, incurred by the city in such proceedings. Reimbursement of attorneys' fees shall be at the prevailing rate within the city for services rendered by the city attorney and employees of the city who assist the office of the city attorney in such proceedings.

128. AUTHORITY

Contractor warrants that the individual executing this contract is property authorized to bind the contractor to the terms of this contract.

ARTICLE II. BIDDING INSTRUCTIONS

201. GENERAL INSTRUCTIONS

These bidding instructions are general in nature, and may be amended or supplemented by the city. Upon submitting a bid proposal, the bidder warrants that it is familiar with all provisions of the contract documents, and agrees to comply with them. Bidding procedures shall at all times conform to the requirements of Chapter 2-8, B.R.C. 1981, as amended.

202. ADVERTISEMENT FOR BIDS

The city manager shall publish a notice of call for bids at least once in a newspaper of general circulation in the city when required by Section 2-8-4, B.R.C. 1981, as amended. The city manager may notify any contractor deemed particularly well suited to perform the particular tasks in a proposed contract.

203. LEGAL QUALIFICATIONS OF BIDDERS

Each bidder shall sign the bid proposal and give the bidder's current business address. The legal status of the bidder shall be stated in the proposal. A corporation shall name the state in which it is incorporated, shall be qualified to do business in the State of Colorado, and shall so state. When a corporation submits a proposal, the proposal shall be signed in the name of the corporation by a duly authorized officer or agent of the corporation, who shall submit a personal address together with evidence that such person has legal authority to sign the proposal. A partnership shall give the full names and addresses of all partners and their interest and role in the partnership business. When a partnership submits a proposal, the proposal shall be signed in the name of the partnership by a duly authorized general partner or agent thereof, who shall submit a personal address together with evidence that such person has legal authority to sign the proposal. If the bidder signs a bid proposal using the designation "President," "Secretary," "Agent," or other designation without disclosing the name of a bidding contractor, the person signing the bid proposal may be held individually

responsible for the bid. If required, the bidder shall furnish the city with a completed copy of Form 2, Contractor/Subcontractor Qualification, at the time and place set forth in the bidding instructions.

204. LICENSES AND PERMITS

Neither the contractor nor any subcontractor shall commence work under this contract in the city until obtaining all required city licenses and permits. The following is a list of licenses and permits which may be required; (the regulations can be accessed via the city's website at www.bouldercolorado.gov). These requirements are subject to change without notice. This list should not be deemed to be exhaustive. In addition, the contractor is responsible for obtaining all required federal, state, and county licenses and permits. The city will pay the development excise tax and any plant investment fees applicable to the project.

License or Permit	B.R.C. 1981	Location
General Contractor's License	4-4-3	Planning and Development Services Phone:303-441-1880
Building Permit	10-5-2	Same
Solar Access Permit	9-8-7	Same
Plumbing Contractor's License	4-15-3	Same
Plumbing Permit	10-10-2	Same
Electrical Contractor's Registration	4-8-2	
Electrical Permit	10-6-2	Same
Mechanical Contractor's License	4-13-3	Same
Mechanical Permit	10-9-2	Same
Sound Level Variance	5-6-2	
Sign Contractor's License	4-21-2	Same
Sign Permit	10-11-4	Same

Moving or Wrecking Permit	10-5-2	Same
Fire Protection System Permit	10-8-2	Same
Fence Permit	10-5-2	Same
Public Right-of-Way License	4-6-2	Same
Public Right-of-way Excavation Permit	4-6-9	Same
Water Main Connection Permit	11-1-14	Same
Sewer Main Connection Permit	11-2-9	Same
Industrial Discharge Permit	4-20-31, 11-3-13	Water Quality Phone: 303-413-7350
Sales and Use Tax License	3-2-11	Sales & Use Tax Division Phone: 303-441-3050

205. LOCATION OF BIDDING DOCUMENTS/ADDENDA

Drawings, specifications and other contract documents and addenda are located at the office described in the advertisement for bids. As used herein, addenda include all written or graphic instruments issued by the city prior to the deadline for submission of bids which modify or interpret the contract documents, drawings or specifications by additions, deletions, clarifications, or corrections. Any potential bidder may request in writing to have copies of all addenda sent to the bidder's address. However, the city shall not be liable for any failure to send or to receive such addenda. No addenda shall be issued less than five (5) working days prior to the deadline for submission of bids. If necessary, the deadline for submission of bids shall be extended to comply with this section.

206. OMISSIONS IN DRAWINGS AND SPECIFICATIONS

Drawings and specifications are intended to be complementary, and must be interpreted in that sense. Anything shown or called for in one and omitted in another is binding as if called for or shown by both. The provisions of section 120 shall apply to any inconsistency between drawings, between specifications, and between drawings and specifications. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. The corrected total will be shown in the tabulation of bids. Special provisions and detail drawings are intended to modify and shall supersede more general drawings and specifications. If work is not described by the drawings and specifications, but is within the reasonable scope of the work, the bidder shall incorporate into the bid proposal such extra work. As used herein, work which is not specifically described in the drawings and specifications but which is within the reasonable scope of the work is work which is necessary for the successful performance of the contract, the necessity of which can be reasonably implied from the contract documents. Failure to notice or acknowledge such work shall not excuse the bidder nor allow a claim for extra payment or time extension in the event that the bidder is awarded the contract. The contractor shall have the burden to prove that such work could not have been reasonably implied from the contract documents.

The City will furnish the contractor, upon award of the contract for construction, five (5) sets of contract documents at no charge. Additional contract documents are available for the City's cost of reproduction.

Order of Precedence of Contract Documents:

A. To resolve conflicts resulting from errors or discrepancies in the contract documents, the order of precedence shall be as follows:

1. Change Orders
2. Addenda
3. The Contract Agreement
4. Permitting or Licensing Conditions as interpreted by the Permitting or Licensing Authority
5. Special Contract Conditions and Provisions
6. Drawings
7. Technical Specifications
8. General Contract Conditions
9. Referenced Standard Specifications
10. Instructions to Bidders
11. Advertisement for Bids
12. Contractor's Bid (Bid Proposal Form)

B. With reference to the Drawings, the order of precedence shall be as follows:

1. Figures govern over scaled dimensions
2. Detail drawings govern over general drawings

3. Addenda/change order drawings govern over Contract Drawings
4. Contract Drawings govern over standard drawings.

207. STANDARDS

Reference to standard specifications of any technical society, organization, or association, or to codes of local or state authorities, shall mean the latest standard code, specification, or tentative specification adopted and published at the deadline for the submission of bids, unless specifically stated otherwise. Wherever the following abbreviations are used, they are to be given the meaning which follows the abbreviation:

AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AI	Asphalt Institute
AGC	Associated General Contractors
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALS	American Lumber Standards
ANSI	American National Standards Institute (successor to USASI)
APA	American Plywood Association
APWA	American Public Works Association
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
AWI	American Woodworkers Institute
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
CDOT	Colorado Department of Highway
CDH	Colorado Division of Health
CLFMA	Chain Link Fence Manufacturers Association
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specification Institute
EPA	Environmental Protection Agency
FS	Federal Specifications
MUTCD	Manual on Uniform Traffic Control Devices
NACE	National Association of Corrosion Engineers
NCMA	National Concrete Masonry Association
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NFPA	National Fireman’s Protection Association

NRMCA	National Ready Mix Concrete Association
NWMA	National Wood Manufacturers Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
SDA	Steel Door Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
UBC	Uniform Building Code
UL	Underwriter's Laboratory
UMC	Uniform Mechanical Code
UPL	Uniform Plumbing Code
WCLB	West Coast Lumber Inspection Bureau
WPCF	Water Pollution Control Federation
WWPA	Western Wood Products Association

208. ROYALTIES AND PATENTS

The contractor shall pay all license fees and royalties. The contractor shall include and shall be considered to have included in the bid proposal a sum sufficient to cover all fees, royalties, licenses and claims for any patent rights, trade secrets, copyrights, trademarks or other intellectual property which may be connected with the work. If the contractor uses any such intellectual property in the work, the contractor shall enter into a written agreement with the owner of the intellectual property to provide that there will be no future payments owed by the city. The contractor shall defend, indemnify, and hold harmless the city, its officers, agents and employees from all fees, royalties, licenses and claims or suits therefore in connection with any infringement or alleged infringement of any intellectual property right, unless the infringement or alleged infringement results from the negligence of the city or an A/E hired by the city in failing to ascertain that an infringement is or may be occurring, in which case the contractor shall defend any action against the city.

209. SITE INSPECTION

Before submitting a bid, each bidder shall:

A. Examine the contract documents thoroughly;

B. Visit the site to familiarize it with local conditions that may in any manner affect cost, progress, or performance of the work;

C. Become familiar with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress or performance of the work;

D. Study and carefully correlate the bidder's observations with the contract documents; and

E. Notify the project manager of all conflicts, errors, omissions, ambiguities or discrepancies in or among the contract documents.

On request, the city will provide each bidder access to the site to conduct such investigations and tests as each bidder deems necessary for submission of a bid. It shall be the bidder's responsibility to make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (including without limitation, surface, subsurface and underground utilities) at or contiguous to the site or otherwise which may affect costs, progress or performance of the work and which the bidder deems necessary to determine its bid for performing the work in accordance with the time, price and other terms and conditions of the contract documents. Location of any excavation or boring made by bidder shall be subject to prior approval of the city and other applicable agencies. Bidder shall fill all holes, restore all pavements to match the existing structural section and shall clean up and restore the site to its former condition upon completion of such exploration. The city reserves the right to require the bidder to execute an access agreement with the city prior to accessing the site.

If a bidder discovers an apparent error or omission in the drawings and specification, or any other contract documents, the bidder shall immediately notify the project manager to enable the city to make any necessary revisions. The city may consider it to be detrimental to the city for a bidder to submit an obviously unbalanced unit bid price.

The lands upon which the work is performed, rights of way, and access thereto, and other lands designated for use by contractor in performing the work are identified on the drawings.

Information and data reflected in the contract documents with respect to underground utilities at or contiguous to the site are based upon information and data furnished to the city by the owners of such underground utilities or others, and the city does not assume responsibility for the accuracy or completeness thereof, unless it is expressly provided otherwise in the contract documents.

By submission of a bid, the bidder shall be conclusively presumed to represent that the bidder has complied with every requirement of these instructions to bidders and that the contract documents are not ambiguous and are sufficient in scope and detail to indicate and convey understanding of all terms and requirements of the contract documents. By failing to make an inspection, the bidder waives all rights to claim extra payment or time extensions due to unexpected conditions which could have been determined had the site been inspected, *see* Section 802. Bidders may not rely on oral or written representations made by the city, unless the city has guaranteed in writing that such representation is factually accurate; and by submitting a bid, each bidder waives all liability for any error in any representation made by the city to the bidder.

210. EVALUATION OF BIDS AND BIDDERS; REJECTION OF BIDS

The city reserves the right (1) to reject any and all bids, (2) to waive any and all informalities or irregularities, (3) to negotiate final terms with the successful bidders and (4) to disregard all nonconforming, nonresponsive or conditional bids.

The city may consider the qualifications and experience of subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the work as to which the identity of subcontractors and other persons

and organizations must be submitted. Operating costs, maintenance considerations, performance data, and guarantees of materials and equipment may also be considered by the city.

The bidder shall furnish the city all information and data requested by the city to determine the ability of the bidder to perform the work. The city reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the city that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein.

The city may conduct such investigation as deemed necessary to assist in the evaluation of any bid and to establish the responsibility, qualifications and financial ability of the bidders, proposed subcontractors and other persons and organizations to do the work in accordance with the contract documents to the city's satisfaction within the contract time.

By submitting a bid, each bidder authorizes the city to perform such investigations of the bidder and, by its signature thereon, authorizes the city to obtain reference information concerning the bidder and releases the city and the party providing such information to the city from any and all liability to the bidder as a result of such reference information so provided.

If the contract is to be awarded, it will be awarded to the bidder who, by evaluation, the city determines will best meet the city's interests.

The city reserves the right to accept or reject the work contained in any of the bid schedules or alternates, either in whole or in part.

211. DETOURS AND TRAFFIC CONTROL

When a street, alley, bikelane, path, or sidewalk detour or temporary transportation device must be constructed or maintained as part of the work, including without limitation traffic control supervision, the contractor shall include such costs in the bid.

212. THE BID PROPOSAL

The bid shall be submitted upon the proposal form supplied by the city. The general conditions, special conditions, bidding instructions and proposal, contract agreement, and specifications are bound in one volume, and this shall be submitted intact. Each proposal must be enclosed in a sealed envelope addressed to the purchasing agent. The face of the envelope must show the name of the bidder, the project number, the descriptive title of the work, for which the bid is made, and the time and date of opening. The bid proposal shall include the furnishing of all materials, plans, equipment, tools, and all other facilities and the performing of all labor and services necessary or proper for the completion of the work, except as may be provided otherwise in the contract documents. The contractor, by submittal of this bid proposal accepts the constructions drawings as referenced in the bid package.

213. COMPLETING AND SIGNING THE PROPOSAL FORM

The bidder shall complete the proposal form by writing or printing, in a legible fashion, the entire bidder's prices offered for the work to be done. All blank spaces which require a response of the

bidder shall be properly filled in. If the words and figures on the proposal form do not agree, the written words will govern. Any alteration, interlineation, or erasure on the proposal form or other parts of the contract documents as originally issued to the bidder must be initialed by the signer of the bid. Proposals that are unbalanced so that each item does not reasonably carry its own proportion of cost and proposals which contain inadequate or unreasonable prices for any item also may be rejected. The bidder shall assume full responsibility for timely delivery at the location designated for the receipt of bids. Oral, telephonic, telegraphic, or telecopied bids are invalid and will not receive consideration.

214. DISCREPANCIES BETWEEN UNIT PRICES AND EXTENSIONS

In the event of discrepancies between the unit prices quoted in the proposal and the extensions thereof, the unit prices shall control. However, the city reserves the right to accept the extension price if that is deemed by the city to be a more accurate valuation for a particular bid item.

215. NO ORAL AGREEMENTS

No oral agreement or conversation with any officer, agent or employee of the city, either before or after the execution of the contract, shall affect or modify any of the terms, conditions, or other obligations set forth in any of the contract documents. All contract modifications must be in writing and signed by the authorized agent of the city who is in charge of the administration of this contract.

216. PREFERENCE FOR COLORADO MATERIALS

Except for federally funded contracts, preference is given to materials, supplies, and provisions produced, manufactured or grown in Colorado, quality being equal to articles offered by competitors outside the state of Colorado, pursuant to Section 8-18-101, C.R.S., as amended.

217. COLORADO LABOR REQUIREMENTS

Except for federally funded contracts, Colorado labor shall be employed for at least eighty percent (80%) of each class of skilled and common labor employed for all city public works projects. “Colorado labor” means any person who is a resident of the state of Colorado at the time of employment, without discrimination as to race, color, creed, sex, age, or religion except when sex or age is a bona fide occupational criterion. Section 8-17-101, C.R.S., as amended.

218. CITY SALES AND USE TAX

The contractor is deemed to be the consumer of the materials used in all construction projects in Boulder. Therefore, all tangible personal property used in the construction project is subject to the current city sales or use tax pursuant to Section 3-2-2, B.R.C. 1981. The city sales tax is imposed on all sales, rentals, leases and taxable services used in the construction project. The city’s construction use tax is imposed upon tangible personal property and taxable services purchased for construction use in the city whether purchased inside or outside of the city. Both non-residents and residents of the city engaged in a construction project in the city are liable to pay the city construction use tax. No credit will be given for taxes paid to another municipality. The General Contractor is liable for

the payment of the city's sales and use tax for the total project including tax due by its subcontractors. This tax must be included in the bid proposal.

219. STATE SALES AND USE TAX

Pursuant to Section 39-26-114, C.R.S., all materials to be incorporated into city projects are exempt from the RTD and State of Colorado sales and use taxes. Bids shall exclude these taxes.

220. CHANGES IN THE CITY SALES AND USE TAX RATE

If the city sales and use tax rate is increased or decreased effective after the deadline for the submission of bids, an adjustment shall be made in the contract by the project manager to take account of any additional or reduced tax liability.

221. BID SHALL IDENTIFY WORK TO BE SUBCONTRACTED

In the special conditions, the city may designate the amount of work which it will permit the contractor to subcontract. This will be determined by considering the various construction trades required to do the work, the market conditions in the construction industry, and how the work can be organized to promote the city's best interests. The bid proposal shall identify each element of the work to be subcontracted, estimate the percentage of the total work which that element represents, and provide the name and qualifications of each proposed subcontractor. However, the city recognizes that prior to bidding, the bidder may not have been able to negotiate for all work which the bidder proposes to subcontract. Therefore, the city will permit the successful bidder to propose additional subcontractors at any time during the contract period, as long as the limitation on subcontracting has not been exceeded. If any of the proposed subcontractors are rejected by the city after acceptance of the bid, the contractor shall replace them with substitute subcontractors acceptable to the city. If the city rejects a proposed subcontractor and the contractor, with the exercise of good faith and best efforts, is unable to employ an alternate acceptable subcontractor within the contract price, the contractor may request an increase in the contract price. If the contractor disputes the contract price increase granted by the city, the contractor may appeal pursuant to section 125.

222. PROPOSAL GUARANTEE

As a guarantee of good faith on the part of the bidder, each bid proposal shall be accompanied by an unconditional letter of credit, money order, certified check, or bid bond payable to the city in an amount not less than five percent (5%) of the total amount of the bid. The city shall only accept a bid bond if it is set forth on Form 1 from the bidder. No bid proposal will be considered unless accompanied by such a proposal guarantee. In case alternate bids are called for, providing for the use of several different classes of material or types of improvement for the same work, one bid bond in the amount of five percent (5%) of the total amount of the highest bid will be sufficient for all proposals.

223. RETURN OF PROPOSAL GUARANTEE

As soon as bid prices have been compared and determination of bidder responsibility has been made, the proposal guarantees of all except the three (3) lowest responsible bidders will be returned unless the city is considering the bids of more than three (3) bidders, in which case all such proposal guarantees may be retained. When the successful bidder executes and delivers the contract agreement and delivers to the city satisfactory performance and labor and material bonds and insurance documentation and all other contract documents, and satisfies all other conditions precedent to contract execution by the city, the proposal guarantees of these three (3) bidders shall be returned to them. In any event, the proposal guarantees of all bidders shall be returned within sixty-five (65) days of the bid opening, unless the city retains the proposal guarantee pursuant to section 224.

224. RETENTION OF PROPOSAL GUARANTEE

If the successful bidder fails to enter into a contract in accordance with an accepted bid proposal, or fails to furnish the required performance and labor and material bonds, insurance certificates, and other contract documents, within fifteen (15) days from the mailing of the notice of award, or if the bidder has engaged in collusion with other bidders in submitting the bid, the bidder's proposal guarantee shall be retained by the city as liquidated damages and not as a penalty. In the event only a portion of the bidder's bid is accepted or if the bidder refuses to accept an award of less than the combination of bids on two (2) or more designated portions of such bids, the city shall retain as liquidated damages a portion of the proposal guarantee equal to the proportion of the work which the bidder refused to perform bears to the total bid price of the contract accepted by the city. By submitting the proposal guarantee with the bid proposal, the bidder agrees to liquidated damages in the event the bidder fails to enter into the contract with the city. The city shall not have to prove actual damages suffered in order to retain the proposal guarantee as liquidated damages. The parties agree that liquidated damages are appropriate because the city's anticipated actual damages are uncertain in amount and difficult to forecast accurately. The parties agree that the amount of the proposal guarantee or the specified portion thereof is a reasonable estimate of damages and not disproportionate to the anticipated loss or injury.

225. ONLY ONE PROPOSAL ACCEPTED

More than one bid proposal from an individual, firm, partnership, or corporation under the same or different names will not be considered. Evidence that any bidder has an interest in more than one proposal for the same work will be cause for rejection of all such proposals. Evidence of collusion or other illegal activities between bidders will be considered sufficient cause for the rejection of all bids so affected. In addition to any other remedies the city may have, the city may retain as liquidated damages for the disruption of the bidding process the proposal guarantees of all bidders involved in collusion or other illegal activities. The parties agree that the amount of the proposal guarantee is a reasonable estimate of damages for collusion or other illegal or improper activities on the part of the bidder and is not disproportionate to the anticipated loss or injury. A person or entity which has quoted prices to a bidder is not thereby disqualified from quoting prices to other bidders or from submitting a direct bid on its own behalf.

226. ALTERNATE BIDS

Whenever alternate bids are called for, providing for use of more than one class of material or type of improvement for the same work, all bidders shall submit prices for each class of material or type of improvement specified, unless otherwise specified in the special conditions. The material to be used or the type of improvement to be adopted will be selected by the city after the bid proposals have been opened and read. The city has the right to accept alternate bids in any order or combination.

227. SUBSTITUTIONS

The materials, products, and equipment described in the bidding documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution. No substitution will be considered prior to receipt of bids unless written request for approval has been received by the project manager at least ten (10) working days prior to the date for receipt of bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cut sheets, performance, and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment, or other work that incorporation of the substitute would require shall be included. The burden of proof of the merit of the proposed substitute is upon the proposer. The project manager's decision of approval or disapproval of a proposed substitution shall be final. If the project manager approves any proposed substitution prior to receipt of bids, such approval will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner. No substitutions will be considered after the contract award unless specifically provided in the contract documents.

228. WITHDRAWAL OF BID PROPOSALS

A bidder may withdraw a bid proposal at any time prior to the submission deadline. Any withdrawal request shall be signed in the same manner as and by the same person or persons who signed the bid proposal.

229. REJECTION OF BIDS

Upon request, bidders shall present satisfactory evidence that they are familiar with the type of work specified, and that they have the necessary capital, experienced personnel, tools, machinery, and other equipment necessary to conduct the work in a good and workmanlike manner. Upon request, bidders also shall satisfy the city that they can complete the work within the time specified in the special conditions and that they have conducted themselves in the past in a manner which assures their probity and trustworthiness. The city purchasing agent and the project manager will determine jointly the bid to be selected. The city, acting through its authorized representatives, retains the right to reject any and all bids and waive any informality or irregularity contained in the bids. Specifically, and without limiting the generality of the foregoing, the city may refuse to accept proposals from bidders or sureties in arrears to the city upon any tax debt or contract, or which are defaulters as surety or otherwise upon any obligation to the city. In the event that all bids are rejected or that a bid other than the lowest bid is selected, the bids received shall be referred to the

city manager. In addition, the city may bar or suspend all bidders who participate in illegal bidding activities from bidding on future projects.

230. BIDDING UNDER A DESIGN-BUILD OPTION

A design-build option is a project in which the contractor accomplishes both the design and the construction of a public facility. If a design-build option is used, the project manager shall conduct a design review evaluation to determine the bid to be selected. Each bidder shall be given equal opportunity to present a design-build offer. This evaluation shall be recorded and competing bidders shall not be allowed to attend another bidder's evaluation. The lowest cost bid for a design-build project need not be selected if the design of a higher cost bid is deemed sufficiently superior to warrant the higher cost.

231. THE BID OPENING

Bidders are invited to be present at the bid opening. All bid proposals will be made available for examination by interested parties immediately following the bid opening unless the bidder specifically requests confidential treatment of specific identified confidential commercial data five days prior to the bid opening date. Such request for confidentiality shall be in writing, and the commercial data for which confidentiality is requested and the basis for the request shall be clearly identified. The city will comply with a bidder's request for confidentiality of commercial data only if the data consist of a formula, patent, device, plan or compilation of information which is used by the bidder and which gives the bidder an advantage over the bidder's competitors who do not already know or use it. The final bid price and the unit prices are not confidential and may not be included in any request for confidentiality.

232. MISTAKES IN BIDDING INSTRUCTIONS

If the city makes a mistake in drafting the bidding instructions or any other contract documents, the city reserves the right to reject any or all bids, or to require that bidders submit an alternate bid proposal with adjustments made to correct the error(s). Such error(s) will be set forth in an addendum. If a contractor has already been selected and has started performing work under the contract, and the city then discovers a mistake in the contract documents for which the city is responsible, the city may opt to reform the contract. If the mistake causes the contractor to receive compensation for materials not used in the work or for labor which would not be required for the work, the contract payment price shall be decreased proportionally. If the mistake causes the contractor to fail to bid on work which must be performed in order properly to complete the contract, the city may increase the contract payment price to equal the proportionate increase in the cost of required materials and labor caused to the contractor. In the alternative, the city may solicit bids for such additional work, or the city may reassign such additional work to another contractor, as the city deems appropriate. Nothing in this provision shall apply to mistakes made by the contractor in completing the bid proposal or in performing the contract.

ARTICLE III. INSURANCE AND BONDING REQUIREMENTS

301. NOTICE OF AWARD

The bidder whose bid proposal has been accepted by the city will be sent a Notice of Award (Form 4) in writing signed by the purchasing agent within forty-five (45) days of the bid opening. The city's acceptance of the bid proposal shall bind the successful bidder to sign the contract agreement (Form 5) within ten (10) days of the date of mailing of the notice of award or to be responsible for liquidated damages as provided in section 224. The city's rights and obligations set forth in the contract agreement shall become effective only with the signatures of the city officials set forth in section 302 on behalf of the city.

302. SIGNING THE CONTRACT AGREEMENT

The notice of award informs the successful bidder that the city is ready to enter into a contract. Once the bidder has been selected, the purchasing agent then will complete the contract agreement (Form 5) for the project and transmit four (4) copies of the agreement to the successful bidder for signing. The successful bidder shall sign, and have notarized, all four (4) copies of the contract agreement and return them to the purchasing agent along with the appropriate performance bond, labor and material bond, insurance certificates, and power of attorney authorizations. The purchasing agent will transmit the four (4) copies of the signed contract agreement to the city attorney, the city manager, and the finance director. After each official has signed all four (4) copies they shall be returned to the purchasing agent. When the contract agreement has been signed by the purchasing agent, city attorney, city manager, and finance director, the purchasing agent will issue a purchase order, which is the official notice to proceed. Copies of the purchase order and the contract agreement will be transmitted to the contractor, project manager, purchasing agent, and finance director. A copy of the purchase order and the contract agreement will be filed in the city central files.

303. LEGAL ADDRESS OF CONTRACTING PARTIES

All notices required to be given to the parties to this contract shall be mailed to the addresses of the project manager and the contractor, or the contractor's superintendent, as designated in the contract agreement (Form 5, Part Eight). The parties so designated or their addresses may be modified upon receipt of a written request by the other party.

304. BOND REQUIREMENTS

Unless otherwise specified in the special conditions, a performance bond and a labor and material bond shall be required for all contracts. The successful bidder shall furnish the performance and labor and material bonds in the full amount of the contract price within fifteen (15) days after the city has issued the notice of award. Both bonds shall be in the form set forth as Form 6 (performance bond) and Form 7 (labor and material payment bond). The bonds must be issued by a surety authorized by the State of Colorado to do business in Colorado and admitted in the State of Colorado with an A.M. best rating of A-VI or better and be named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring

Companies" as published in circular 570 (amended) by the Audit Staff, Bureau of Accounts, U.S. Treasury Department. If at any time a surety which issues a performance bond or a labor and material bond becomes insolvent or the subject of bankruptcy proceedings or loses its right to do business in Colorado, another surety shall be required, which the contractor shall obtain within five (5) days after receipt of any form of notice of such event. In the event that there is a conflict between the city-approved bond form and any other contract entered into between the contractor and the surety on either the performance or the labor and material payment bond, the conditions stipulated in the city-approved bond form shall control. The contractor shall also notify the city immediately if the surety becomes insolvent or the subject of bankruptcy proceedings or loses its right to do business in Colorado pursuant to section 1005. In the event that the contract price is increased due to a change order, the city reserves the right to require the contractor to procure additional performance and labor and material payment bonds to cover the increase in the contract price. The city shall reimburse the contractor for the increased cost of such additional bonds, which will be added to the contract price by an executed change order.

305. PERFORMANCE BOND

The contractor shall procure and pay for a performance bond (Form 6) which, when executed by the contractor and the surety, shall be a guarantee for the faithful performance and completion of the work in strict accordance with the terms of the contract. The performance bond shall also be a guarantee for the repair or replacement of all work found by the city to be defective or otherwise unacceptable during the contract performance time and through the guarantee period. *See* article 7. With regard to design/build contracts, unless otherwise specified, the performance bond shall guarantee the faithful performance and completion of all design work as well as construction. The performance bond shall stay in effect during the guarantee period set forth in section 701. The performance bond shall be in an amount of one hundred percent (100%) of the dollar value of the contract. The surety which executes the performance bond waives any right to independent notice under the contract if the contractor receives such notice, and consents to any extension of time, modification, waiver, forbearance, or change which may be made in any of the terms and conditions of the contract by the parties or by their successors or assigns. In the event that the guarantee period for the contract is extended pursuant to section 717 past the original guarantee period, the contractor's performance bond shall cover automatically the extension of the guarantee period. If a product is used in the work and the product fails before the guarantee period (including extensions) has expired, the contractor must replace the defective product and guarantee the product during a new guarantee period for the same length of time as the original guarantee period, unless the defective product is the result of a design error caused by the city, or an architect, engineer, or project manager whom the city employed.

306. LABOR AND MATERIAL PAYMENT BOND

The contractor must procure and pay for a labor and material payment bond (Form 7) which guarantees that all those performing labor or furnishing materials, supplies, tools and equipment under the contract shall be paid. This bond shall be in the amount of one hundred percent (100%) of the dollar amount of the contract. The surety which executes the labor and material bond waives any right to independent notice under the contract if the contractor receives such notice, and consents to any extension of time, modification, waiver, forbearance, or change which may be made in any of the

terms and conditions of the contract or by the parties or by their successors or assigns.

307. INSURANCE POLICIES

The contractor shall procure and maintain, at its own cost, a policy or policies of insurance sufficient to insure against all liability, claims, demands, and other obligations assumed by the contractor pursuant to this section. Such insurance shall be in addition to any other insurance requirements imposed by this contract or by law. The contractor shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant to this section by reason of its failure to procure or maintain insurance, or by reason of its failure to procure or maintain insurance in sufficient amounts, durations, or types.

Contractor shall procure and maintain and, if applicable, shall cause any subcontractor of the contractor to procure and maintain the insurance coverage listed below. Such coverage shall be procured and maintained with forms and insurers acceptable to the city. All coverage shall be continuously maintained to cover all liability, claims, demands and other obligations assumed by the contractor pursuant to this section. In the case of any claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage

The Contractor shall obtain and maintain the minimum insurance coverages set forth below, unless specified otherwise in the special conditions. By requiring such minimum insurance, the city shall not be deemed or construed to have assessed the risk that may be applicable to Contractor. Contractor shall assess its own risks and if it deems appropriate and / or prudent, maintain higher limits and / or broader coverages.

A. Insurance Coverages

1. ***Commercial General Liability – ISO CG 00001 or equivalent. Coverage to include:***
   - Premises and Operations
   - Explosions, Collapse and Underground Hazards
   - Personal / Advertising Injury
   - Products / Completed Operations
   - Liability assumed under an Insured Contract (including defense costs assumed under contract)
   - Broad Form Property Damage
   - Independent Contractors
   - Designated Construction Projects(s) General Aggregate Limit, ISO CG 2503 (1997 Edition)
   - Additional Insured—Owners, Lessees or Contractors Endorsement, ISO Form 2010 (2004 Edition or equivalent)
   - Additional Insured—Owners, Lessees or Contractors Endorsement, Completed Operations, ISO CG 2037 (7/2004 Edition or equivalent)

2. ***Automobile Liability including all:***

- Owned Vehicles
- Non-Owned Vehicles
- Hired Vehicles

3. *Excess/Umbrella Liability (applies to large construction projects):*
   - Excess of Commercial General Liability, Automobile Liability, and Employers' Liability.
   - Coverages should be as broad as primary.
   - The city reserves the right to require higher limits.

4. *Workers* ***Compensation***
   - Statutory Benefits (Coverage A)
   - Employers Liability (Coverage B)

5. ***Installation Floater/Builder's Risk***
   - Special cause of loss
   - Theft
   - Faulty workmanship
   - Vandalism
   - Labor costs to repair damaged work

6. ***Contractors Pollution Liability/Environmental Impairment Liability***

This section applies to the following types of proposals, including but not limited to:

- ASBESTOS/LEAD ABATEMENT Contracting Services
- CORE DRILLINGS Contracting Services
- ROOFING Contracting Services
- GENERAL CONSTRUCTION CONTRACTORS
- BOILER REPAIRS & CLEANING
- GAS & ELECTRICAL TURBINES

The city requires this coverage whenever work at issue under this contract involves potential pollution risk to the environment or losses caused by pollution conditions (including asbestos) that may arise from the operations of the Contractor described in the Contractor's bid and specifications. Policy shall cover the Contractors completed operations. Such coverage shall include:

- Bodily Injury, sickness, disease, mental anguish or shock sustained by any person, including death.
- Property Damage including natural resource damages, physical injury to or destruction of tangible property including resulting loss of use, clean up costs, and the loss of use of tangible property that has not been physically injured or destroyed.

- Defense, including costs, charges and expenses incurred in the investigation, adjustment or defense of claims for such compensatory damages.
- Cleanup costs, removal, storage, disposal, and or use of the pollutant; and defense, including costs and expenses incurred in the investigation, defense, or settlement of claims.
- Coverage shall apply to sudden and gradual pollution conditions resulting from the escape of release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants (including asbestos). If the coverage is written on a claims-made basis, the Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of this contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of three (or specify desired number) years beginning from the time that work under this contract is completed.
- On the Automobile Liability Coverage endorsements CA9948 and MCS-90 are required if the Contractor is transporting any type of hazardous materials.
- Contractor shall name the City of Boulder, its elected officials, employees, agents and volunteers as "Additional Insureds" for work that is being performed by the Contractor and as respects the Contractors Pollution Liability.

B. Limits Required

The Contractor shall carry the following limits of liability as required below:

Commercial General Liability

General Aggregate	$2,000,000
Products/Completed Operations Aggregate	$2,000,000
Each Occurrence Limit	$1,000,000
Personal/Advertising Injury	$1,000,000
Fire Damage (Any One Fire)	$ 50,000
Medical Payments (Any One Person)	$ 5,000

Excess/Umbrella Liability (as needed)

General Aggregate Limit	$1,000,000
Products/Completed Operations Aggregate	$1,000,000

Automobile Liability

Bodily Injury/Property Damage (Each Accident)	$1,000,000

Workers' Compensation

Coverage A (Workers' Compensation)	Statutory
Coverage B (Employers Liability)	$ 100,000 Each Accident
	$ 100,000 Disease Ea.

	Employ
	$ 500,000 Disease-Policy Limit

Contractors Pollution Liability/Environmental Impairment Liability (as needed)

Per Loss	$1,000,000
Aggregate	$1,000,000

Installation Floater/Builder's Risk

For materials and equipment to be installed:

- Shall be written for 100% of the completed value (replacement cost basis)
- Deductible maximum is $10,000.00
- Waiver of Subrogation applies on Installation Floater/Builder's Risk

308. ADDITIONAL INSURANCE REQUIREMENTS

Failure of the Contractor to fully comply with these requirements during the term of the Contract may be considered a material breach of contract and may be cause for immediate termination of the Contract at the option of the city. The city reserves the right to negotiate additional specific insurance requirements at the time of the contract award.

A. All insurers must be licensed or approved to do business within the State of Colorado, and unless otherwise specified, all policies must be written on a per occurrence basis.

B. The Contractor shall provide the city 4 (four) copies of the Certificate of Insurance Form, including all required endorsements, evidencing all required coverages, prior to signature of the contract by the city. The city will not execute the contract until the city has verified that all required insurance is in effect.

C. The Contractor shall name "The City of Boulder, its elected officials, employees, agents and volunteers" as an Additional Insured as respects General Liability.

D. Upon request by the city, Contractor must provide a copy of the actual insurance policy effecting coverage(s) required by the contract.

E. The city requires that all policies of insurance be written on a primary basis, non-contributory with any other insurance coverages and/or self-insurance carried by the city.

F. A Separation of Insureds Clause must be included in general liability policies.

G. The Contractor shall advise the city in the event any general aggregate or other aggregate limits are reduced below the required per occurrence limit. At their own expense, the Contractor will reinstate the aggregate limits to comply with the minimum requirements and shall furnish to the city a new certificate of insurance showing such coverage is in force.

H. Contractor's insurance carrier should possess a minimum A.M. Best's Insurance Guide rating of A- VI.

I. Commercial General Liability Completed Operations policies must be kept in effect for up to two (2) years after completion of the project.

J. Contractors Pollution Liability policies must be kept in effect for up to two (2) years after completion of the project.

K. Contractor, or Contractor's insurance broker, shall notify the City of any cancellation or reduction in coverage or limits of any insurance within seven (7) days of receipt of insurer's notification to that effect. The Contractor shall forthwith obtain and submit proof of substitute insurance in the event of expiration or cancellation of coverage.

L. Certificate Holder: City of Boulder, Purchasing, P.O. Box 791, Boulder, CO 80306.

M. Contractor is responsible for any damage or loss to its own vehicles or equipment.

N. The city and Contractor shall cooperate with each other in the collection of any insurance proceeds which may be payable in the event of any loss, including the execution and delivery of any proof of loss or other actions required to effect recovery.

309. NON-WAIVER

The parties hereto understand and agree that the city is relying on, and does not waive or intend to waive by any provision of this Contract, the monetary limitations or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, 24-10-101 et seq., as from time to time amended, or otherwise available to the city or its elected officials, employees, agents, and volunteers.

310. RISK OF LOSS OR DESTRUCTION OF THE WORK DURING CONSTRUCTION

The contractor shall bear the risk of any loss or destruction to the work at any time before the city issues a certificate of substantial completion pursuant to section 713. The contractor shall bear any cost or expense arising out of the work, or from the contractor's actions, or from the action of the elements such as wind, flood, snow, hail, etc., or from ground water, or from subsidence or failure of subjacent support, or any other obstruction or difficulty which may be encountered in the work.

311. INSURANCE TERM

All required insurance in this article, except builder's risk, shall remain in effect until the expiration of all guarantee periods. In the event of a material alteration or cancellation of any insurance coverage, the contractor shall notify the project manager immediately and shall suspend work under the contract until the city issues written instructions to proceed with the work.

312. INDEMNIFICATION

The contractor shall defend and indemnify the city, its officers, employees, and agents from and against all claims, damages, losses, and expenses which arise out of or are related to the work. These shall include without limitation reasonable attorneys' fees for any services rendered by the office of the city attorney and employees assisting the office of the city attorney and discovery and litigation costs arising out of or resulting from the performance of the work, provided that any such claim, damage, loss, or expense (1) is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, including without limitation the loss of use resulting therefrom, and (2) is caused in whole or in part by any act or omission of the contractor, any subcontractor,

anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, attorneys' fees due for services by the office of the city attorney shall be at the rates generally charged for similar services by private practitioners within the boundaries of the city of Boulder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this section. If, in a final judgment no longer subject to appeal, the city is determined to be the proximate cause of a percentage of the damages, then the city shall pay that percentage of the damages to the party or parties that have been awarded the judgment and reimburse the contractor for that percentage of the attorneys' fees and costs incurred by the contractor for the defense of the suit. In any and all claims against the city or any of its agents or employees by any employee of the contractor, any subcontractor or anyone for whose acts any of them may be liable, this indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the contractor or any subcontractor under workers' or workmen's compensation acts, disability benefit acts, or other employee benefit acts, except as otherwise provided by law. The obligations of the contractor under this section shall not extend to the liability of the project manager or A/E or their agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs, or specifications by the project manager or A/E or their agents or employees, or (2) the giving of or the failure to give directions or instructions by the A/E or their agents or employees, provided that such giving or failure to give is the primary cause of the injury or damage and provided that a reasonably prudent contractor would have prosecuted the work based on such giving or failure to give directions or instructions.

ARTICLE IV. TERM

401. CONSTRUCTION PROGRESS SCHEDULE

The contractor shall submit to the project manager a proposed construction progress schedule within five (5) days following the notice to proceed. The construction progress schedule shall be subject to the project manager's approval, which approval shall not be unreasonable. The construction progress schedule shall comply with the specifications of the contract documents and shall be in the form of a graphic display indicating the proposed construction sequence for key elements of the work and the anticipated start and finish dates for each of the key elements. The schedule shall be coordinated with the critical times and dates contained in the contract documents. The city will use the construction progress schedule to monitor progress of the work. The contractor shall keep an annotated copy of the construction progress schedule in the contractor's office. The contractor shall adhere to the construction progress schedule, subject to the other requirements of the contract documents and shall provide the project manager with a detailed and accurate update of the actual construction with its monthly application for payment and at regularly scheduled construction meetings. Acceptance of the updates or the making of any payment by the city does not constitute approval of any change in the construction progress schedule or other requirements of the contract documents, nor does it constitute or imply acceptance of any of the work. In addition to liquidated damages as provided in section 406 for failure to substantially complete the work in the time period required by the contract, if the contractor fails to keep up with the construction progress schedule, as revised to reflect approved change orders for time extensions, delays caused by the contractor, the city or the A/E, and delays caused by inclement weather, the contractor shall indemnify the city for

all liability, loss or expense incurred by the city due to the contractor's failure to remain on schedule. If the city acknowledges that the contractor is off schedule, and allows the contractor to continue the work, or if the city accepts the work as meeting other contract specifications, such forbearance or acceptance shall not limit any action the city may have against the contractor for failure to remain on schedule.

402. PERIOD FOR PERFORMANCE

The contract documents shall specify a time period for performance, which may be based on days excluding weekends and city holidays. Alternatively, completion may be required before a certain specified date. Each date or time period specified in the contract documents shall be deemed material to the performance of the contract. The contract time for performance shall run from the date on which the notice to proceed is issued until the date specified for completion. The contractor must begin work no later than ten (10) days after the notice to proceed is issued. If the contractor fails to substantially complete the work within the allotted time, the contractor shall be liable for liquidated damages as set forth in section 406. Contractor acknowledges and agrees that the contract time for performance is a reasonable period in which to complete the work.

403. CONTRACT DAYS

A contract which specifies that construction will be completed within a certain number of consecutive calendar days contemplates that all days, whether weekend, holiday, or days of normal inclement weather will be included in the contract time. Unless the term "calendar days" is used, the term "day" shall refer to a day between Monday and Friday, excluding Saturdays, Sundays, or city-observed holidays.

404. SATURDAY, SUNDAY, HOLIDAY, AND NIGHT WORK

If the contractor believes it necessary to work on Saturdays, Sundays, holidays, or from 5:00 P.M. to 7:00 A.M., the contractor shall make prior arrangements with the project manager and receive written approval before the work commences, which approval shall not be unreasonably withheld. Such approval may be revoked by the project manager for good cause, including, without limitation, failure to maintain adequate equipment and lighting at night for the proper implementation, control and inspection of the work. If work is done without the project manager's prior approval and as a result the project manager is unable adequately to inspect the work, the work done during these periods of time may be declared defective, solely on the grounds that it was not properly inspected. No extra money will be awarded to the contractor by the city due to labor overtime or other increased costs of performing the work on Saturdays, Sundays, holidays, or at night, so long as such work was not caused by the actions or inactions of the city. If inspectors charge overtime or other incidental expenses for performing inspections on Saturdays, Sundays, holidays, or at night, the contractor shall be responsible to pay for all such charges, and shall not be granted a contract price increase for such charges.

405. TIME EXTENSIONS AND CONTRACTOR'S DELAY

The contractor specifically waives any and all claims against the city for monetary damages resulting from any hindrance or delay during the performance of the contract that impede the contractor's performance, except those that qualify for an extension of contract time. The contractor may be granted a time extension as expressly provided below only with respect to any hindrance or delay that impedes its performance and is described in subsections A, B, and C, for which the city will not claim actual damages. The contractor shall provide to the project manager written notice of any delays within three (3) days from the beginning of the delay. The written notice shall explain the causes(s) and the expected duration of the delay. The contractor shall file a written request for a change order extending the contract performance period within five (5) days after the period of delay has ceased. If the contractor fails so to notify the project manager of any such delay, the contractor shall be deemed to have waived any right to request a time extension, and may be held in default on the contract. All time extensions shall be made by written change order. Extensions of time will be granted only to the extent that equitable time adjustments for affected activities exceed the total float along their paths. The project manager will grant time extensions, by written change order, beyond the original schedule of performance for the following reasons only:

A. Suits, Delays by city, Acts of God, and Similar Events

1. A suit or other legal action against the city which causes a delay in the work, other than a suit or legal action asserted by the contractor, will entitle the contractor to an equivalent extension of time unless the period of such delay exceeds three (3) months. When such period is exceeded, the city will, upon a request by the contractor in writing, elect either to terminate the contract or to grant a further extension of time, whichever shall at that time appear most advantageous to the city.

2. If a suspension of work or stop work order caused by a breach of a contract condition by the city or its agents or the negligence of the city or its agents occurs, which, in the opinion of the city, justified delay of the contractor's performance, then the city will grant a reasonable time extension equivalent to the delay. The contractor has the burden to prove the events which caused each such delay, and that the contractor made timely requests for time extensions pursuant to this section. Stop work orders due to improper work or otherwise due to the contractor's acts shall not be cause for extension of time.

3. If in the city's reasonable opinion the contractor's performance is delayed by acts of God, wars, epidemics, or other causes beyond its control or anticipation, then, upon the contractor's written request, the city will grant a reasonable time extension equivalent to the delay. No such extensions shall be granted for delays caused by events within the control of the contractor, nor for delays which the contractor could have foreseen and avoided, prevented, or significantly ameliorated by exercising reasonable prudence or diligence, nor for any delays caused in whole or in part by the contractor

itself, nor by its subcontractors or suppliers, including without limitation, freight carriers, nor for any delays caused by labor unrest. In all instances, the contractor shall use its best efforts to minimize the length of delay. The contractor shall have the burden to prove the events which caused the delays, and that it made timely requests for time extensions pursuant to this section. This paragraph (3) shall not govern cases where the work is suspended for the city's convenience by written change order. Such cases will be governed by section 1003.

B. Changes in Specified Work

If the volume of specified work, measured in dollars, is increased by written change order over the total value shown in the contractor's bid proposal at the time that the contract is awarded, the contractor may be granted an extension proportionately equal to the increase in total value, if the contractor requests a time extension in writing within twenty-one (21) days after service of the change order. If a change order requires work more complex or more difficult than that originally specified and shown on the plans and specifications and such work requires more time to execute than the proportional increase in dollar value, the contractor may be granted a further time extension if the contractor requests such extension in writing within twenty-one (21) days after service of the change order.

C. Excusable, Inclement Weather

1. If the contractor believes that a contract extension should be granted due to delays caused by excusable, inclement weather, it may request a contract extension in writing from the project manager. The project manager shall thereon grant -- subject to the provisions of subsection (4) below -- an extension equal, in the project manager's reasonable opinion, in duration to the delay, if any, that was caused by excusable, inclement weather.

2. The contract time will be extended for as many calendar days in excess of the allotted number of days of excusable, inclement weather -- as set forth in subsection (4) below -- as the contractor is prevented by excusable, inclement weather, or conditions resulting immediately therefrom, from proceeding with an activity on the critical path of the Project Construction Schedule.

3. Excusable, inclement weather is snowfall, rainfall, freezing temperatures or excessive wind conditions, the degree or duration of which varies in excess of the average conditions expected, which is unusual for the particular time and place where the work is to be performed, or which could not have been reasonably anticipated by the contractor, as determined from U.S. Weather Bureau records for the location closest to the site or the work for the preceding 10-year period. No extensions of contract time will be allowed for any inclement weather that could reasonably have been predicted from such weather records.

4. The contractor shall include in its construction schedule the following anticipated number of calendar days lost due to adverse weather conditions for each month based on National Oceanic and Atmospheric Administration (NOAA) data for the Boulder area:

Jan 7	Feb 4	Mar 4	Apr 4	May 6	June 3	July 4	Aug 2	Sep 3	Oct 3	Nov 2	Dec 5

No extension of the contract time limit due to excusable, inclement weather will be considered by the city until after the number of days of excusable, inclement weather allocated to the construction schedule up to the time in question has been reached. No reduction in contract time shall be made if the allocated number of days of excusable, inclement weather is not reached.

406. LIQUIDATED DAMAGES

Time is of the essence for every time period set forth in the Contract Documents. Except for delays specified in Section 405, of the General Conditions, if the contractor fails to perform the work within the time limit set forth in the Contract Documents, or as adjusted by written change orders, the contractor shall be liable to the city for liquidated damages, not as a penalty, for the amount set forth in the Contract Agreement for Construction (Form 5, Part Three) for each and every calendar day that substantial completion of the work is delayed. The city may extend the contract period for performance without impairing its right to collect liquidated damages. The city shall have the right to deduct liquidated damages from any amount due, or that may become due, to the contractor, or to collect such liquidated damages directly from the contractor or the surety. The city has the option to enforce liquidated damages or to waive such damages.

Liquidated damages are intended only to apply to the contractor's delay in performance and are intended to compensate the city for additional city personnel efforts in administering the contract after normally scheduled completion dates, and for city government and citizen inconvenience, lost opportunities, and loss of confidence in government and morale of government when work is not completed on time. Such damages are uncertain in amount and difficult to measure accurately.

By executing the contract, the contractor agrees that the liquidated damages specified in the contract documents are reasonable in amount and are not disproportionate to actual anticipated damages. Liquidated damages do not include any sums of money to reimburse the city for extra costs which the city may become obligated to pay on other contracts which were delayed or extended because of the contractor's failure to complete the work within the contract time. Should the city incur such additional costs due to delays or extensions to other contracts resulting from the contractor's unexcused failure or delay in performing the contract, as extended, the city will assess these extra costs against the contractor in addition to the stipulated liquidated damages. In addition, liquidated damages are not intended to cover attorney's fees and costs incurred by the city in any action involving the contractor, nor any other actual costs which do not result directly from the contractor's delay in performance. In order to recover liquidated damages, the city is under no obligation to prove the actual damages sustained by the city due to the contractor's delay in performance. In addition, the contractor shall pay interest at the rate established by section 124 that shall accrue on liquidated damages from the date on which such damages arise. Liquidated damages shall be incurred in the amount calculated by the project manager as set forth in the special conditions and in

part three of the contract document (Form 5), but in no case less than $1,000 per day for each calendar day the project is incomplete beyond the substantial completion date specified herein.

ARTICLE V. COMMUNICATION AND MAINTENANCE OF RECORDS

501. SERVICE OF DOCUMENTS ON THE CONTRACTOR

Both the business address of the contractor designated in the bid proposal and the work site are designated as places to which notices, letters and other communications or documents to the contractor may be mailed or delivered. The delivery at either of the above named addresses, or the addressing and depositing in any mail box regularly maintained by the United States Postal Service, first class postage prepaid, of any notice, letter, or other communication or document to the contractor, shall be deemed sufficient service thereof upon the contractor, and the date of said service shall be the date of such delivery or mailing. The address set forth in the bid proposal may be changed at any time upon five (5) days notice by an instrument in writing, executed by the contractor and received by the city.

502. CONTRACTOR'S MAINTENANCE OF RECORDS

The contractor shall maintain a complete file of all records, communications, and other documents which pertain to the contract at its main office in Colorado or at its main office outside Colorado if it has no office in Colorado. The contractor shall maintain such records for a period of three (3) years after the date of completion of the contract, and for such longer period as may be necessary to resolve any matters which may be pending at that time.

503. CITY MAY AUDIT CONTRACTOR'S RECORDS

Subject to a requirement of confidentiality in the treatment of all confidential financial data and the contractor's internal memoranda, and privileged documents, the contractor shall permit the city to audit or inspect its records during the term of the contract, for a period of three (3) years following the completion of the contract, and for such further periods as may be necessary to resolve any matters which may be pending at that time. The purpose of this provision is to assure the contractor's compliance with the terms of the contract and to evaluate the contractor's costs and performance under the contract. Any audit conducted shall be at the sole expense of the city.

504. RECORDS OF SUBCONTRACTORS AND CONSULTANTS

The contractor shall require all of its subcontractors and consultants to maintain all of their records which pertain to the project in the same manner and for the same length of time as the contractor is required to do, and to allow the city the same access to those records as it has to the contractor's records.

505. CHANGES IN THE WORK MUST BE NOTED

The contractor shall maintain at the contractor's field office one copy of all drawings and specifications in good condition and immediately note thereon all changes made during the construction process. Any deviation between the drawings and specifications and the work actually

done must be noted on this set of drawings, which should be referred to as the "as built" set of drawings. If the contractor performs work which is at variance with the plans and specifications, the contractor has the burden to prove that it has provided work equally suited for the purpose and of equal value. All underground utility structures encountered or constructed in the process of doing the work shall be correctly located on the drawings. When the work is completed, the contractor shall deliver this "as built" set of drawings and specifications to the project manager as a condition precedent to final payment.

506. PROJECT IDENTIFICATION

In addition to appropriate warning and traffic signs, there shall be a sign at the job site which identifies the contractor and the city department in charge of construction and gives a telephone number for each. The contractor must provide this sign unless the special conditions state otherwise. This sign shall identify an authorized representative of either or both the city and the contractor who is to be contacted whenever there is an emergency at the job site, including without limitation evenings, weekends, holidays, and all times when the job site is unattended. The sign shall be placed in a prominent location, properly supported in position, and maintained in good condition during the life of the project. The contractor must obtain a sign permit from the city manager before erecting the project identification sign, pursuant to Subsection 10-11-4(a), B.R.C. 1981. The sign shall be limited to free-standing, wall or window signs not exceeding sixty-four (64) feet in total area or thirty-two (32) square feet per face and may not exceed eight (8) feet in height. Paragraph 10-11-17(a)(1), B.R.C. 1981. No sign shall obstruct traffic or a motorist's view of traffic signs, signals or other official notices. All signs shall be constructed and conform to the construction standards set forth in Section 10-11-24, B.R.C. 1981, and with the standards for temporary signs as set forth in Section 10-11-17, B.R.C. 1981. All signs shall conform to the setback standards set forth in Section 10-11-12, B.R.C. 1981. Under Section 4-21-2, B.R.C. 1981, only licensed sign contractors shall install signs for which a permit is required.

507. SUPERVISION AT THE JOB SITE

The contractor shall provide and maintain continually on the work site a superintendent for all work being performed under the contract. The contractor shall designate the superintendent, who shall be authorized to act on behalf of the contractor in all matters related to the contract. Within five (5) days after the execution of the contract documents, the contractor shall inform the project manager in writing of the home and residence address and residence telephone number of the person designated as the superintendent. The contractor shall also provide a pager or mobile phone to the superintendent and inform the project manager in writing of the telephone number therefor. A call to any one of these numbers shall constitute notice by the city. The superintendent shall be on-call at all times.

In the event of an emergency, the contractor shall be responsible for remedying all aspects of the work creating the emergency or loss of utility service and respond within two (2) hours. If the contractor does not respond within two (2) hours, the contractor shall be responsible for any and all costs incurred by the city including, but not limited to, deployment of public safety personnel, and any labor, equipment and materials required to remedy the emergency.

Unless the project manager requests that a superintendent be replaced or permits such replacement or the superintendent ceases to be employed by the contractor or becomes sick or disabled, the same person shall continue in the capacity of superintendent and be present continuously or immediately available at the work site until the work has been completed.

508. COMMUNICATIONS AT THE WORK SITE

The superintendent shall be the normal recipient of work site communications from the project manager. Important communications from the project manager shall be in writing and shall be made by field order (Form 10), or a reasonable facsimile thereof. Other important communications from the contractor to the city shall also be in writing. Further, the superintendent shall designate agents at the site to receive such communications when the superintendent is away from the site. When the superintendent is absent, such persons shall be authorized to act immediately on emergency communications given by the project manager. If the project manager issues an emergency communication to the contractor, but there is no authorized representative of the contractor able to act on the emergency communication, the project manager may take whatever action is necessary to deal with the emergency, at the contractor's cost. If the city finds it necessary to communicate at the work site with contractor personnel authorized to receive such communications and none are available to receive such communications, the city may suspend the contractor's operations at the work site which are affected by the communications until such communications can be accomplished.

509. DISPUTES BETWEEN THE CONTRACTOR AND THE PROJECT MANAGER

The contractor shall follow all instructions issued by the project manager. If the contractor requests clarification or interpretation of any contract documents the contractor shall notify the project manager in writing. The project manager shall issue a written response to the contractor within ten (10) days following the contractor's request. If the project manager fails to issue a written reply within ten (10) days after receipt of the contractor's request for interpretation, the contractor may suspend the portion of the work which is the subject of the dispute. The contractor shall be granted a time extension of one (l) day for each day following the suspension for which the project manager fails to issue a written resolution of the dispute if the entire work is suspended. However, if the suspension applies to only a part of the work, a time extension will not be authorized until the partial suspension has run and its effect on the entire contract can be evaluated. The city shall be liable to the contractor under this section for all costs actually incurred which result from resuming the suspended work. The contractor shall not work on any part of the work which is the subject of a dispute between the contractor and the project manager until the project manager issues a written notice to continue. If the contractor proceeds with work which is the subject of a dispute between the project manager and the contractor, and the contractor later must replace this work because the project manager determines that the work was not performed in accordance with the contract documents, the contractor shall bear all costs of removal and replacement of the non-conforming work.

ARTICLE VI. CONSTRUCTION SITE REQUIREMENTS

601. PUBLIC RELATIONS

The contractor shall carry on the work in such a manner as to cause as little inconvenience as possible to the public, particularly to occupants of property near or contiguous to the project, as is consistent with good workmanship. The contractor shall notify such occupants at least forty-eight (48) hours in advance of proposed work that may block entrances or otherwise cause undue difficulty to the occupants of affected property and shall restore such entrances to usable condition as soon as possible. The contractor, subcontractors and employees shall at all times be courteous to the public, the project manager, and other city representative while engaged in work under the contract. Any employees of the contractor, subcontractors or agents who fail to act in a courteous manner toward the public, the project manager or other city representative shall be immediately and permanently removed from the construction site by the contractor upon the reasonable request of the project manager.

The contractor shall notify all business managers and residents affected by the interruption of utilities and other services caused by his operations. Such notice shall be given at least forty-eight (48) hours prior to the interruption of service. Notice shall be given for the interruption of domestic water, irrigation water, sewer, trash pickup, and changes in access to property. Prior to interruption of domestic water service, a second notice shall be given no less than one hour and no more than four hours prior to discontinuation of service. Notifications may be oral or in written form if the business manager or resident cannot be located. Water services shall not be discontinued for more than two (2) consecutive hours without special written permission from the project manager. If requested by a commercial business, potable water bottles and toilets for use by their employees shall be furnished and serviced by the contractor.

The above items required in this section are considered as incidental to the work and no additional payment will be made by the city.

602. PROTECTION OF PERSONS AND PROPERTY

The contractor shall be responsible for initiating maintaining and supervising all safety precautions and programs in connection with the work. The contractor shall designate a person at the work site who is responsible to oversee or take precautions to prevent accidents. The contractor shall take all reasonable safety precautions and provide all reasonable protection to prevent damage, injury, or loss to:

A. All employees at the work site and all other persons affected by the work;

B. All materials and equipment in the care, custody, or control of the contractor or subcontractor, whether stored on or off the work site;

C. All work done under the contract;

D. All property at the site including walks, pavements, roadways, structures and utilities, and all neighboring property which may be affected by the work; and

E. All plant materials including without limitation grasses, trees, and shrubs except where specifically identified for removal.

The contractor shall repair or replace any damage, injury, or loss to all public or private property caused directly or indirectly, in whole or in part, by the contractor or any subcontractor or their employees or agents or anyone directly or indirectly employed by them or anyone for whose acts any one of them may be responsible. The contractor shall give all notices and comply with all applicable laws bearing on the safety of persons or property or their protection from damage, injury, or loss.

603. PROTECTION AND PREVENTION OF SITE ACCESS

Where the work is conducted in or adjacent to any street, alley, bikelane, path, sidewalk or public place, the contractor shall, pursuant to section 211, furnish and erect such barricades, fences, lights, and danger signals and shall furnish such personnel to warn the public and guard the site and shall take such other precautionary measures as are reasonably necessary to protect persons, property, and the work done under the contract. Excavations in or adjacent to public streets, alleys, bikelanes, paths or sidewalks shall be securely barricaded so as to prevent access by small children or any other person or vehicle when work is not being carried on at the site of excavation. Such barricades shall be painted in a color that is visible at night. The contractor shall follow the guidelines set forth in the Manual of Uniform Traffic Control Devices ("MUTCD"). Any costs incurred to satisfy requirements of this section will be considered Costs of the Work.

604. TRAFFIC MAINTENANCE

It is a priority for the city to maintain access for all modes of travel, including vehicles, transit, pedestrian and bicyclists, at all times. Before proceeding with construction, the contractor shall obtain written approval from the city of Boulder Division of Transportation of the proposed method of handling traffic. The MUTCD shall be followed for traffic control. The procedures designated by this hand book may be modified when necessary by change order. Closing or otherwise severely obstructing streets, alleys, bikelanes, paths, sidewalks and road systems will be permitted only after the project manager has authorized the contractor in writing to do so. When a detour is necessary because a street, alley, bikelane, path, sidewalk or road system is blocked in whole or in part by the work, the city will designate its route, and the contractor shall furnish, post, and maintain detour signs of the type and size required by the city of Boulder Division of Transportation at the places designated by the city of Boulder Division of Transportation prior to impairing public access or closing or otherwise obstructing a street, alley, bikelane, path, sidewalk or road system. The superintendent designated pursuant to section 507 shall be responsible for traffic control. The superintendent shall have the responsibility to sign documents on behalf of the contractor related to traffic control, and to handle all other details covered by the contract documents which contribute to the comfort and safety of the traveling public.

605. MAINTAINING TRAFFIC DURING SUSPENSION OF WORK

Upon any suspension of the work under this contract (*see* article 11), the contractor shall make passable and shall open to vehicles, bicyclists and pedestrians such portions of the work site as are reasonably directed by the project manager for the temporary accommodation of the public during

the anticipated period of suspension. Thereafter, until the project manager orders that construction be resumed, the city shall maintain any temporary travel ways through the work site. Unless the city expressly and in writing assumes such responsibility, the contractor shall be responsible for protecting the work site itself during the period of suspension.

606. RESUMPTION OF WORK

When work is resumed, the contractor shall replace or renew any work or materials damaged or lost as a result of temporary use of portions of the work site. The contractor shall also remove, as directed by the project manager, any work or materials used by the city in the maintenance of any temporary travel ways. The contractor shall complete the work in every respect as though its implementation had been continuous and without interruption. Except for suspensions of work pursuant to sections 1003 or 1008, the contractor shall bear the costs which result from the period of suspension and all start up costs associated with resuming the work as set forth in this section.

607. DRAINAGE

The contractor shall provide at its own cost and expense all reasonable methods for adequately draining the work and shall assume full responsibility and liability for damage to any person or property resulting from inadequate or excessive drainage unless the damage resulted from a design error which was caused by the city or by an A/E hired by the city, or is due to sequencing of projects beyond the contractor's control. The contractor shall be responsible for the preservation and protection of storm water collection systems and other natural and developed drainage ways which may be affected by work done under the contract. This municipal service system is operated and regulated by the Utilities Division of the city of Boulder Department of Public Works. The contractor is required to notify the Director of Public Works for Utilities prior to initiation of the work when the work may diminish the system's capabilities or may redirect water flow. This notification process does not, however, relieve the contractor of any responsibility for damage which may result from the contractor's operations.

If the construction requires land disturbance of one acre in size or greater, then the contractor shall conform to the requirements for a stormwater discharge permit associated with construction activity from the Colorado Department of Public Health and Environment (Colorado Department of Public Health and Environment, Water Quality Control Division, 303-692-3500 http://www.cdphe.state.co.us/wq/PermitsUnit/wqcdpmt.html). If this permit is not obtained by the city, the general contractor is responsible for obtaining this permit from the Colorado Department of Public Health and the Environment.

The contractor shall satisfy all environmental quality standards imposed by law and take reasonable steps to minimize the environmental impact of the work. These environmental quality standards include, without limitation, noise control, air pollution control, water pollution control, and dust control, which may be placed at risk by the activities of the contractor:

A. The contractor shall not pollute the water of any pond, lake, stream, ditch, or other watercourse, as prohibited pursuant to Title 11, Chapter 5 "Storm Water and Flood

Management Utility," B.R.C. 1981, which generally prohibits discharge of pollutants to water bodies.

B. The contractor will implement erosion control practices and stormwater best management practices in accordance with Title 11, Chapter 5 "Storm Water and Flood Management Utility," B.R.C. 1981.

C. The contractor will comply with permits required to discharge groundwater to the storm drainage system in accordance with Title 11, Chapter 5 "Storm Water and Flood Management Utility," B.R.C. 1981, which regulates groundwater discharges to storm sewer.

608. WASTE WATER

Except for sanitary sewage which shall be discharged only into the city's sanitary sewer system, the contractor shall not discharge any water or other liquids to the city's sanitary sewer system. All bypassing or pumping of sanitary sewage required during construction shall be to other sanitary sewer facilities approved by the project manager by a field order. All existing sanitary sewer facilities shall remain in continuous and full operation during construction. All costs incurred for bypassing, removal, pumping, and disposal of wastewater and sanitary sewage during construction shall be borne by the contractor.

609. DITCH IMPACTS AND CROSSINGS

The contractor shall confirm, prior to the start of construction, what agreements the city has procured with any ditch company. If a ditch agreement has been negotiated between a ditch company and the city, the contractor is responsible for complying with the terms of that agreement.

The contractor is responsible for notifying a ditch company's representative when the work will breach a ditch, tunnel under a ditch, is within 25 feet of a ditch, redirect the flow of a ditch, or in any way will impact or diminish the ditch system's capability to carry water. Such notification shall occur as soon as the schedule for the work is established, but at a minimum of fourteen (14) days prior to initiating the work. This notification does not relieve the contractor of any responsibility for damage that may result from the contractor's operations, nor does it relieve the contractor of any responsibility to obtain any necessary approvals from a ditch company. Should the contractor require additional approval from a ditch company, the contractor should note that such approvals generally take more than thirty (30) days to obtain.

610. PROTECTION OF MUNICIPAL SERVICE FACILITIES

The contractor shall provide and maintain free access to all municipal service systems including, without limitation, fire hydrants, water and gas valves, manholes, and utility poles. All natural and developed drainage ways shall be kept open unless and until other provisions satisfactory to the project manager are made for the removal of storm water. If the contractor damages any municipal service systems, the contractor shall immediately repair or replace the damaged municipal service facilities at no cost to the city.

611. LIST OF MUNICIPAL SERVICE SYSTEMS

If the contractor's work affects any municipal service system, the contractor shall notify the affected organization immediately. The term "municipal service system" or "facility" shall mean any equipment located in the public right-of-way or in a utility easement, whether or not platted or formally deeded to the city. The list below is not intended to be complete; rather, it identifies the systems which contractors encounter most frequently:

System	Agency to Contact	Telephone #
Telephone	Qwest	1-800-954-1211
Buried Utilities Location Service	Utility Notification Center of Colorado	1-800-922-1987
Streets, Roads, Alleys, Bikelanes, Paths or Sidewalks and Traffic Control Equipment	Department of Public Works/Transportation Division	303-441-3266
Sanitary Sewer Collection, Storm Water Collection and Drainage Ways; Water Distribution	Department of Public Works/Utilities Division	303-413-7100
Electrical Power Lines and Natural Gas Lines	Xcel Energy	303-623-1234
Tree Removal/Pruning in city-owned property and right-of-way	Parks and Recreation Department, Forestry Division	303-441-4406
Work within easements through public parkland	Parks and Recreation Department	303-413-7200
Open Space and Mountain Parks	Open Space Department	303-413-3440
Police and Alarms	Police Department	303-441-3333
Fire	Fire Department	303-441-3350
Cable Television	Comcast	303-930-2000

612. INTERRUPTIONS TO UTILITIES

If the contract requires that any utility be interrupted, or the contractor desires to interrupt a utility for its convenience, it shall promptly contact the affected utility and customers and obtain the necessary permissions. The interruption shall be confined to the least possible time period and cause the least possible inconvenience to service recipients. The contractor shall bear all costs related to a utility interruption. If such an interruption is required by the contract, the contractor shall include its best estimate of those costs in the bid items.

613. UTILITIES, STRUCTURES, AND CONDITIONS SHOWN IN CONTRACT DOCUMENTS

A. Except as set forth in paragraph B, below, existing underground, surface or overhead utilities, structures and conditions may be omitted in the drawings, specifications and other contract documents, and those shown may not be accurately situated or drawn to scale. The contractor shall be responsible for protecting all such utilities as described below.

B. The approximate locations of underground facilities and the tie in points which are owned or operated by the city are shown on the plans and specifications. As part of the work contractor shall, on behalf of the city, locate and mark the precise location of such facilities as required by ' 9-1.5-101 *et seq*., C.R.S. In addition the plans and specifications may indicate that the location of any underground facilities owned or operated by the city are "unknown," "uncertain" or "within a range." The contractor shall have full responsibility for determining the exact location of all the above mentioned underground facilities by "potholing," "handwork" or such other means as may be necessary to determine the precise location without damaging such underground facilities. This work is included in the contract price unless called out as a separate pay item. The precise location of all such underground facilities shall be incorporated into the record drawings by the contractor.

C. Contractor shall notify the "Utility Notification Center of Colorado" in a timely fashion as required by Section 9-1.5-101 *et seq*., C.R.S. Contractor shall request written record of any information from all owners or operators, of underground facilities (as defined in the above statute) regarding the location of the specific underground facilities. Contractor shall comply with all requirements of the above statute as it pertains to the "excavator". The city shall not be responsible for the accuracy or completeness of any information provided by third-party owners or operators of underground facilities, including the marking thereof.

D. The cost of all the following will be included in the contract price and contractor shall have full responsibility for:

1. Reviewing and checking all information and data provided by all owners or operators of underground facilities;

2. Locating all underground facilities shown or indicated in the contract documents;

3. Coordination of the work with the owners and operators of all underground facilities during construction;

4. The safety and protection of all utilities and the entire expense of repairing or replacing any utilities or structures disturbed or damaged during construction.

5. The contractor shall be responsible for all coordination and implementation associated with any necessary relocation or removal of utilities, including relocation and removal which must be performed by third parties.

6. The contractor shall be responsible for the location and protection of all individual service lines, notwithstanding any requirements to the contrary in Section 9-1.5-101 *et seq*., C.R.S.

7. The contractor shall be responsible for the repair of any damage to utilities that have been properly located by the designated utility locating service and for utilities for which the contractor has not obtained the proper field location marking.

E. If any underground facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the contract documents or by reason of information supplied pursuant to Section 9-1.5-101 *et seq*., C.R.S., contractor shall promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any work in conjunction therewith (except in emergency situations) identify the owner of such underground facility and give written notice to that owner, the "Utility Notification Center of Colorado", and the city. The location of all such underground facilities shall be incorporated into the record drawings by contractor. The city will promptly review the underground facility and determine the extent, if any, to which a change is required in the contract documents to reflect and document the consequences of the existence of the underground facility. During such time, contractor shall be responsible for the safety and protection of such underground facility. The contractor shall be allowed an increase in contract price, or an extension of contract time, or both, in accordance with article 8, to the extent that they are attributable to the existence of any underground facility that is not shown or indicated in the contract documents and that the contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If the city and contractor are unable to agree on entitlement to or the amount or length of any such adjustments in the contract price or contract time, contractor may make a claim therefore as provided in the contract documents.

F. In the event of a break in an existing water main, gas main, sewer or underground cable, the contractor shall immediately notify the responsible official of the organization operating the utility interrupted and the project manager, and shall lend all possible assistance in restoring service.

614. ARCHAEOLOGICAL AND HISTORICAL DISCOVERIES

If any fossils or treasure or unusual or valuable geological formations are found during the work, such items shall be carefully preserved by the contractor, who shall notify the project manager and request instructions regarding the disposition of these items. These items are the property of the city. In addition, the contractor shall inform the project manager of any evidence which might suggest to a lay person that deposits of historical or archeological interest or treasure or unusual or valuable

geological formations may be present on the work site. Upon making such a discovery, the contractor shall avoid disturbing that part of the work site. This could require that the contractor's activities be redirected or stopped until the project manager determines how to proceed. No further disturbance of such discoveries shall be made until the Regional Office of the Environmental Protection Agency and the State Historical Preservation Officer have been notified, and the project manager determine how the work should proceed. If the project manager finds that protecting such discoveries causes an increase or decrease in the contractor's cost or time required to perform the work, an equitable adjustment will be made in the contract price, in accordance with article 8 and/or time of performance by way of a change order.

615. HAZARDOUS OR EXPLOSIVE MATERIALS

Before using or storing hazardous or explosive materials at the work site, the contractor shall inform the project manager and the city's fire department of the proposed action in writing, and shall receive the project manager's written approval before proceeding. Explosives or hazardous materials shall be handled and used by experienced workers only. All firing shall be done by electricity. All storage places shall be marked clearly: "DANGEROUS –EXPLOSIVES" or "DANGEROUS - HAZARDOUS MATERIALS." Caps or other exploders shall not be stored at the same place where dynamite or other explosives are stored. All explosives, firing devices, and other hazardous materials shall be kept in locked containers.

616. PROTECTION OF PRIVATE PROPERTY

The contractor shall not enter upon private property for any purpose without having previously obtained permission from the property owner. The contractor shall be responsible for the preservation of, and shall use every reasonable precaution to prevent damage to all private property adjacent to the work site. The contractor shall repair or replace any damage, injury, or loss to such property caused directly or indirectly, in whole or in part, by the contractor or any subcontractor, their employees or agents, or anyone directly or indirectly employed by them or anyone for whose acts anyone of them may be responsible to a condition substantially similar or equal to that existing before such damage was done, by repairing, rebuilding, or otherwise restoring the property or paying the owner for such damage as may be directed by the project manager. If the contractor fails to restore such property or pay for such damage, the city may, upon forty-eight (48) hours written notice to the contractor under ordinary circumstances, and without notice when a nuisance or hazardous condition results, repair, rebuild, or otherwise restore such property or pay for such damage and the cost thereof shall be deducted from any payments due to the contractor under this contract. If not so deducted, the contractor shall immediately reimburse the city for the cost thereof.

The contractor shall immediately notify the project manager of all proposed uses of private property related to the project. The contractor shall provide written verification that the use of the private property has been negotiated with and approved by the private property owner prior to the use of the property. Verification shall include Boulder County records related to property ownership, and signed and notarized agreement(s) between the property owner and the contractor. Uses of private property that are considered directly related to the project include, but are not limited to, material storage, equipment or manpower access, material disposal, and material borrow. In case the

contractor negotiates use of the private land(s) with property owners for its convenience, the contractor shall be fully responsible for all related negotiations and payments.

617. PROTECTION OF EXISTING PLANT MATERIALS

The contractor shall be responsible for taking all reasonable steps for protecting, transplanting, and replanting existing trees, shrubs, and other plant materials which may be affected by the work. Plants designated to remain shall be protected by construction fencing or barriers at all times during the entire contract period. No material shall be stockpiled and no equipment shall be parked or repaired within twenty-five (25) feet of existing trees unless it is impossible to avoid doing so. No oil, gasoline, concrete, or other materials shall be dumped or temporarily stockpiled anywhere on site unless permission is first obtained from the project manager. *See* section 703. Any plants damaged or scarred during construction shall be mitigated immediately at the contractor's expense, *see* Chapter 6-6, "Protection of Trees and Plants," B.R.C. 1981. Where separations expose or damage the root systems of plants designated to remain, the contractor shall take remedial measures at the direction of the project manager within two (2) hours or as soon as reasonably possible to insure the health of the plant. Plants designated to remain but which are, in the opinion of the project manager, damaged beyond repair, shall be replaced by the contractor at the contractor's own expense with a similar size and species chosen by the project manager. Any existing sod damaged by the construction operations shall be replaced by the contractor at the contractor's own expense. The contractor's liability for damages due to injured plant materials shall not be limited to the replacement of such materials, but shall also include damages incidental to removing and replacing such materials. No plant materials shall be cut except with the written permission of the project manager. If the contractor must repair or replace damaged plant materials, the contractor shall guarantee such replacement materials for one full growing season following the planting thereof. As used herein, the growing season begins on April 1 and ends on August 31.

618. PLANTING, PROTECTION AND GUARANTEE OF PLANT MATERIALS

The contractor shall take special care when plant materials have been planted as part of the work. If such plant materials are damaged or die from natural causes or due to the negligence of the contractor within a period of one (1) full growing season from the date of planting, then the contractor shall replace such plant materials with plant materials of the same size and quality at no cost to the city. Damaged plant materials shall be replaced no later than the following growing season, and sooner if possible. As used herein, the growing season begins on April 1 and ends on August 31. The project manager shall approve all plant materials, including replacement materials, in writing before the planting thereof. If the contractor must replace any plant materials, the contractor shall guarantee such replacement items for a period of one full growing season following the planting thereof. If the plant materials so replaced are damaged or die from natural causes or due to the negligence of the contractor during the guarantee period, the contractor shall replace such damaged plant materials, and again guarantee them for an additional full growing season, and so on until the guarantee is fully met.

If the project manager directs, the contractor shall guarantee proper performance of landscaping materials for a period of two years from the date of final completion and secure this guarantee with a maintenance bond. This maintenance bond shall be based on the cost of landscaping as set forth in

the bid schedule or schedule of values, and shall only apply to landscaping maintenance purposes including, without limitation, replacement of trees, shrubs, reseeding, weed control, operation and repair of sprinkler system, and any other maintenance requirements.

619. WEED MANAGEMENT PLAN

All weed control practices shall be in accordance with the city's Integrated Pest Management Policy, available from the city of Boulder, Office of Environmental Affairs (Atrium Building at 13th and Canyon, phone: 303-441-1915). The contractor shall prepare a weed management plan in accordance with this policy and submit it to the project manager. Chemicals shall not be used for weed control unless approved by the project manager. The contractor shall comply with the pesticide notification requirements of this policy and notifications required under Title 6, Chapter 2 "Weed Control," B.R.C. 1981, and Title 6, Chapter 10 "Pesticide Use," B.R.C. 1981.

620. WORK IN EXISTING BUILDINGS

If the work involves an existing building, the contractor shall plan and execute the work to avoid unnecessary damage to walls, ceilings, ducts, pipes, wires, and any other building elements. The contractor shall organize and plan the work to reduce to a minimum the need for cutting or otherwise removing load bearing structural elements to accommodate the installation of piping, ductwork, or equipment. If two or more persons are doing work in the same place, the contract superintendent shall be responsible for coordinating efforts. If cutting or removal of structural elements is necessary because the work could not be organized and planned to avoid such cutting or removal, the contractor shall so inform the project manager. The contractor shall not damage or endanger any portion of other work of the city or any separate contractor by cutting, patching, or otherwise altering any work, or by excavation or except with the written consent of the project manager and of such separate contractor. Such consent shall not be unreasonably withheld. The contractor shall be responsible for all repair, replacement and patching that becomes necessary. If the work involves an existing building, the contractor shall erect and maintain during the progress of the work suitable dustproof partitions to protect the building and the occupants thereof. The contractor shall schedule the work of subcontractors and other persons in order that each may accomplish the work in an efficient and orderly fashion and in a manner which will permit maximum use of the building and minimize impairment of any existing facilities.

621. CONNECTIONS TO EXISTING FACILITIES

Unless otherwise specified or indicated, the contractor shall make all necessary connections to existing facilities, including, without limitation, structures, drain-lines, and utilities such as water, sewer, and electric. In each case, the contractor shall receive permission from the city or the owning utility prior to undertaking connections. The contractor shall protect facilities against deleterious substances and damage.

Connections to existing facilities which are in service shall be thoroughly planned in advance and all required equipment, materials, and labor shall be on hand at the time of undertaking the connections. Work shall proceed continuously, around the clock if necessary to complete connections in the minimum time. Utilities interruptions shall be kept to a minimum and scheduled for the least

inconvenient time for service recipients. Operation of valves or other appurtenances on existing utilities, when required, shall be by or under the direct supervision of the owning utility.

622. REMOVAL/REPLACEMENT OF EXISTING FACILITIES

The contractor shall perform all removal and replacement required for, and in connection with, the work, including but not limited to, the following:

A. Removal of improperly timed work;
B. Removal of samples of installed materials for testing;
C. Alteration of existing facilities;
D. Installation of new work in existing facilities.

Contractor shall provide all shoring, bracing, supports, and protective devices necessary to safeguard all work and existing facilities during cutting and patching operations. Contractor shall not undertake any cutting or demolition which may affect the structural stability of the work or existing facilities without the project manager's concurrence.

Materials shall be cut and removed to the extent indicated on the drawings or as required to complete the work. Materials shall be removed in a careful manner, with no damage to adjacent facilities or materials. Materials which are not salvable shall be removed from the site by contractor.

All work and existing facilities affected by cutting operations shall be restored with new materials, or with salvaged materials acceptable to the project manager, to obtain a finished installation with the strength, appearance, and functional capacity required. If necessary, entire surfaces shall be replaced and refinished.

623. PROTECTION AGAINST WEATHER

All work and construction materials, unless otherwise protected, shall be protected in a manner to prevent damage to the construction materials. Sufficient covering shall be kept ready at the work site for this purpose. If the city chooses to protect any construction materials or work done under the contract which the contractor has left unprotected, the contractor shall reimburse the city for the value of city labor and materials expended in protecting the work or construction materials.

624. TEMPORARY ENERGY, WATER, TELEPHONE AND OTHER SERVICES

The contractor shall pay for all temporary energy, water, telephone, and other services needed to do the work and provide and pay for all temporary facilities needed to deliver such services to the work. Temporary facilities shall be installed and maintained to protect the public and workers and shall conform to any applicable requirements for the delivery of the services. Upon completion of the work, the contractor shall remove all such temporary facilities. The contractor may use a structure's permanent heating system in order to provide temporary heat if the project manager approves this in writing. If temporary heating is required for the benefit of the city before the permanent heating system is available, the contractor shall provide safe heating apparatus acceptable to the project manager and shall provide all fuel that is required. All expenses resulting from temporary heating shall be paid for by the contractor and not reimbursed by the city. When the heating system in any

new construction is ready for operation, the contractor may put it into operation and remove the temporary heating equipment. Operation of the heating system before the city issues a certificate of substantial completion is at the contractor's risk and expense.

625. SANITARY FACILITIES

The contractor shall provide and maintain suitable, weather tight, plastic or painted sanitary toilet facilities for any and all workers engaged on the work for the entire construction period. The contractor shall keep the toilets clean. When the toilet facilities are no longer required, the contractor shall promptly remove them from the site and disinfect and treat the site area as required. Toilet facilities of any existing building at or near the site shall not be used by employees or agents of the contractor or subcontractors unless the project manager grants prior written approval.

626. MONUMENTS AND STAKES

Prior to starting work on site, the contractor shall hire a licensed surveyor to locate and stake, with a very visible temporary stake, all existing property corner markers and survey monuments within the planned disturbance area of the project or within the right-of-way access to the project. The contractor shall not disturb any monuments or stakes until so ordered by the project manager. In case any monument or stake is disturbed by the contractor without orders from the city, the contractor shall pay the cost of the survey and other work required to relocate the same. Any work done without being properly located and established by base lines, offset stakes, bench marks, or other basic reference points located, established, or checked by the city may be ordered removed and replaced by a licensed surveyor at the contractor's expense. In such case, the contractor shall bear any expense to the city caused by improper location of the work.

627. PROTECTION OF THE ENVIRONMENT

The contractor shall satisfy all environmental quality standards imposed by law and take reasonable steps to minimize the environmental impact of the work. These environmental quality standards include, without limitation, noise control, air pollution control, water pollution control, and dust control, which may be placed at risk by the activities of the contractor; (the regulations can be accessed via the city's website at www.ci.boulder.co.us). In addition:

A. The contractor shall not burn any trash, rubbish, or other materials except in accordance with the provisions of Paragraph 10-8-2(b)(29), B.R.C. 1981.

B. The contractor shall not pollute the water of any pond, lake, stream, ditch, or other water course on city property, as prohibited pursuant to Section 5-4-11, B.R.C. 1981.

C. The contractor shall not deposit in any part of the water utility any substance or material that will injure or obstruct the utility, or contaminate or pollute the water or obstruct the flow of water, as prohibited pursuant to Section 11-1-12, B.R.C. 1981.

D. The contractor shall comply with the provisions of Chapter 11-3, B.R.C. 1981, regarding industrial and prohibited wastewater discharges.

E. The contractor shall not discharge visible emissions from motor vehicles pursuant to Section 7-3-5, B.R.C. 1981.

F. The contractor shall implement erosion control practices and stormwater best managements practices in accordance with Section 11-5-6, B.R.C. 1981.

G. The contractor will comply with permits required to discharge groundwater to the storm drainage system in accordance with Section 11-5-7, B.R.C. 1981.

Should the contractor or its subcontractors fail to satisfy environmental quality standards, the city shall have the right to employ outside assistance, city employees, or a private contractor to provide control and clean up, as necessary. All such costs may be deducted from any payment due to the contractor or charged to the contractor directly.

628. NOISE CONTROL

The contractor shall comply with all provisions of Sections 5-6-2 and 5-3-8, B.R.C. 1981. If the contractor believes that the work will violate these provisions, the contractor shall notify the project manager and shall also apply for a variance from the city's Environmental and Zoning Enforcement Division before beginning the work. A variance may be granted if it is found that compliance with these standards twill cause an undue hardship and it is found that:

A. The activity, operation or sound source will be of temporary duration, and even with the application of the best available control technology cannot be done in a manner that would comply; and

B. No reasonable alternative is available to the applicant.

If a variance is granted, reasonable conditions or requirements may be prescribed to minimize adverse effects upon the community or the surrounding neighborhood.

629. STORAGE AND REMOVAL OF CONSTRUCTION MATERIALS

The contractor shall routinely keep the work site and the surrounding premises free of accumulated waste materials and rubbish. Contractor shall provide adequate trash receptacles about the site and shall promptly empty the containers when filled. Waste materials must be removed regularly to a suitable landfill or recycling facility. Volatile wastes shall be properly stored in covered metal containers and removed daily. Wastes shall not be buried or burned on the site or disposed of into storm drains, sanitary sewers, streams or waterways. If space is available, the project manager may designate a place on the site to collect debris, rejected materials and other waste materials. If such a place is designated, the contractor shall, at the contractor's sole expense, install fencing and whatever else is necessary to keep loose materials confined so that they are not scattered by wind. The contractor shall be liable for any damage caused by construction materials which have been scattered by wind. The contractor and all subcontractors are hereby notified of the frequent wind hazards of Boulder, and waive any defense that wind gusts of high velocity could not be anticipated. Reusable construction materials such as concrete forms and scaffolding shall be neatly stacked by contractor when not in use. Contractor shall promptly remove splattered concrete, asphalt, oil, paint, corrosive

liquids, and cleaning solutions from surfaces to prevent marring or other damage. Progress payments may be withheld if the contractor fails to maintain the work site in a clean, orderly, and safe condition.

The contractor shall re-use and recycle, to the greatest extent possible, the waste produced as a result of the project. Unless otherwise indicated or specified, existing materials and equipment removed as a part of the work shall become contractor's property. Contractor shall carefully remove, in a manner to prevent damage, all materials and equipment specified or indicated to be salvaged and reused or to remain the property of city. Contractor shall store and protect salvaged items specified or indicated to be reused in the work. Salvaged items not to be reused in the work, but to remain city's property, shall be delivered by contractor in good condition to the city as directed by the project manager or at the city Yards. Any items to be reused or salvaged that are damaged in removal, storage, or handling through carelessness or improper procedures shall be replaced by contractor in kind or with new items. Contractor may, at its option, furnish and install new items in lieu of those specified or indicated to be salvaged and reused, in which case such removed items will become contractor's property. Existing materials and equipment removed by contractor shall not be reused in the work except where so specified or indicated.

630. EXISTING TRAVEL WAYS CONDITIONS DURING CONSTRUCTION

When reasonable and appropriate, equipment, tools, and materials shall be kept out of traveled ways such as streets, alleys, sidewalks, paths and bikelanes. Equipment which may endanger vehicular traffic must be lighted and marked to warn motorists. No sand, gravel, rocks, mud, dirt, or other debris may be deposited upon any streets, alleys, sidewalks, paths and bikelanes in violation of Section 8-2-10, B.R.C. 1981. If the contractor does not comply with this provision after receiving written notification, the city may have the debris removed and the costs of removal may be deducted from any payment to the contractor or charged to the contractor directly.

631. POST-CONSTRUCTION CLEANUP AND REPAIRS

At the completion of the work, the contractor shall remove all spots from floors, walls, ceilings, windows and doors and, where necessary, refit windows, doors and cabinet work. The contractor shall also clean all window glass and all plumbing fixtures. The contractor shall make such minor repairs and alterations as may be necessary to make any building or structure ready for occupancy. The contractor shall replace all broken and scratched glass with material which complies with the contract documents. This section shall not apply after or to the extent that the city has taken possession of a building on which the contractor has performed work. On all street construction projects, the contractor shall conform the work to acceptable line and grade, as determined by the project manager. In addition, the contractor shall have the streets, alleys, sidewalks, paths and bikelanes affected by the work swept clean of sand, gravel, rocks, mud, dirt or other debris by a street, alley, sidewalk, path and bikelane cleaner when necessary, as determined by the project manager. The city will not authorize final payment until the contractor has removed all rubble and other debris from the street and adjoining work area.

ARTICLE VII. CONTRACTOR'S WARRANTY AND GUARANTEE

701. CONTRACTOR'S WARRANTY AND GUARANTEE

The contractor's guarantee shall continue for a period of two (2) years after the date of substantial completion, except as otherwise provided in the contract document, notwithstanding the warranty period of any product which may be incorporated into the work which would otherwise expire before the expiration of this two-year warranty period.

The contractor warrants and guarantees to the city that all materials and equipment will be new, unless otherwise specified, suitable for the purpose intended and will be of the highest quality, new, merchantable, and fit for the purpose for which they are intended, and that the work will be performed using the best skills and workmanship to provide a project of the highest quality. The contractor also warrants and guarantees that the workers who perform the work will be sufficiently skilled to produce a high quality product which is free of faults or defects, including blemishes (surface defects) and flaws (internal defects), and in accordance with the requirements of the contract documents and of any inspections, tests or approvals required.

Contractor further warrants that it has full title to all equipment, components and other items conveyed to the city under the terms of this contract, that its transfer of such title to the city is rightful and that all such equipment, components and other items shall be transferred free and clear from all security interests, liens, or encumbrances, whatsoever. The contractor agrees to warrant and defend such title against all persons claiming the whole or any part thereof at no cost to the city.

All subcontractors', manufacturers' and suppliers' warranties and guarantees, expressed or implied, for any part of the work and any materials used therein, shall be obtained by the contractor for the benefit of the city whether or not such warranties have been assigned or otherwise transferred to the city, and enforced by the contractor during its guarantee period. The contractor shall assign or transfer such warranties and guarantees to the city if the city requests the contractor to do so. If within ten (10) days after written notice by the project manager to the contractor, or its agent, requesting such repairs or replacement, the contractor shall neglect to make or undertake with due diligence to do the same, the city may make such repairs or replacement in accordance with the terms of the contractor's performance bond at the contractor's and/or surety's expense, provided, however, that in the case of emergency where, in the judgment of the project manager, delay would cause serious loss or damage, repairs or replacement may be made without notice being sent to the contractor.

The duties and obligations imposed by these general contract conditions and the rights and remedies available hereunder and, in particular but without limitation, the warranties, guarantees and obligations imposed upon the contractor and the remedies available to the city thereunder, shall be in addition to and not a limitation of any otherwise imposed or available by law, by special guarantee or other provisions of the contract documents.

Nothing herein shall be construed to establish a period of limitation with respect to any other obligation which the contractor might have under the contract documents. The establishment of the warranty period set forth above relates only to the specific obligations of the contractor to correct

known defects in the work which are discovered and called to the contractor's attention during the warranty period, and has no relationship to the time within which its obligation to comply with the contract documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the contractor's liability with respect to its obligations and resulting damages. Nothing herein shall limit the city's right to seek recovery for latent defects which are not observable until after the warranty periods have run.

The contractor shall repair or replace all damaged or defective work immediately upon discovering any damage or defect, provided such damage or defect is not due to a design error caused by the city or an A/E hired by the city or an agent or employee thereof. The contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the construction manager, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage to the extent the above do not arise out of contractor's action or failure to act. The contractor shall promptly, without cost to the city and in accordance with the project manager's written instructions, either correct such defective work, or, if it has been rejected by the city, remove it from the site and replace it with non-defective work. The contractor's guarantee shall cover all materials and equipment incorporated in the work, and shall cover the work of the contractor and any subcontractors and their employees and agents engaged in the work.

As used in this contract, the terms "warranty" and "guarantee" shall be synonymous, and the terms "warranty period" and "guarantee period" shall be synonymous.

702. EXPERIMENTAL CONSTRUCTION METHODS

If the contractor proposes to use any method or product which can reasonably be considered to be experimental, the contractor must advise the project manager of that proposed method or product in writing. The contractor shall not employ any such experimental method or product until advised to proceed by the project manager in writing. The city may require special guarantees of the contractor to cover the work produced by the experimental method or product. By failure to require any such special guarantees, however, the city does not excuse the contractor for liability due to damages resulting from the use of experimental methods or products.

703. MATERIALS

The contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials to be used in the work. All materials used shall be, unless otherwise specified in the bid proposal, the standard stock products of reputable manufacturers. From the time of commencement of the work until its completion, the contractor shall be solely responsible for the care of all materials delivered at the site intended for use in the work, unless the materials are damaged by an act of the city or an employee or agent thereof. All injury or damage to any materials, whether or not incorporated into the work, shall be repaired or replaced at the contractor's expense before final payment shall be made unless the injury or damage is caused by an act of the city or an employee or agent thereof. The contractor shall provide suitable protection for all materials intended for use in the work, as well as for all completed work. The contractor may use a portion of the work site for storage of materials and equipment, provided that the use of this portion of the site is approved in writing by the project manager, which approval shall not be unreasonably withheld, and that it is

protected from wind as provided in section 623. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the particular manufacturer, fabricator, or processor, except as otherwise provided in the contract.

704. MATERIALS TESTS

If the contract documents require any portion of the work to be tested or specially inspected, the contractor shall give the project manager forty-eight (48) hour advance notice of its readiness in order that the project manager may observe such testing. In addition, the project manager may order testing or special inspection of any materials employed in the work. The city shall bear all costs of tests or special inspections not called for by the contract documents. If such testing or special inspection reveals a failure of the work to comply with the requirements of the contract documents, the contractor shall bear all costs of replacement thereof including retesting. The contractor shall provide such facilities as the city may require for collecting and forwarding samples and for conducting materials tests. The project manager may require that the contractor not use the materials represented by the samples which have been requested by the project manager until the project manager has informed the contractor that the materials satisfy the requirements of the contract documents. The contractor shall furnish the required samples to the city. If testing results require that the contractor obtain new or additional materials, these shall be obtained at the contractor's expense. In addition, the contractor shall pay all incidental expenses associated with procuring such new or additional materials, including, without limitation, transportation and shipping costs.

705. PROJECT INSPECTOR

A project inspector is assigned to a project to keep the city informed as to the progress of the work and the manner in which it is being done; to keep records; act as liaison between the contractor and the city; and to call the attention of the contractor to any deviations from the contract documents. The project manager shall inform the contractor as to who will be serving as the project inspector.

The contractor shall permit a project inspector unlimited access to the work as well as whatever access is needed to off-site facilities used to store or manufacture materials and equipment to be incorporated into the work.

706. AUTHORITY OF PROJECT INSPECTOR

A project inspector may communicate to the contractor any work directives, change orders, field orders, or other modifications in the work ordered by the project manager. The project inspector is authorized to reject any work or materials which do not conform with the contract documents, and if necessary, to suspend operations until corrective measures are taken, but may not order any modifications in the contract documents, or in the materials or construction methods employed by the contractor, unless specifically authorized by the project manager by a field order or change order.

The project inspector shall not have the power to waive obligations of the contractor, to revoke, alter, enlarge or reduce the requirements of the contract documents, (nor to delay the fulfillment of the contract by failure to inspect materials and work with reasonable promptness), or to approve or accept any portion of the work or to issue instructions contrary to the contract documents. The

contractor may not rely upon information or instruction offered by any person other than the project manager unless the project manager has authorized such other person in writing to deliver or otherwise communicate instructions to the contractor.

If the contractor questions or disagrees with any communication of a project inspector, the contractor shall notify the project manager, who shall inform the contractor in writing how to proceed. The contractor shall not be entitled to claim damages because the contractor relied on information or instructions offered by a project inspector and as a result performed work which was defective, or had to be repaired or replaced, unless the information or instruction was in the form of or pursuant to a writing issued and signed by the project manager.

The presence or absence of a project inspector on the job will be at the sole discretion of the city and such presence or absence of a project inspector will not relieve the contractor of its responsibility to obtain the construction results specified in the contract documents.

707. INSPECTION OF WORK BY PROJECT INSPECTOR

The project manager and project inspector shall at all times have the right and access to inspect the work and materials during normal working hours. The contractor shall furnish all reasonable aid and assistance required by the project manager or project inspector for the proper examining of the work and all parts thereof. Subject to the other provisions of this section, unless otherwise directed by the project manager, no work shall be done or materials used without inspections by the project manager or the project inspector having been performed, and no work shall be covered up or backfilled until the project manager's or project inspector's inspections are completed.

All material and workmanship (if not otherwise designated by the specifications) shall be subject to inspection, during manufacture and/or construction and at any and all places where such manufacture and/or construction is carried on.

Observations, inspections, and tests by the project manager, project inspector, or others are for the express purpose of providing quality assurance for the sole benefit of the city. Such activities shall not relieve the contractor from its quality control obligations or from its obligations to perform the work strictly in accordance with the requirements of the contract documents.

Nothing in this article shall in any way be construed as to require or to place responsibility for the method, manner or supervision of the performance of the work under this contract upon the project inspector or the city. Such responsibility rests solely with the contractor.

Failure of the project inspector to call the attention of the contractor to faulty work or deviations from the contract documents shall not, however, constitute acceptance of said work.

708. UNCOVERING OF WORK

If any portion of the work is covered contrary to the request of the project manager or to requirements specifically expressed in the contract documents, it must, if required in writing by the project manager, be uncovered for the project manager's observation and shall be replaced at the contractor's expense. If any other portion of the work has been covered which the project manager

has not specifically requested to observe prior to being covered, the project manager may request to see such work and it shall be uncovered by the contractor. If such work is found in accordance with the contract documents, the cost of uncovering and replacement shall, by appropriate change order, be charged to the city. If such work is found not in accordance with the contract documents, the contractor shall pay such costs unless it be found that this condition was caused by the city or a separate contractor, in which event the city or the contractor shall be responsible for the payment of such costs.

709. FIELD ORDERS

After a contract has been awarded, the contractor shall submit any requests for explanation or clarification of the contract documents to the project manager. When the city responds to such requests, it will issue a written explanation ("Field Orders") (Form 10) which shall consist of a written explanation with or without amended drawings. Field orders do not provide for either time extensions or changes in contract prices. If the contractor believes that the field order will require a time extension or extra payment, the contractor shall inform the project manager in writing within ten (10)days of the field order, or the contractor shall be deemed to have waived the right to make the request.

710. SUGGESTIONS TO THE CONTRACTOR

Any plan of action, method of work, or construction procedure suggested to the contractor by any city representative other than the project manager shall be adopted or followed at the sole risk and responsibility of the contractor. This section shall not apply to change orders or field orders which have been duly issued by the project manager.

711. CORRECTION OR REMOVAL OF DEFECTIVE WORK

If required by the project manager prior to final payment, and subject to the contractor's right to subsequently dispute the decision of the project manager, the contractor shall promptly, without cost to the city and as specified by the project manager, either correct any defective work, whether or not fabricated, installed, or completed, or, if the work has been rejected by the project manager, remove it from the site and replace it with nondefective work. If the contractor does not correct such defective work or remove and replace such rejected work, all as specified in a written notice from the project manager within a reasonable time, the city may have the deficiency corrected or the rejected work removed and replaced. All direct or indirect costs of such correction or removal and replacement, including without limitation, compensation for additional professional services and costs of additional testing and inspections, shall be paid by the contractor, and an appropriate deductive change order shall be issued. The contractor shall also bear the expenses of making good all work of others destroyed or damaged by the correction, removal, or replacement of its work. The city's failure to reject any material or work at the time of its use in the project shall not constitute a waiver of any rights hereunder. The contractor shall not be entitled to any time extension for performance of the work as a result of the correction of defective work by the contractor or the city.

712. NEGLECTED WORK BY CONTRACTOR

If the contractor should fail to prosecute the work in accordance with the contract, including any requirements of the progress schedule, the city, after seven days written notice to contractor, and subject to the contractor's rights to subsequently dispute the decision of the project manager, may, without prejudice to any other remedy it may have, make good such deficiencies, and the cost thereof (including compensation for additional professional services) shall be charged against contractor, in which case a change order shall be issued incorporating the necessary revisions in the contract including an appropriate reduction in the contract price. If the payments then or thereafter due contractor are not sufficient to cover such amount, contractor shall pay the difference to city.

713. SUBSTANTIAL COMPLETION

"Substantial completion" means that the work is completed to the point that the city may occupy and fully utilize the facilities and no nuisance is created, to the satisfaction of the city. All equipment shall be installed and operational, or temporary arrangements satisfactory to the city shall be made. All performance testing need not be completed prior to the date of substantial completion. The last date for which liquidated damages may be assessed against the contractor for failure to complete work on time shall be the date of substantial completion of the work or designated portion unless otherwise provided in the certificate of substantial completion. The city may, in its sole discretion, choose to allow a portion of the work to be deemed substantially complete prior to substantial completion of all the work.

When contractor considers the work ready for full occupancy or utilization by the city, contractor shall declare in writing to the project manager that the work is substantially complete. Within a reasonable time thereafter, the project manager and contractor shall make an inspection of the work to determine the status of completion. If the project manager does not consider the work substantially complete, the contractor shall be notified in writing giving reasons therefore. If the project manager considers the work substantially complete, the contractor shall receive a "Certificate of Substantial Completion" (Form 12), which shall establish the date of substantial completion and which shall set forth the responsibilities of the city and contractor for security maintenance, heat, utilities, damage to the work, and insurance.. The certificate of completion shall be signed by both the contractor and the project manager and shall include a tentative list of items to be completed or corrected before final acceptance, *see* Section 715, "Final Inspection."

Portions of the work not essential to the city's operation, which can be completed without interruption to the city's operation, may be completed after the work is accepted as substantially complete.

714. PARTIAL UTILIZATION

The city has the right to take possession or use of any completed or substantially completed portions of the work at any time, but such action will not be deemed an acceptance of any work not completed in accordance with the contract documents.

The city's use of any work so identified in the contract documents will not be grounds for extension of the contract time or change in the contract price. The city's use of any work not specifically identified in the contract documents will be in accordance with conditions agreed to prior to such use, and any extra costs or delays in completion incurred and properly claimed by contractor will be equitably adjusted by change order.

Guarantee periods for accepted or substantially completed work, including mechanical and electrical equipment, will commence upon the start of continuous use by the city. The issuance of a certificate of substantial completion for one portion of the work does not indicate final acceptance of the overall work.

715. FINAL INSPECTION

When the work is complete and ready for final inspection, the contractor shall file a written notice with the project manager to that effect. The project manager and the contractor shall then together make a final inspection of the work to determine whether the work has been completed in accordance with the contract documents. Following the final inspection, the project manager shall send the contractor a final inspection report, which shall notify the contractor of any incomplete, unsatisfactory, or questioned work noted by the project manager. Subject to the right to dispute the project manager's final inspection report, the contractor must satisfy any remaining questions or repair or replace the incomplete or unsatisfactory work promptly as directed by the project manager. If the contractor does not begin to take such action within five (5) days after receipt of notice, or does not pursue such action diligently, the city may, without further notice and without impairing the contract, make other arrangements to have the questions answered and the work completed in a satisfactory manner at the contractor's expense. The contractor shall be liable for any costs so expended by the city, and such costs may be deducted from any payments due or which may become due to the contractor under the contract. If the contractor contests any such deductions from payments owed the contractor, the contractor must file a written appeal pursuant to section 1254 with the city manager within five (5) days after receiving notice of the pending deduction. The contractor shall not become eligible for final payment from the city until the project manager finally accepts the work by certifying in writing that the work has been completed and that the contractor has passed the final inspection. The contractor shall be deemed to have finally completed the work when the contractor has remedied all deficiencies to the reasonable satisfaction of the project manager and delivered all construction records, maintenance and operating instructions, schedules, guarantees, certificates of inspection, and other documents required by the contract and the city issues a favorable final inspection report (Form 14).

716. PERFORMANCE DURING THE GUARANTEE PERIOD

The project manager will notify the contractor in writing of any damage or defects which are discovered during the guarantee period, and, subject to its rights to dispute such notice, the contractor shall begin to repair or replace any such defects within ten (10) days of receipt of such notice without cost to the city and in conformance with the project manager's written instructions. If the contractor does not begin to repair or replace such damage or defects within ten (10) days of receipt of notice, or does not pursue such action diligently, the city may without further notice and without impairing the contract make the repairs or replacements at the expense of the contractor, or the city may request

that the surety repair or replace the defects. If the city manager determines that immediate action is necessary to make repairs or replacements because of emergency conditions or to prevent further loss or damage, the city may proceed without prior notice to the contractor but at the expense of the contractor. In any event, the contractor shall be notified of the situation and of the action taken. If the contractor disputes that it is responsible for the damage or defects, the contractor may appeal to the city manager pursuant to section 125. If the contractor does not deliver a notice of appeal specifying the issues in dispute to the project manager within ten (10) days after the project manager serves notice on the contractor of the defects, the contractor shall be deemed to have waived any right to appeal. In any event, the contractor shall correct the damage or defect as specified in this section, and the question of responsibility for the expense will be determined subsequently by the city manager if an appeal is taken pursuant to section 125.

717. EXTENSION OF THE GUARANTEE PERIOD AND ADDITIONAL BOND REQUIREMENTS

If the city notifies the contractor of any defect in the work, other than a defect resulting from a design error caused by the city or by an A/E hired by the city, or damage or defects caused by abuse, modifications not executed by the contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage, the contractor shall remedy the defect pursuant to section 715. The contractor shall guarantee the replacement work for two (2) years from the date of the city's acceptance of the replacement work. In addition, if the bonds provided for in article 3 expire prior to the expiration of this extended guarantee period, then the contractor shall procure a new bond or bonds to be in effect until the expiration of the extended guarantee period. Such new bonds shall be in an amount equal to the cost of the replacement work which is the subject of the extended guarantee. The new bonds shall meet the requirements set forth in sections 304 through 306 except to the extent that they conflict with this section.

718. GUARANTEE PERIOD INSPECTION

The project manager shall make at least one (l) complete inspection of the work after the work has been accepted, and before the guarantee period expires. This shall be known as the guarantee period inspection. The project manager shall schedule and notify the contractor of this inspection, which shall be made during the last month of the guarantee period. The project manager shall send a written report of the guarantee period inspection to the contractor within ten (10) days after the completion of the inspection. If the report calls for repairs by the contractor, and if the contractor does not begin work to repair or replace the damage and defects within ten (10) days following receipt of this report, or does not pursue such action diligently, the city may, without further notice and without impairing the contract, make the repairs or replacements at the contractor's expense, subject to the contractor's right to dispute the guarantee inspection. If the city manager determines that immediate action is necessary to make repairs or replacements because of emergency conditions or to prevent further loss or damage, the city may proceed without prior notice to the contractor, but at the expense of the contractor. In any event, the contractor shall be notified of the situation and of the action taken. If the contractor disputes that it is responsible for the damage or defects, the contractor may appeal to the city manager pursuant to section 125. In any event, the contractor shall correct the damage or defect as specified in this section, and the question of responsibility for the

expense will be determined subsequently by the manager if an appeal is taken pursuant to section 125. The guarantee period inspection report is set forth as Form 19.

719. RIGHT OF OCCUPANCY

At the end of the time for completing the work specified in the contract documents, subject to reasonable insurance requirements contained in policies required by article 3 of the contract, the city shall have the right to take possession of and to use any completed or partially completed portions of the work. If the city possesses any portion(s) of the work or makes regular use of it before the contractor has completed the work, the city shall take all reasonable steps to avoid interfering with the work to be performed by the contractor. If such use or occupancy by the city exposes damage or defects, such damage or defects shall be replaced or repaired by the contractor immediately. The city's possession or use of the work will not be grounds for an extension of the project time or a change in the contract price, except as stated immediately hereafter. When the city partially occupies a facility, it shall share with the contractor the costs of energy to heat and light the facility and the costs of water and sanitary sewer service. The city's share of these costs will be determined by the project manager on an equitable basis, and the contractor will be reimbursed by a change order. The contractor may appeal the project manager's apportionment to the city manager pursuant to section 125.

720. ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK

If the project manager prefers to accept defective or non-conforming work, the project manager may do so instead of requiring its removal and correction, in which case a change order will be issued to reflect a reduction in the contract price which will be reduced as appropriate and equitable by a change order or otherwise. Such adjustment shall be effected whether or not final payment has been made. The contractor may appeal the project manager's reduction in the contract price to the city manager pursuant to section 125.

721. CONTRACTOR'S CONTINUING DUTY TO WARN OF DESIGN OR PRODUCT DEFECTS

The contractor is under a continuing duty to warn the city manager and the project manager of any possible defect in the design of the work and materials incorporated in the work and against potentially unsafe uses of products incorporated in the work which may cause personal injury or property damage, as soon as the contractor discovers the possible defect or has notice that a product may be unsafe. The contractor's duty under this section shall be continuing, and shall not expire until three years after the date of final payment. If the contractor fails to warn the city of a design or product defect of which the contractor is aware, and if personal or property damage thereafter results from such design or product defect, the contractor shall be liable jointly and severally with any other party responsible at law for all damages resulting from such defect.

ARTICLE VIII. CHANGE IN CONTRACT TERMS

801. RIGHT TO CHANGE WORK

The city may order changes by addition, deletion or modification of the work at any time without invalidating the contract. The city reserves the right to contract with any person or entity other than the contractor for any or all extra work authorized by change orders. In the event that the city contracts with a person or entity other than the contractor for such extra work, the city shall be responsible for coordinating the efforts of the contractor and the other person or entity, in order to avoid, insofar as practicable, any interference with the contractor's work.

802. DIFFERING SITE CONDITIONS

The contractor shall promptly, upon discovery, and before the conditions are disturbed, provide written notice to the project manager of any subsurface or latent physical conditions at the site which differ materially from those indicated in the drawings and specifications issued by the city, or unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as being inherent in work of the character provided for in this contract or that could have not been determined at a site investigation conducted pursuant to section 209.

The project manager shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, then the contract price shall be equitably adjusted by a change order as provided in this article 8 upon claim by either party and made within five (5) days after the conditions first become apparent. If the contractor disputes the change order price, the contractor may appeal pursuant to section 125. The contractor shall have the burden to prove that actual conditions under the surface or in an existing building vary materially from those shown in the contract documents and/or that the differing site conditions could not have been discovered at a site investigation conducted pursuant to section 209.

No request by the contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under the contract.

803. FIELD ORDERS

By field order (Form 10), the project manager or project inspector may make minor changes within the scope of the work as long as such changes are reasonable. The contractor is not entitled to extra compensation for such minor changes which are within the scope of the contract, nor is a change order required. Such changes shall be effected by written field order and shall be binding on the city and the contractor. The contractor shall carry out such written orders promptly.

804. CHANGE ORDERS

A change order is a written order from the project manager, issued after the execution of the contract, authorizing a change in the work and a related adjustment in the contract price or the contract time.

Only the project manager is authorized to sign a change order. The contract price and the contract time may be changed only by a change order. Any change order signed by both the project manager and the superintendent or any other representative of the contractor shall be considered a part of the contract and subject to every term and requirement of the contract documents. A change order which changes the contract price must be signed by both the project manager and the city manager or the manager's delegate in the purchasing division. No change order shall be issued which causes the aggregate amount due the contractor under this contract to exceed the original contract price unless the city provides the contractor with a written assurance that funds sufficient to cover the cost of the change have been lawfully appropriated. In addition, the department head of the affected city department or departments must sign any change order which cumulatively adjusts the original contract price by more than ten percent (10%). The form of change orders is set forth as Form 9. Any change order waiving any general condition shall be approved by the city attorney. It is the contractor's duty to notify the surety which issues the bonds required by sections 305 and 306 of any changes affecting the general scope of the work or change in the contract price and, if requested by the city, to increase the amount of the bonds accordingly.

If the project manager determines that a change order requires the contractor to do work which is a substitute for other work originally called for in the bid proposal, and if the project manager determines that the change order does not require the contractor to use substantially more materials or labor than were originally called for in the bid proposal, then, and to that extent, the project manager shall not allow the contractor extra compensation. The contractor shall have the right to dispute the project manager's determination.

805. CHANGE IN THE CONTRACT TIME

If the contractor believes that a change order will significantly affect the contract schedule of performance, and require the contractor to spend more time on the project than was earlier anticipated, the contractor shall submit a written request to the project manager for a time extension within ten (10) days after service of the change order. Such requests for time extensions shall be evaluated as set forth in section 405, paragraph B.

806. CHANGE IN THE CONTRACT PRICE

If any instruction of the project manager or any condition of the work appears to the contractor to require a change in the work for which the contractor should receive extra compensation, the contractor shall make a written request to the project manager for a change order. Except for claims by the contractor arising from design error which is caused by the city or an A/E hired by the city or an agent or employee thereof, no extra compensation shall be authorized for work performed more than ten (10)days before a written request for a change order is received by the project manager. The change order may reflect the agreement of the contractor and the city to a contract price adjustment for the change. On unit price contracts, the change order shall indicate the unit prices which apply. The cost or credit to the city resulting from a change order shall be determined in one or more of the following ways:

A. By mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data; or

B. By unit price adjustments as determined in section 902, “Unit Price Contracts”; or

C. By actual costs as determined in section 808, “Cost Adjustments for Extra Work.”

807. ELIMINATED ITEMS

Should any item contained in the bid proposal be found unnecessary for the proper completion of the work, the city will by change order eliminate such item from the contract, and reduce the contract price insofar as is possible, according to the prices set forth in the bid proposal. If any change order shall cause the loss of any work or materials already furnished by the contractor under the terms of the original contract, the contractor shall be reimbursed for the actual cost of such work, and the net cost of salvaging such materials. The city may purchase any such materials at the actual cost to the contractor. However, the contractor shall be awarded transportation, storage, installation, and salvage costs which have been incurred for eliminated items, provided the contractor can provide invoices or receipts or other evidence that such costs were incurred by it.

808. EXTRA WORK

The contractor may be called upon to perform extra work which is not provided for in the bid proposal or other contract documents, but which is essential to the satisfactory completion of the contract. Extra work is work not provided for in the contract documents but which is found desirable to include in the contract because of timing, mobilization, or other factors. Any extra work authorized by the project manager shall be compensated for and performed under the general provisions of Article 8 of the General Conditions or by mutually satisfactory negotiation, whichever the city deems most appropriate. Once an agreement has been reached between the contractor and project manager, the project manager may issue a Work Directive (Form 8) authorizing the contractor to proceed with the extra work. Work Directives shall serve as the basis for negotiating subsequent change orders.

Should any oral or written order or instructions appear to the contractor to involve extra work for which, in its opinion, it should receive extra compensation and/or time extension, the contractor shall, within ten (10)calendar days of receiving the order or instruction, submit a written request for extra compensation to the project manager. This written request should include the costs for which the contractor feels it should be compensated. If a request is not made within this time period, the contractor shall waive any right to compensation and/or time extension for the extra work. No extra work shall be performed by the contractor until approved by the project manager.

In the event the parties cannot agree on compensation for the extra work, compensation will be paid on a time and materials basis as follows:

A. Labor

The contractor shall receive the rate of wage agreed upon in the bid proposal for all labor employed in performing the extra work. If the extra work requires labor for which the rate of wage was not earlier established in the bid proposal, the contractor will receive the rate of wage agreed upon in writing before beginning the extra work. If the city and contractor are unable to agree upon an acceptable rate of wage before beginning the extra work, the

contractor shall perform the work and will be paid at the hourly rates as certified by payroll records, plus 50%. The certified payroll record shall include the employee's hourly rate and all fringe benefits resulting from collective bargaining units (trade unions). The 50% loading factor shall not be applied to the fringe benefits. The 50% loading factor shall include such items as overhead, bonds, insurance, taxes, and profit. Only the employees directly involved in the extra work shall be included. Project superintendents or foremen, who generally direct the extra work but who have overall project responsibilities, shall not be included.

B. Materials

For materials accepted by the city and used in the work, the contractor shall receive the actual cost of such materials, including transportation charges (exclusive of equipment rentals as set forth below). The contractor shall furnish invoices to the city for all materials used and transportation charges. If the materials used in performing the extra work are taken from the contractor's stock, then in lieu of invoices the contractor shall furnish an affidavit, certifying that such materials were taken from its stock, that the quantity claimed was actually used in the work, and that the price and transportation claimed represent the actual cost to the contractor. The contractor shall be paid an additional fifteen percent (15%) of the sum of all materials used to cover overhead and profits, unless otherwise agreed by the parties.

C. Equipment Rental Rates

The contractor shall be paid according to rental rates agreed upon by the parties in writing before the extra work is begun for any machinery or special equipment (other than small tools) necessary for performing the extra work. The rental rates shall include fuel, lubricants, and the costs of transporting the special equipment to the site. Equipment rates shall be charged only for the time the equipment is operating. Standby time shall only be paid when the project manager determines the equipment is needed at the site, but is not operating. Non-listed equipment needed for specific jobs will be paid for at hourly rates for operating time only if agreed to in writing before the work begins.

D. Other Miscellaneous Expenses

The contractor shall be reimbursed for the actual cost of other services or expenditures including, without limitation, as agreed upon by the parties before the extra work is begun, use of materials testing laboratories, employment of design professionals and surveyors, bond premiums, and any other cost directly related to accomplishment of the extra work but not provided for in other categories in this section. Additional allowance shall not be made for overhead, general superintendence, the use of small tools, further profit, or any other cost for which no specific allowance is provided herein.

E. Sales and Use Taxes

The contractor shall charge and pay to the city all sales and use taxes which accrue from the extra work. The contractor shall not receive final payment for the extra work until the contractor pays all applicable sales and use taxes.

809. NOTICE OF INTENT TO CLAIM

If after receiving a decision from the project manager that a change order will not be issued as requested by the contractor, or the contractor does not agree with the project manager's decision on a change in price or time or the contractor disputes any decisions of the project manager and the contractor intends to submit a claim therefor, the contractor shall submit in writing a notice of intent to claim to the city manager.

The written notice of intent to claim shall be clearly titled as such and all notices shall be numbered sequentially. The notice shall contain the following:

A. Date of the event giving rise to the claim.

B. A description of the claim.

C. The reasons why the contractor believes additional compensation or time is due or charges were wrongly assessed.

D. An estimate of any additional costs associated with the claim.

E. The contractor's plan for mitigating costs or delays associated with the claim, if mitigation is feasible.

The notice of intent to claim described above shall be given within ten (10) days after denial of any request for a change in the contract amount or contract time, or within ten (10) days after an informal appeal pursuant to section 125 is denied or deemed to be denied pursuant to that section.

810. SUBMITTAL OF CLAIM

The contractor shall, within twenty (20) days after it submits a notice of intent to claim, submit to the city manager a complete and itemized claim which includes any claimed increase in contract time and contract amount. The contractor may request an extension of time to submit the claim, which extension may be granted by the city manager for good cause shown. The claim must be described in sufficient detail to allow the city manager to evaluate the basis of and costs associated with said claim. A claim for increase in contract amount shall be submitted based on actual costs whenever possible, rather than estimate or opinion, and shall be supported by invoices, time cards, and other business records commonly accepted in the construction industry. The claim shall be accompanied by copies of all contract provisions or other documents relied on and a summary of the factual theories supporting the claim. A claim for time extension must be accompanied by a revised construction schedule reflecting the effects of the delay on the critical path and showing actions which the contractor has taken or proposes to take to minimize the effects of the delay. The claim shall also identify any reasonable measures the city can take to minimize the claim.

The contractor shall furnish upon request all additional information and data which the city reasonably determines would be needed to aid in resolving the claim through negotiation or which is required to complete an evaluation of the claim. The contractor shall give the city manager access to its books, correspondence, records and other materials relating to the work described in the claim,

shall require its subcontractors and suppliers to provide the city with such access, and shall make its personnel and that of its subcontractors and suppliers available to discuss and answer cost, schedule and other questions related to its claim. Clear copies of all necessary supporting records shall be provided to the city at no cost. Failure to submit requested information may be the basis for denial of a claim. However, the city may not deny a claim on the basis of incomplete information if the contractor can convincingly demonstrate that the missing information is in the possession of a Subcontractor or supplier, and, despite the contractor's diligence efforts, the subcontractor has failed or refused to provide the contractor with the information.

The contractor shall submit with its claim a sworn and notarized certificate that:

A. The claim is made in good faith;

B. All supporting data are reasonably accurate and complete to the best of the contractor's knowledge and belief as of the time of submitted by the contractor;

C. The amount requested is not overstated or inflated and fairly and accurately reflects that contract adjustment for which the contractor believes the city is liable, and

D. To the best of the contractor's knowledge and belief, the prices stated for material and equipment are the lowest reasonably available to the contractor and include all available discounts.

If the contractor is an individual, the certification shall be executed by that individual. If the contractor is not an individual, the certification shall be executed by (i) a senior company official in charge of the work performed under this contract; or (ii) an officer or general partner of the contractor.

The city manager or his designee shall in good faith investigate, review and evaluate the claim and make a determination. Such determination shall normally be made in writing within thirty (30) days of receipt of a completed and fully-documented claim; however, if special circumstances exist or the claim is unusually complex, the contractor will be notified of a longer period not to exceed sixty (60) days.

The contractor shall proceed diligently with performance of this contract, pending final resolutions of any claim made under this section 810, and shall comply with any reasonable decision of the city pending final resolution of the claim. Failure to proceed with the work shall be grounds for suspension or termination of the contractor.

If the contractor agrees with any determination or resolution by the city requiring a change in contract time or amount, it shall be processed as a change order.

Failure to meet any of the requirements of this section in a timely and complete manner shall constitute a waiver by the contractor of any right to adjustments of contract time or amount either by administrative review or by any other action at law or equity.

ARTICLE IX. PAYMENT PROVISIONS

901. CONSIDERATION (CITY'S PROMISE TO PAY)

The city's promise to pay for the work is limited by the city's charter, code, and other ordinances. Furthermore, this contract is only valid to the extent that funds are appropriated and made available therefor, and is void as to any obligations not covered by available appropriations. The city shall pay the contractor only for the contract price as set forth in the original contract, and for additional price adjustments authorized by change orders. The city shall take all necessary action to ensure that sufficient funds are appropriated for all work performed by the construction manager.

902. UNIT PRICES AND ALTERED QUANTITIES

If payments for portions of the work are based on specially identified units of construction rather than on a lump sum price, the contract is referred to as a unit price contract. The number of units of any specific designation set forth in the proposal is an approximation and may not correspond to the number of units actually completed. When the accepted quantities of work vary from the quantities in the contract, the contractor shall be paid, so far as contract items are concerned, at the contract unit prices for the accepted quantities of work done. The contractor shall also set forth unit prices in all subcontracts to which they apply.

Should the final pay quantity of any major contract item increase or decrease by more than twenty percent (20%) from the quantity in the contract, the contract unit price will be adjusted to balance fixed and job indirect costs as by the parties to the contract. A major contract item is any item having an original contract value in excess of ten percent (10%) of the original contract amount. The new unit prices negotiated will be distributed over, and will apply to, the total final pay quantity for the item, and not solely the excessive overrun or excessive under run quantities.

903. PROGRESS PAYMENTS FOR COMPLETED WORK

Before the first application for payment, for a lump sum or cost plus contract, the contractor shall submit to the project manager a schedule of values allocated to the various portions of the work, subject to the project manager's reasonable approval. For portions of the work based on unit prices, the unit prices shall serve as the schedule of values. This schedule shall be used only as a basis for the contractor's application for payment. The contractor shall submit a signed written statement of the total value of the work completed, together with such data or schedules as may be required, at the end of each month to the project manager as an application for payment. The application shall be accompanied by a copy of the contractor's current construction progress schedule with those shop drawing schedules, procurement schedules and other data specified for periodic submission in the special conditions or reasonably required by the project manager. The project manager shall, within five (5) days, either recommend payment or return the application to the contractor indicating in writing the reasons for refusing to recommend payment. In the latter case, the contractor may make the necessary corrections and resubmit the application. The city shall, within thirty (30) days of presentation to it of an acceptable application for payment, pay the contractor the amount recommended by the project manager. The contractor shall receive progress payments for work authorized by change orders as the contractor completes such work. Ninety-five percent (95%) of

the calculated value of completed work shall be paid. Pursuant to Section 2-8-9(e), B.R.C. 1981, the city may include other retainage provisions in contracts not covered by state law. All of the funds which have been retained pursuant to this section shall be retained until the work is completed and finally accepted by the city. The contractor warrants that it shall pay each subcontractor promptly upon receipt of payment from the city the amount to which the subcontractor is entitled. Notwithstanding anything to the contrary, the contractor shall not be required to pay a subcontractor or supplier that has not performed in accordance with its subcontract or purchase order. The contractor shall, by appropriate agreement with each subcontractor, require each subcontractor to make payments to the subcontractor's sub-subcontractors in similar manner. The city may furnish to each subcontractor information regarding the percentages of completion or the amounts applied for by the contractor.

904. PROGRESS PAYMENTS FOR MATERIALS

The paid invoice price of materials and equipment delivered to the construction site but not yet incorporated in the work may be included as a part of progress payments. Any payment for materials is conditioned upon the contractor's furnishing to the city adequate information to establish the city's title to such materials or otherwise protect the city's interest, including without limitation applicable insurance and transportation to the site for those materials. By submission of a request for a progress payment, the contractor warrants that title to all materials and equipment covered by application for payment will pass to the city either by incorporation in the construction or upon receipt of payment by the contractor, free and clear of all liens, claims, security interest, and encumbrances. The contractor further warrants that no such materials or equipment will be subject to an interest or encumbrance of the seller of such materials or equipment. Payment by the city for such materials and equipment shall not relieve the contractor of responsibility for the care of such materials and equipment, and the city does not assume ownership of the materials or equipment until they are incorporated into the completed work and the certificate of substantial completion is signed by the city and the contractor.

905. PROGRESS PAYMENTS TO SUPPLIERS AND SUBCONTRACTORS

The contractor shall make partial payments of the amount due to each of the contractor's suppliers and subcontractors in the same manner as the city is required to pay the contractor under section 903, provided that the suppliers and subcontractors are performing to the contractor's satisfaction. If the city is notified that the contractor is in arrears in payments to the contractor's suppliers or subcontractors, the project manager shall notify the contractor and determine why such funds are being withheld. If the project manager determines that no legitimate basis exists for the contractor's withholding of such payments, the city may, five (5) days after the mailing of written notice to the contractor, make such payments directly to the contractor's suppliers or subcontractors from funds which otherwise would be due to the contractor, unless the contractor objects to such payments within said five (5) day period, and provides reasonable documentation to support its position.

906. DISPUTE RETAINAGES

In addition to the retainages set forth in section 903, the city may retain up to one hundred percent (100%) of any disputed line item or portion thereof included in progress payments for any unsatisfactory performance of the work, including without limitation:

A. Failure to repair or replace defective work.

B. Claims filed against the contractor, or reasonable evidence indicating that claims may be filed against the contractor.

C. Failure of the contractor to make adequate payments to subcontractors or suppliers for labor or materials.

D. Failure to obtain necessary permits or licenses, or to comply with applicable laws, ordinances, codes, rules or regulations, unless such noncompliance is due to reasons beyond the control of the contractor, or due to acts of the city or an A/E hired by the city, or agents or employees thereof.

E. Failure to satisfy affirmative action and equal employment opportunity requirements.

F. Failure to maintain an adequate rate of progress.

G. Failure to maintain the contractor's portion of the work in a clean and orderly manner.

H. Failure to repair or replace city or private property damaged during the progress of the work.

I. A reasonable doubt that the contract will be completed for the balance of the contract price then unpaid.

J. As a set off for amounts due to the city, whether liquidated or unliquidated, including, without limitation, liquidated damages as provided by the contract.

K. Collusion with other bidders in preparing the bid.

If the reasons for such retainage no longer exist, the city shall make payment to the contractor of the sums withheld pursuant to this section, subject to the amounts required to be retained pursuant to section 903.

907. PAYMENT OF CITY SALES AND USE TAXES

There are two options for payment of city sales and use taxes: A. Estimated Percentage Basis; or B. Monthly payments for holders of a city sales tax license.

If the contractor selects the second method to pay sales and use tax, the contractor and all the subcontractors, after the bid is awarded, must obtain a Boulder Sales and Use Tax License from the city Sales and Use Tax Division, pursuant to Section 3-2-11, B.R.C. 1981.

A. Estimated Percentage Basis

For any contract in which the contract price is $50,000 or more, the contractor shall pay city construction use tax based upon the following percentages:

Type of contract	percentage of contract amount to which tax is applied
Building construction, landscape installation, Playground installation and construction	50 percent
Construction in the city's right-of-way, Sewer or water line installation or rehabilitation	30 percent

For such contracts the contractor shall pay the construction use tax to the city based on the contract price at the time it applies for a building or right-of-way permit. Payment of the sales and use tax at this time will give the contractor proof that tax has been paid and therefore, prevent duplicate payment of taxes to suppliers.

At the time that the contractor applies for final payment it must submit Form 15, attached to the general conditions, to the Lead Sales Tax Auditor ("auditor") for the city. The auditor will determine the total amount paid by the city for the work under the contract, which includes all work performed pursuant to a change order, and compute the total use tax due based on the above percentages. After the total tax payment is received by the city's Sales and Use Tax Division, it will approve Form 15. At this point the contractor may request an audit by the city in accordance with section 909 rather than paying using the percentage method. Depending upon the determination of the city's auditor, the contractor will either be refunded use tax by the city or pay the city additional use tax.

For any contract in which the contract price is under $50,000, the contractor may pay all estimated sales and use taxes due on the work based upon the contract price at the time that the contract is executed. The tax due under this procedure will the rate in effect during the term of this contract multiplied by fifty percent (50%) of the contract price for building construction, landscape installation, playground installation and construction and (30%) for construction in the city's right-of-way, sewer or water line installation or rehabilitation.

B. Actual Basis on Monthly Return

If the contractor elects to obtain a Boulder Sales and Use Tax License from the city Sales and Use Tax Division, pursuant to Section 3-2-11, B.R.C. 1981,the contractor will pay the actual

use tax due by the 20th day of each month for each purchase of tangible personal property and payment of taxable services made during the previous calendar month. The contractor shall be granted a credit for Boulder sales taxes paid to a vendor, if any, upon purchase of tangible personal property or taxable services when filing this monthly return, but not for taxes paid to other municipalities. The contractor shall retain a copy of each monthly report as evidence that sales and use taxes have been paid. Under this method, the contractor shall cause each of its subcontractors and suppliers to obtain a Boulder Sales and Use Tax license and to pay the actual sales and use tax which it owes by the 20th day of each month. The contractor shall be liable for the payment of all sales and use taxes which any of its subcontractors or suppliers fails to remit to the city. The permit pulled for this form of payment will not show that Boulder use tax has been paid therefore, by using this form of payment the contractor and its sub-contractors will not have the protection from duplicate taxation. The city will audit the project at completion and will not give credit to taxes paid to other municipalities.

If additional information is required, please *see* Section 3-2-14, B.R.C. 1981 or contact the city's Sales and Use Tax Division at 303-441-3921.

908. PAYMENT OF CITY SALES AND USE TAXES FOR CHANGE ORDERS

The contractor is responsible for payment of all city sales and use taxes paid on additional work authorized by any change order.

909. SALES AND USE TAX AUDITS

In the event a contractor requests a tax audit, the city's auditor will request the following from the contractor and the contractor shall provide this information:

A. List of all subcontractors and the related information from the contractor.

1. Type of work performed

2. Contract amount

3. Name, address, phone and contact person for the contractor

B. A copy of the general contractor's job cost reports and related invoices, as well as additional information which may be requested.

C. The auditor will contact all of the subcontractors by letter requesting job cost information. Also, as a part of the letter to subcontractors, the auditor will request the amount of materials billed to the contractor.

D. Subcontractors will complete the contractor's letter and return it to the auditor. Rental of equipment is taxable as a cost of the construction project.

If additional information is required, please contact the city's Sales and Use Tax Division at 303-441-3921.

910. REQUIREMENTS FOR FINAL PAYMENT

The contractor shall not receive the final payment due under the contract until the following conditions have been satisfied and the correct forms or certifications have been submitted to the project manager:

A. The contractor passes final inspection, and the project manager formally accepts the work in writing. Form 14.

B. The city Sales and Use Tax Form is completed, submitted and signed by the Lead Sales Tax Auditor for the city; Form 15. If additional information is required, please contact the city's Sales and Use Tax Division at 303-441-4017.

C. Either (1) the contractor files claim releases signed by all suppliers and subcontractors with the project manager certifying that all outstanding claims for payment have been paid (Form 16); or (2) the contractor files conditional claim releases signed by all suppliers and subcontractors from which it has not obtained unconditional claims release and agrees to give the city within ten (10) days after final payment unconditional claims releases from each such subcontractor or supplier or copies of canceled checks showing that each of these subcontractors and suppliers has been completely paid.

D. The surety on the labor and material bond signs the surety release (Form 18).

E. The contractor obtains written certification from the surety that final settlement may be made with the contractor and that the performance bond shall be in effect throughout the guarantee period.

F. The contractor has given the project manager the copy of the contract documents and the as-built drawings which reflect all changes in the work.

911. FINAL PAYMENT PROCEDURE

Prior to receiving final payment the contractor shall make application for final payment following the procedure for progress payments set forth in section 903. The application for final payment shall contain a final estimate of the total value of all work done under the contract. This shall include all extra work performed pursuant to change orders. All prior estimates and payments shall be subject to correction in the final estimate and payment. However, in the absence of error, manifest mistake, or fraud, all estimates, when approved by the project manager, shall be conclusive evidence of the work done and materials furnished. Prior to final payment the project manager will inspect the work and review the application for final payment to determine whether the contractor has fulfilled its obligations under the contract. The project manager will, within five (5) days of receipt of the application for final payment, give written notice to the contractor that the work is acceptable or return the application for final payment indicating in writing the reasons for refusing final payment in which case the contractor shall make the necessary corrections. After making the necessary corrections the contractor shall resubmit its application for final payment which shall be reviewed as outlined above. Final payment shall not be made to the contractor until the city advertises a notice of

final settlement at least twice in a newspaper of general circulation in Boulder County at least ten (10) days prior to the date of final settlement, pursuant to Section 38-26-107, C.R.S. If no claims are filed before final settlement and if the sureties consent pursuant to Form 18, the city shall pay the advertised amount to the contractor, after deducting all payments previously made to the contractor under the contract and all other charges properly chargeable to the contractor under the terms of the contract.

912. PROCEDURE FOR WITHHOLDING ALL OR PART OF FINAL PAYMENT

The city is required to comply with Section 38-26-101 *et seq*., C.R.S. This statute generally allows a supplier or a subcontractor to file a verified statement of claim, upon which the city is required to withhold funds from the contractor as set forth in the statute. Further, the statute allows unpaid subcontractors and suppliers who have filed verified statements of claim to file a notice of lis pendens with the city, in which event the city must continue to withhold amounts from the contractor longer than ninety (90) days after the date of final settlement.

913. WAIVER OF CLAIMS UPON FINAL PAYMENT

The acceptance of final payment shall constitute a waiver of all claims by the contractor except those previously made in writing and identified by the contractor as unsettled at the time of the final application for payment. The making of final payment shall constitute a waiver of all claims by the city excepting those arising from:

A. Unsettled liens;

B. Faulty or defective work appearing after substantial completion;

C. Failure of the work to comply with the requirements of the contract documents;

D. Terms of any special warranties required by the contract documents; or

E. Claims for contribution or indemnification as provided by the contract documents.

ARTICLE X. SUSPENSION AND TERMINATION

1001. SUSPENSION OF WORK BECAUSE OF CONTRACTOR DEFAULT

The project manager may suspend the work or any part of the work without invalidating the contract because the contractor has materially breached any of the contract conditions. A suspension shall not absolve the contractor or the contractor's sureties of any duties or responsibilities except for the performance of the work which has been suspended during the suspension period. If the contractor later resumes work which the city previously suspended because the contractor has materially breached any of the contract conditions, the city shall not be liable to the contractor for additional costs caused by the suspension or for extra start-up costs which result from resuming the suspended work. If the contract is not performed within the time limit set forth due to suspension for the contractor's default, the city shall be entitled to liquidated damages for such delay as set forth in section 406.

1002. SUSPENSION BECAUSE OF ORDER OF STATE OR FEDERAL COURT

In the event a state or federal court order requires suspension of work, the order of suspension shall identify the court order which caused the suspension and shall extend the time limit of the contract by the amount of time specified by the court order. If the court order causes suspension for an indefinite period of time and as a result a time extension cannot be established, the order of suspension will also be for an indefinite period of time. In the event that the contract is suspended for an indefinite period of time, the city may elect to terminate the contract. Should this occur, the contractor shall be paid for all work performed to the date of suspension, and for all other costs which the contractor actually incurs as a result of the suspension. The contractor and the city shall decide which work shall be required to protect completed work and to restore utility service to the area under construction. Payment for such work shall be according to the unit prices listed or, if not specifically covered under the contract, at a price to be determined by the project manager, construction manager, and contractor, in the event that the city elects to terminate the contract because of a suspension due to a court order, arising from the methods or activities of the contractor or its subcontractors in constructing the project, the contractor hereby waives all claims for damages because of such inability to complete the project as planned, including, without limitation, damages for loss of anticipated profits.

1003. SUSPENSION OF THE WORK FOR THE CITY'S CONVENIENCE

The city may at any time and without cause suspend the work or any portion thereof by written change order which shall fix the date upon which work on the project shall be recommenced and state that the suspension is expressly for the city's convenience. If the suspension applies to only a part of the work, a time extension will be authorized based on the project manager's estimate of the delay to the entire project caused by the partial suspension. Liquidated damages will not be assessed by the city during the extended period caused by suspension for the city's convenience under this section. In all cases of suspension for the city's convenience, a price adjustment will be made by the project manager by change order to reflect the reasonable, demonstrable cost to the contractor of the suspension. The contractor shall consult with the project manager about the cost of suspension, if the project manager so requests. Equipment rates shall be charged only for the time the equipment is operating. Standby time shall only be paid when the project manager determines the equipment is needed at the site, but is not operating. Upon receiving such an order of suspension, the contractor shall immediately protect and maintain the work in a condition which will permit its resumption for the least possible start-up cost. If the city wrongfully suspends the contract, this shall be treated as a suspension of the work for the city's convenience. If a portion of the work is suspended for more than three (3) months by the city, the contractor may then terminate that part of the contract. Contractor shall have the right to dispute any decisions made by the project manager.

1004. CITY MAY TERMINATE THE CONTRACT FOR CAUSE

Without prejudice to any other right or remedy, the city may terminate the contract or reassign all or any portion of the work pursuant to section 1006 for any of the following reasons:

A. The contractor assigns work to be performed under the contract without the written permission of the project manager.

B. A petition for bankruptcy is filed relating to the affairs of the contractor. As used in this section 1004, "contractor" shall be deemed to include the contractor, or any of its officers, employees or major shareholders possessing at least ten percent (10%) of the contractor's equity.

C. A general assignment of the contractor's assets is made for the benefit of the contractor's creditors or any of the funds due to the contractor under this contract are assigned for the benefit of the contractor's creditors.

D. A trustee or receiver is appointed for the contractor or any of the contractor's property.

E. The work is being unjustifiably delayed by the contractor, including allowance for any time extensions.

F. The city learns that the contractor has been guilty of collusion with other bidders in preparing the bid.

G. A surety which has bonded the contractor for the work becomes insolvent, bankrupt, or loses its right to do business in the State of Colorado, and the contractor does not provide a substitute bond within the time set forth in section 304.

H. The contractor refuses or fails to supply enough properly skilled workers or proper materials, unless it can convincingly demonstrate to the city that such workers or materials cannot be obtained by exercising reasonable diligence.

I. The contractor fails to make proper payment to subcontractor or suppliers.

J. The contractor breaches any of the conditions of the contract or executes the contract in bad faith or otherwise not in accordance with the terms of the contract.

K. The contractor disregards any law, ordinance, regulation, role, or order of any public body having jurisdiction.

If the city lawfully terminates the contract and reassigns all or any portion of the work, the city may take possession of the work and of all materials thereon owned by the contractor and finish the work by whatever method it may deem expedient. In the event of such a default the city shall give the contractor ten (10) days written notice and the opportunity to cure such default. In the event of termination, the contractor shall not be entitled to receive any further payment until the work is completed and accepted. The contractor and the contractor's surety shall reimburse the city for all expenses sustained by the city in completing the contract, including, without limitation, administrative expense and other expenses incurred even if they exceed the contract price, but not including extra which is authorized after the termination. Where the contractor's services have been so terminated or reassigned by the city, said termination shall not affect any rights of the city against contractor then existing or which may thereafter accrue. Any retention or payment of moneys by the city due the contractor shall not release the contractor from liability.

1005. CONTRACTOR SHALL NOTIFY CITY OF CERTAIN EVENTS

The contractor shall notify the project manager of the following events:

A. Any of the events described in subsections A, B, C or D of section 1004.

B. Any change in the contractor's legal relationship with the surety which may affect the contract.

C. Bankruptcy or insolvency of the surety, or any other event which prevents the surety from doing business in the State of Colorado.

D. Assignment of any of the funds due to the contractor under the contract.

E. Any adverse occurrence which may materially affect the contractor's ability to perform this contract.

F. Proceedings which could lead to the revocation of any of the licenses which are necessary for the contractor to perform work under the contract.

G. Grant of a security interest by the contractor in any of the materials or equipment to be incorporated into the work to any third party.

H. Violation by any subcontractor or supplier of any of the terms of the contract, or occurrence of any event listed in subsections A through G above with respect to a subcontractor or supplier.

1006. CITY MAY REASSIGN THE WORK

If the contractor remains in breach of any of the conditions of the contract after all applicable cure periods have expired, the city may reassign any part of the contract to another party in lieu of terminating the contract. Such reassignment shall not lessen any of the contractor's responsibilities to perform the work on any part of the contract which was not reassigned. The contract price shall be decreased in proportion to the amount of the work which was reassigned. In the event that the city reassigns work, the city may deduct from payments due to the contractor and may claim against the contractor for costs incurred by the city, including without limitation reasonable attorney fees in effecting the reassignment.

1007. CONTRACT TERMINATION FOR REASONS BEYOND THE CONTROL OF THE CONTRACTOR OR THE CITY

In the event that the work cannot be completed within the time set forth in the contract because of conditions or circumstances beyond the control of either the city or the contractor, such as, without limitation, an executive order of the president of the United States with respect to the prosecution of war or in the interest of national defense or an order of any state or federal court prohibiting the construction of the project, the city, acting by and through its city manager and project manager, may terminate the contract or any portion thereof by giving at least seven (7) days written notice to the

contractor. When the contract is terminated under this section before completion of the work in the contract, payment will be made for the actual items of work completed at the contract price. For items which are only partially completed, the city shall pay for the portion of the item actually completed. The contractor also shall be awarded compensation for costs associated with materials which must be returned, rental contracts which the contractor has entered into but may not terminate, and other reasonable costs which the contractor legitimately incurs as a result of the termination. If the contractor disputes the project manager's valuation of work completed, the contractor may appeal pursuant to section 125. Acceptable materials, obtained or ordered by the contractor for the project but not yet incorporated in the work at the time of such termination, may at the option of the city be purchased from the contractor at actual cost as shown by receipted bills and actual cost records at the point of delivery. The intent of this section is to provide a method of equitable settlement with the contractor in the event of termination of the contract because of conditions or circumstances beyond the control of either the city or the contractor. It is also intended by this section that a settlement for the work performed shall not relieve the contractor or its surety from responsibility for defective work and/or materials on the completed portion of the work nor for payment for labor and materials as guaranteed by the surety bond or bonds.

1008. TERMINATION OF CONTRACT FOR CONVENIENCE

The performance of work under this contract may be terminated by the city in whole or in part whenever for any reason, in its sole discretion, the city shall determine that such termination is in the best interest of the city or whenever the city is prohibited from completing the work because of conditions beyond the control of either the city or the contractor. Such termination shall be effected by giving not less than three (3) days written notice to the contractor specifying the extent to which performance of work under this contract is terminated and the date upon which such termination becomes effective.

Upon receipt of notice of such termination, the contractor shall:

A. Stop work as specified in the notice;

B. To the fullest extent possible, terminate all orders and subcontracts except as necessary to complete work which is not terminated;

C. If directed by the city, assign all right, title and interest in subcontracts and materials in progress, as long as the contractor is released from all prospective liability to subcontractors and suppliers, in which case the city will have the right, in its discretion, to settle or pay any and all claims arising out of the termination of such subcontracts;

D. Negotiate or otherwise settle outstanding liabilities and claims with the approval of the city or its designated representative and, upon receipt of all payments due from the city for termination for convenience, pay the amounts that were agreed upon in the settlements;

E. Complete performance of such part of the work as has not been terminated; and

F. Take such other actions as may be necessary, or as may be directed by the city, for the protection and preservation of the property related to the contract.

Except as provided above, any inventory resulting from the termination of this contract may, with written approval of the city, be sold or acquired by the contractor under the conditions prescribed by and at prices approved by the city. Upon receipt of the notice of such termination, the contractor shall submit to the city a request for payment of its termination costs, in the form and with any reasonable certification prescribed by the city. Such request shall be submitted promptly but in no event later than six (6) months from the effective date of termination, unless extended in writing by the city upon the written request of the contractor within such six (6) month period. If the city determines that the facts justify it, a request may be received and acted upon after six (6) months.

The contractor shall be entitled to receive reimbursement for the reasonable cost of the work as of the date of termination, including a release of retainage. The city will additionally reimburse the contractor for other reasonable costs resulting from said termination such as restocking charges and protection of the work. The contractor shall not be entitled to loss of other anticipated profits, profits lost on other work not obtained or any other consequential damages, or any reimbursement for any costs incurred due to the contractor's fault or failure to mitigate as a result of any such termination for convenience, and in no event shall the total sums paid the contractor exceed the contract price.

In arriving at the amount due the contractor under this section, there shall be deducted:

A. All unliquidated advance or other payments theretofore made to the contractor, applicable to the terminated portion of this contract;

B. Any claim which the city may have against the contractor in connection with this contract;

C. The agreed price for, or the proceeds of sale of, any materials, supplies or other things acquired or sold by the contractor or sold pursuant to the provisions of this article not otherwise recovered by or credited to the city; and

D. Any outstanding subcontractor claims.

The city may, from time to time, under such terms and conditions as it may prescribe, authorize partial payments and payments against costs incurred by the contractor for the terminated portion of the contract, if it is estimated that the total of such payments will not exceed the amount to which the contractor will be entitled. If the total of such payments is in excess, the excess shall be payable by the contractor to the city upon demand.

A settlement for the work performed shall not relieve the contractor or its surety from responsibility for defective work and/or materials on the completed portion of the work or for the payment of labor and materials as guaranteed by the payment and performance bonds.

Upon reasonable notice to the contractor the city shall be given full access to all books, correspondence, records and other materials of the contractor relating to this contract in order to

determine the amounts to be paid on account of the termination of the contract. The contractor shall, as requested by the city furnish clear copies of any such materials.

1009. CITY SHALL HAVE ACCESS TO CONTRACTOR'S RECORDS

Upon reasonable notice to the contractor the project manager shall be given full access to all books, correspondence, and papers of the contractor which are necessary to determine the amounts to be paid on account of the termination of the contract, or for any other application for payment made by the contractor, or to determine the amounts paid by the contractor to subcontractors or suppliers or their agents, employees, or assigns.

1010. ACCOUNTING OF COSTS AND AUDIT

Contractor shall keep and maintain and shall contractually require its subcontractors and outside consultants to keep and maintain books, records, accounts and other documents (hereinafter collectively referred to as "records") that are sufficient to accurately and completely reflect all costs incurred pursuant to this contract, including costs which may be the basis of a contractor's request for a change in the contract or a claim by the contractor. Such records shall include the bid estimate and all bid work papers and take-offs, receipts, memoranda, vouchers, and accounts of every kind and nature pertaining to the performance of the work, including, but not limited to, job cost ledgers, invoices from and payments to subcontractors and material suppliers, records of home and field office overhead, as well as complete summaries and reports setting forth all reimbursable personnel-hours expended and payroll and equipment records. All such records shall be kept for three (3) years from the date of final completion.

The city and any firm of auditors retained by the city shall have access, upon reasonable advance notice in writing, to all such records maintained by contractor and its subcontractors and consultants, for the purpose of auditing and verifying contractor's costs or any other costs claimed to be due and payable hereunder.

The contractor shall include in all subcontracts, consulting agreements and any other agreements entered into by contractor for the performance of the work a provision to the effect that its subcontractors, consultants or other parties shall observe and comply with all the obligations of contractor under this provision in the same manner and to the same extent as the contractor.

1011. CONTRACTOR MAY TERMINATE THE CONTRACT

The contractor may terminate the contract for any of the following reasons:

A. The work is suspended for more than three (3) months by the city for its own convenience under section 1003 or by an order of a court or other public authority, provided the suspension does not result from an act or omission of the contractor.

B. The project manager fails to act on a properly completed and substantiated application for payment within twenty (20) days after it is submitted by the contractor.

C. The city fails to issue a check or warrant to the contractor within thirty (30) days after payment is approved by the project manager.

If any of these conditions exist, the contractor shall, ten (10) days after service of written notice on the project manager, terminate the contract. The city shall have the right to remedy and/or cure the problem prior to expiration of the 10 day period. In such event, the contractor shall be entitled to payment for all work executed based on the proportion of the work completed. When the contract is terminated before completion of all items of work in the contract, payment will be made for the actual items of work completed at the contract price. For items which are only partially completed the city shall pay for the portion of the item actually completed. The contractor may appeal such determination pursuant to section 125.

1012. CONTRACTOR MAY SUSPEND WORK

In lieu of terminating the contract under section 1011, if the city fails to issue a check or warrant for payment more than thirty (30) days after approval by the project manager, the contractor may, seven (7) days after service of notice on the project manager, suspend the work until payment is received. If the contractor makes such election and later resumes the suspended work, the city shall be liable to the contractor for extra start-up costs which result from resuming the suspended work.

1013. NO ARBITRATION

Except as may otherwise be provided in the special conditions or by law, or agreed to by the city, no claims, disputes, or other disagreements arising out of the contract or work performed under the contract shall be decided by arbitration. If at any time during the performance of the work the city and contractor agree to submit a dispute to arbitration, then the dispute shall be decided in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect. Unless otherwise agreed in writing, the contractor shall carry on the work and maintain its progress during the arbitration proceedings, and the city shall continue to make payments to the contractor in accordance with the contract documents.

1014. MEDIATION

If disputes remain unresolved after negotiations between the city and the contractor, the parties shall submit the disputes to nonbinding mediation. The mediator shall be a trained mediator with experience on municipal construction projects. The parties shall attempt to jointly select the mediator from a list of proposed mediators generated by the parties. The parties may seek the assistance of the American Arbitration Association in generating a list of potential mediators. In the event that the parties are unable to agree on a mediator, the Chief Judge of Boulder District Court should appoint one. Each party shall bear its own costs associated with presenting any disputes to the mediator, which costs shall not be recoverable as part of a change order or in any subsequent litigation or arbitration.

No decisions or statements of the mediator may be admitted as evidence in any subsequent litigation or arbitration between the parties nor may the mediator be called to testify in any litigation or arbitration between the parties concerning such disputes.

The submittal of disputes to non-binding mediation shall be a condition precedent to commencing litigation or arbitration by either party.

In the event any dispute, mediation, arbitration, or litigation arises under this contract and during the time such dispute, mediation, arbitration, or litigation is pending, the contractor shall continue performance under this contract in accordance with the terms and conditions hereof. The failure of the contractor to continue expeditious performance due to a dispute arising under this contract shall, at the option of the city, be construed as a material breach of this contract justifying termination or such other action as the city deems appropriate.

APPENDIX 1: DEFINITIONS

1. Abnormal Weather. Snowfall, rainfall, freezing temperatures, or excessive wind conditions, which cause a delay in the contractor's performance. *See* section 405(C).

2. Addenda. Written or graphic instruments issued prior to the execution of the contract agreement which modify or interpret the contract documents by additions, deletions, clarifications, or corrections.

3. Architect or Engineer (A/E). As used herein, AA/E@ refers to an architect or engineer hired by the city to design or supervise the work. The duties of the A/E are set forth further in section 113. The contractor may only rely on instructions or communications issued by the project manager and may not rely on instructions or communications of the A/E, unless they are ratified in writing by the project manager.

4. Bid Bond. The security furnished by the bidder as a guarantee of good faith to enter into a contract with the owner if the work is awarded to him. The bid bond is set forth as Form 1.

5. Bidder. Any individual, firm, or corporation submitting a proposal for the advertised work.

6. Bidding Instructions The instructions set forth in article 2 herein.

7. Bid Proposal. The form supplied by the city for the submission of bids. The bid proposal, special conditions, contract agreement, and drawings and specifications are bound in one volume, pursuant to section 212.

8. Boulder Revised Code (B.R.C.). The Boulder Revised Code, which is referred to herein as "B.R.C. 1981," is the code of ordinances adopted by the City of Boulder. This code may be reviewed at the Boulder Public Library, which is located at 1000 Canyon Boulevard, Boulder, Colorado and is also available on line at www.bouldercolorado.gov.

9. Calendar Day. Any day of the week, including Saturdays, Sundays, and city-observed holidays.

10. Calendar Week. A week which begins on Monday and ends on Sunday.

11. Change Order. A written order, set forth as Form 9, issued by the project manager to the contractor, covering changes in the plans or quantities within the scope of the contract and establishing the basis of payment and time adjustments for the work affected by the changes. The contract price and the contract time for performance may only be amended by a change order signed by the project manager.

12. City. This term shall mean the City of Boulder, Colorado, a municipal corporation organized under and by virtue of Article XX of the Constitution of the State of Colorado.

13. City Attorney. The city attorney of the City of Boulder, Colorado, who must sign the contract agreement for it to be effective, and alone has authority to authorize changes to the

general conditions of the contract. The city attorney may be contracted at Office of the City Attorney, P.O. Box 791, Boulder, Colorado 80306; telephone, 303-441-3020.

14. City Manager. The city manager of the city of Boulder, Colorado, who alone has the authority to solicit bids for a contract and must sign the contract agreement for it to be effective. The contractor may appeal decisions by the project manager to the city manager pursuant to section 125, as set forth in the general conditions. The city manager may be contacted at the Office of the City Manager, P.O. Box 791, Boulder, Colorado 80306; telephone 303-441-3090.

15. Colorado Revised Statutes (C.R.S.). The Colorado Revised Statutes, which are referred to herein as AC.R.S.,@ are the statutes adopted by the State of Colorado. If necessary, the contractor may review these statutes at the Office of the City Attorney, P.O. Box 791, Boulder, Colorado 80306; telephone, 303-441-3020.

16. Construction Bonds. The approved form of security, executed by the contractor and the contractor's surety(s), which guarantee complete execution of the contract and all supplementary agreements pertaining thereto, and the payment of all legal obligations pertaining to the performance of the work.

17. Contract. The entire agreement between the contractor and city. The term is used generally, and does not refer to any particular document.

18. Contract Agreement. The written agreement between the city and the contractor who has been awarded the bid. The contract agreement set forth in Form 5.

19. Contract Completion Date. The contract completion date shall be the day that the contractor passes final inspection, as set forth on Form 14. *See* section 715.

20. Contract Documents. All written documents which define the construction work and the obligations of the city and contractor in performing the work. The contract documents consist of the materials set forth in section 103.

21. Contract Performance Period. The contract performance period runs from the date the notice to proceed is issued until the certificate of substantial completion (Form 12) is issued by the project manager.

22. Contract Price. The amount which the contract agreement states the city shall pay the contractor for its work under this contract, as that amount may be adjusted by change orders.

23. Contractor. The individual, firm, or corporation with whom the city contracts for the performance of the work. This term also means the construction manager.

24. Day. As used herein, the term "day" shall apply to a day between Monday and Friday, excluding Saturdays, Sundays, or city-observed holidays.

25. Default. A breach of the contract term(s) and conditions.

26. Drawings and Specifications. All documents approved by the city for the purpose of describing the work under the contract. *See* sections 107, 120, and 206 for further information.

27. Extra Work. Work not provided for in the contract documents but found desirable to include in the contract because of timing, mobilization, or other factors. *See* section 808.

28. Field Orders. A writing issued by the project manager to explain or clarify any of the drawings and specifications or other contract documents. The contract price or period for performance can not be amended by a field order. *See* section 709 and Form 10.

29. Final Settlement. The date of final settlement shall be the day upon which the project manager authorizes final payment to the contractor. The date of final settlement may be the same date as the contract completion date (*see* definition (19) herein), but may not occur before the contract completion date.

30. Finance Director. The finance director of the City of Boulder, Colorado, who must sign the contract agreement for it to be effective. The finance director's duties are outlined further in the general conditions. The finance director may be contacted at the Office of the Finance Director, P.O. Box 791, Boulder, Colorado 80306; telephone, 303-441-3042.

31. General Conditions. The sections set forth in this document. The general conditions may be amended by the city attorney.

32. Growing Season. The growing season for plant materials planted or altered by the contractor (*see* sections 617 and 618) shall begin April 1 and end August 31.

33. Laws. As used herein, "laws" shall include, without limitation, all applicable federal, state, and city codes, charters, ordinances, standards, statutes, rules, and regulations.

34. Notice of Award. The document which certifies that the contractor has been selected to perform the work. *See* section 301 and Form 4.

35. Notice to Proceed. The date of purchase order issued by the purchasing agent is the official notice to proceed. It shall be the beginning date of the contract for purposes of determining the contract performance period and liquidated damages.

36. Project Inspector. An authorized representative of the city assigned to make inspections of the work performed and the materials furnished by the contractor. The inspector's duties are outlined further in article 7. The inspector has no authority to vary any of the terms of the contract documents.

37. Plans. All city-approved drawings or reproductions pertaining to the construction of the work and appurtenances thereof.

38. Project. The entire work which the contractor has been hired to perform under the contract documents. The project shall be identified by a project number. The project shall also include extra and force account work.

39. Project Manager. The city employee who shall supervise the implementation of the contract and represent the city in all matters and questions arising under the contract. *See* section 111. The project manager's duties are also set forth further in other sections of the general conditions.

40. Purchase Order. The purchase order is the document issued by the city purchasing department which commits the payment of city funds for the work. The purchase order is also the notice to proceed, which is the official beginning date of the contract.

41. Purchasing Agent. An employee of the city purchasing division. The purchasing agent's signature is required on the contract (Form 5) and on all change orders (Form 9) in which the contract price is adjusted. The purchasing agent may be contacted at the Purchasing Department, P.O. Box 791, Boulder, Colorado 80306; telephone, 303-441-3060.

42. Special Conditions. Additions or revisions to the general conditions which refer to special aspects of particular contracts. In case of conflict, special conditions supersede general conditions, pursuant to section 105.

43. Specifications. A general term applied to all directions, conditions, requirements, and written agreements which pertain to the method and manner of performing the work, or to the quantities and qualities of materials to be furnished under the contract.

44. Subcontractor. An individual, firm, or corporation to whom the contractor sublets part of the contract but not including one who only furnishes material.

45. Substantial Completion. The date of substantial completion of the work or designated portion thereof is the date certified by the project manager when construction is substantially complete in accordance with the contract documents. *See* Form 12 and section 713.

46. Superintendent. The individual designated by the contractor to act on behalf of the contractor in all matters related to the contract. Unless otherwise agreed, the superintendent shall serve on a full time basis. *See* section 507.

47. Surety. The corporation, partnership, or individual, other than the contractor, which executed a bond or bonds with the contractor guaranteeing the complete execution of the contract and all supplementary agreements pertaining thereto.

48. Work. The completed construction required by the contract documents including all labor, materials, and equipment necessary to produce such construction. Work not covered by the contract documents will not be required unless it is consistent therewith and is reasonably necessary to produce the results intended in the contract documents.

49. Work Directive. A Work Directive, set forth in Form 8, authorizes the contractor to proceed with the extra work. Work Directives shall serve as the basis for negotiating subsequent change orders.

50. Work within the Scope of the Contract. Work which is identified in the bid proposal or other contract documents or which is not identified in the bid proposal or other contract documents but which is necessary for satisfactory prosecution and completion of the work is work, within the scope of the contract. The contractor will not be awarded extra compensation or a time extension for performing work which is within the scope of the contract.

51. Written Notice. Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by certified mail to the last business address known to the party who gives the notice.

COLORADO
DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISIONS
Wonderland Creek Greenways Improvements

The 2011 Standard Specifications for Road and Bridge Construction controls construction of this project. The following special provisions supplement or modify the Standard Specifications and take precedence over the Standard Specifications and plans.

PROJECT SPECIAL PROVISIONS

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Revision of Section 106 – Certificates of Compliance and Certified Test Reports	(February 3, 2011)	1
Revision of Section 106 – Hot Mix Asphalt – Verification Testing	(July 29, 2011)	2
Revision of Section 106 – Material Sources	(October 31, 2013)	1
Revision of Section 106 – Supplier List	(January 30, 2014)	1
Revision of Sections 106, 627 and 713 - Glass Beads for Pavement Marking	(February 8, 2013)	2
Revision of Section 107 – Contractor Obtained Stormwater Construction Permit	(July 31, 2014)	1
Revision of Section 107 – Project Payrolls	(May 2, 2013)	1
Revision of Section 107 - Responsibility for Damage Claims, Insurance Types, and Coverage Limits	(February 3, 2011)	1
Revision of Section 107 – Warning Lights for Work Vehicles and Equipment	(January 30, 2014)	1
Revision of Section 108 – Delay and Extension of Contract Time	(April 30, 2015)	2
Revision of Section 108 – Liquidated Damages	(May 2, 2013)	1
Revision of Section 108 – Notice to Proceed	(July 31, 2014)	1
Revision of Section 108 – Project Schedule	(July 31, 2014)	6
Revision of Section 108 – Subletting of Contract	(January 31, 2013)	1
Revision of Sections 108 and 109 - Payment Schedule (Multiple Construction Years)	(Nov. 15, 2013)	1
Revision of Section 109 – Compensation for Compensable Delays	(May 5, 2011)	1
Revision of Section 109 – Measurement of Quantities	(February 3, 2011)	1
Revision of Section 109 – Measurement of Water	(January 6, 2012)	1

Revision of Section 109 – Prompt Payment	(January 31, 2013)	1
Revision of Section 109 – Fuel Cost Adjustment Asphalt Cement Cost Adjustment (Asphalt Cement Paid Separately)	(April 5, 2013)	2
Revision of Section 203 – Imported Material for Embankment	(February 3, 2011)	2
Revision of Sections 203, 206, 304 and 613 - Compaction	(July 19, 2012)	2
Revision of Section 206 – Imported Material for Structure Backfill	(July 19, 2012)	2
Revision of Section 206 – Structure Backfill (Flow-Fill)	(April 26, 2012)	2
Revision of Section 206 – Structure Backfill at Bridge Abutments	(January 30, 2014)	1
Revision of Section 206 – Backfilling Structures that Support Lateral Earth Pressures	(July 29,, 2011)	1
Revision of Section 208 – Aggregate Bag	(January 31, 2013)	1
Revision of Section 208 – Erosion Control Supervisor	(April 30, 2015)	1
Revision of Section 208 – Erosion Log	(January 31, 2013)	1
Revision of Section 212 – Seed	(April 26, 2012)	1
Revision of Section 213 – Mulching	(January 31, 2013)	4
Revision of Section 216 – Soil Retention Covering	(January 30, 2014)	6
Revision of Section 250 –Environmental, Health, and Safety Management	(January 15, 2015)	14
Revision of Section 401 – Compaction of Hot Mix Asphalt	(April 26, 2012)	1
Revision of Section 401 – Compaction Pavement Test Section (CTS)	(July 19, 2012)	1
Revision of Section 401 – Plant Mix Pavements	(February 3, 2011)	1
Revision of Section 401 – Reclaimed Asphalt Pavement	(May 2, 2013)	2
Revision of Section 401 – Reclaimed Asphalt Shingles	(April 26, 2012)	3
Revision of Section 401 – Temperature Segregation	(February 3, 2011)	1
Revision of Section 401 and 412 – Safety Edge	(May 2, 2013)	2
Revision of Section 412 – Portland Cement Concrete Pavement Finishing	(February 3, 2011)	1
Revision of Section 412, 601, and 711 – Liquid Membrane Forming Compounds for Curing Concrete	(May 5, 2011)	1
Revision of Section 507 - Grouted Riprap Slope and Ditch Paving	(November 6, 2014)	1
Revision of Section 507, 601, and 606 – Macro Fiber-Reinforced Concrete	(May 2, 2013)	1
Revision of Section 601 – Concrete Batching	(February 3, 2011)	1
Revision of Section 601 – Concrete Finishing	(February 3, 2011)	1
Revision of Section 601 – Concrete Form and Falsework Removal	(July 28, 2011)	2
Revision of Section 601 – Concrete Slump Acceptance	(July 29, 2011)	1
Revision of Section 601 – Fiber-Reinforced Concrete	(May 2, 2013)	1
Revision of Section 601 - Structural Concrete Strength Acceptance	(April 30, 2015)	1
Revision of Section 601 and 701 – Cements and Pozzolans	(November 6, 2014)	4
Revision of Sections 603, 624, 705, 707 and 712 - Drainage Pipe	(April 30, 2015)	3
Revision of Section 612 – Delineators	(February 3, 2011)	1
Revision of Section 620 – Field Laboratories with Ignition Furnace	(February 3, 2011)	1
Revision of Section 627 and 708 – Pavement Marking Paint	(January 31, 2013)	2

Revision of Section 630 – Construction Zone Traffic Control	(February 17, 2012)	1
Revision of Section 630 – Retroreflective Sign Sheeting	(May 8, 2014)	1
Revision of Section 703 - Aggregate for Bases	(October 31, 2013)	1
Revision of Section 703 – Aggregate for Hot Mix Asphalt	(November 1, 2012)	2
Revision of Section 703 – Concrete Aggregate	(July 28, 2011)	1
Revision of Section 712 – Geotextiles	(November 1, 2012)	2
Revision of Section 712 – Water for Mixing or Curing Concrete	(February 3, 2011)	1
Disadvantaged Business Enterprise (DBE) Requirements	(Dec. 26, 2013)	9
Affirmative Action Requirements – Equal Employment Opportunity	(February 3, 2011)	10
Minimum Wages, Colorado U. S. Department of Labor General Decision Number C0150017, Highway Construction for Boulder County	(January 9, 2015)	4
On the Job Training	(July 29, 2011)	3
Partnering Program	(February 3, 2011)	1
Railroad Insurance	(February 3, 2011)	1
Required Contract Provisions – Federal-Aid Construction Contracts	(October 31, 2013)	14

The following forms are included and shall be submitted with all contractor's bids. Bids will not be accepted if these forms are not included. Form 606- Anti-Collusion affidavit (shall be fully executed prior to bid opening) Form 1413- Bidders List Form 1414- Anticipated DBE Participation Plan Post Bid Forms (These Forms are required to be submitted within five days of being apparent low bidder): Form 605 – Contractors Performance Capability Statement Form 621 – Assignment of Antitrust Claims Form 1415- Commitment Confirmation (if the DBE goal>0) Form 1416- DBE Good Faith Effort Documentation (if the DBE goal is not met).

Attachments:

Federal Forms (see listing described above)
Geotechnical Reports: (3 Included)
Permits and Agreements: BNSF Agreements, BWRD Agreement, 404 Permit, 4F Permit, City of Boulder Wetland Permit, and 401 WQ Certification, Wonderland Creek Conditional Letter of Map Revision (CLOMR) Approval Letters.

NOTICE TO BIDDERS

The proposal guaranty shall be a certified check, cashier's check, or bid bond in the amount of 5 percent of the Contractor's total bid.

A mandatory pre-bid meeting will be held for this project. The meeting will include a mandatory site visit following the pre-bid meeting. Bids will be accepted only from pre-qualified bidders who attend the mandatory pre-bid conference. All questions shall be directed to the City contact listed below no later than two weeks prior to the bid opening:

City of Boulder Project Engineer - Mr. Kurt Bauer, PE
City of Boulder
1739 Broadway, 2nd Floor
Boulder, CO 80306
Office Phone: 303-441-4232

The above referenced individual is the only representatives of the Department with authority to provide any information, clarification, or interpretation regarding the plans, specifications, and any other contract documents or requirements.

Questions received from bidders along with City responses will be posted on the Rocky Mountain E-purchasing website as they become available. Questions and answers shall be included as an addendum to the bid documents and shall be considered part of the Contract.

If the bidder has a question or requests clarification that involves the bidder's innovative or proprietary means and methods, phasing, scheduling, or other aspects of construction of the project, the City Project Engineer will direct the bidder to contact the Project Engineer directly to address the question or clarification. Both the City Project Engineer and the Project Engineer will keep the bidder's innovation confidential and will not share this information with other bidders.

The City Project Engineer will determine whether questions are innovative or proprietary in nature. If the City Project Engineer determines that a question does not warrant confidentiality, the bidder may withdraw the question. If the bidder withdraws the question, the City will not answer the question and the question will not be documented on the City web site. If the bidder does not withdraw the question, the question will be answered, and both the question and City answer will be posted on the web site. If the City Project Engineer agrees that a question warrants confidentiality, the City Project Engineer will answer the question, and keep both question and answer confidential. The City will keep a record of both question and answer in their confidential file.

CITY OF BOULDER- SPECIAL CONDITIONS

1. **STANDARD SPECIFICATIONS AND DETAILS** – All work shall be done in accordance with the most recent edition of the Colorado Department of Transportation's "Standard Specifications for Road and Bridge Construction", and the most recent edition of the City of Boulder's "Design and Construction Standards" (which controls in case of a conflict), except has herein modified. Design and Construction Standards can be viewed and/or printed in Acrobat and/or AutoCAD format from the City's website at https://bouldercolorado.gov/plan-develop/design-construction-standards.
   All contractors bidding on this project are responsible for acquainting themselves thoroughly with all applicable specifications prior to submitting their bid. The successful bidder is responsible for thoroughly acquainting all of the personnel he intends to use on this project with all applicable specifications prior to the commencement of any construction.

2. **ADDITIONAL WORK PAID BY FORCE ACCOUNT –** The Contractor shall do no work on a force account basis without prior approval of the Engineer, and shall inform the Engineer in advance before commencing work on each and every item of force account work. The Engineer may require a written estimate from the Contractor of force account work that is contemplated. No force account work shall be done until the Engineer approves such written estimates. If a dispute arises over what constitutes force account versus contract work, and the plans and specifications are not clear, the Engineer shall make the final determination as to how the item in question shall be paid for.

   Force account work shall be compensated for as per subsection 109.04 of the Standard Specifications.

3. **CONTRACTOR'S PERSONNEL – JOB SITE CONDUCT –** The Contractor and his workers shall maintain a civil decorum throughout the term of this contract. Any workers, who make catcalls, harass, argue with, or otherwise act in an antisocial manner toward citizens or City representatives will be immediately and permanently removed from the job site by the Contractor upon direction to do so by the Engineer. If the Contractor fails to heed the City's order in such an instance, the City, at its sole discretion, may immediately terminate this contract, and offer it to the next lowest bidder; or the City, again at its sole discretion, may impose liquidated damages, in the amount specified in the General Conditions, for each and every day the Contractor permits such workers to remain.

4. **JOB SITE SAFETY –** The Contractor shall conduct his operations in a safe manner at all times. All OSHA regulations and all other pertinent regulations pertaining to the safe operation of construction equipment, workers, methods, and the JOB SITE shall be strictly adhered to by the Contractor.

5. **UTILITY STRUCTURE ACCESS –** The Contractor is responsible for locating all water valves, manholes, monument boxes, traffic pull boxes, etc. prior to construction. All costs associated with locating and raising valve boxes, manholes, monument boxes, traffic pull boxes, etc. if paved over will be deducted from monies due the Contractor.

All water valves, manholes, etc. must be brought to grade during the paving operation. No sanitary sewer manholes or valves may be left inaccessible at any time during the construction process, except immediately during the paving operation.

All liabilities for damages arising from water valves or manholes being left inaccessible during construction, rest with the Contractor. All liabilities for damages arising from sanitary sewer, storm sewer, or private utility manholes or structures being plugged or rendered inoperable due to the Contractor's construction operations, rest with the Contractor.

6. **CONSTRUCTION JOINTS –** At all concrete construction joints, dowels consisting of #4 rebar shall be placed at 18 inch centers along the entire cold joint and be epoxied in place with a minimum embedment length of 6 inches. The dowels shall be placed at construction joints on all sidewalk, bike path, pavement and curb and gutter. The dowels will not be paid for separately but shall be included in the work. Refer to M-Standard M-412 for concrete pavement construction joints.

7. **ACCESS RAMP LOCATIONS –** The final location of all access ramps will be approved in the field by the City prior to pouring the ramp.

8. **PROJECT IDENTIFICATION SIGN –** The Contractor will be responsible for having two project signs manufactured and placed at each end of the project. The information on the signs shall be jointly determined by the City and the Contractor and approved prior to manufacturing the signs. The project identification signs shall be paid for under force account Item 700 – F/A Project Identification Sign.

9. **ACCESS REQUIREMENTS –** Access to driveways, pedestrian routes, adjacent homes and businesses shall be maintained at all times during construction. Temporary access detours may be allowed, if agreed by both the Engineer and the affected property, in advance of the work. Contractor shall coordinate access detours with the affected property owners and/or residents as may be required to function effectively. PLEASE SEE EASEMENT SPECIAL CONDITION BELOW FOR ADDITIONAL REQUIREMENTS.

   Construction and maintenance of temporary access ramps, paths or other temporary facilities at adjacent properties or through work zones shall be the responsibility of the Contractor. Depending on the frequency of use, the duration it is intended, and the overall performance of the temporary facility, the engineer may require the use of better performing materials (including asphalt) as appropriate.

   If access is required on a regular basis and high early concrete is required to maintain access, the Contractor shall place high early concrete at no additional cost to the project. The design mix for the high early concrete shall be approved prior to placement.

10. **SALES AND USE TAX –** The Contractor is required to become familiar with the portions of the Boulder Revised Code regarding this item. Contact Calder Grey at (303) 441-1857 for information on payment of sales and use tax.

11. **MILESTONES, WORK PERIOD LIMITATIONS, AND LIQUIDATED DAMAGES** The

Contractor is alerted to the existence of several milestones, disincentives, and liquidated damages in connection with this project. Each are briefly outlined below, and covered in greater detail elsewhere in these construction documents:

Violation of Working Time Limitations:
As detailed in Standard Special Provisions Section 105-Violation of Working Time Limitations.

Work not Complete by Contract Date:
The project is to be completed within two (2) years from Notice to Proceed. Contractor shall pay liquidated damages in accordance with CDOT specification 108.09.

Milestone Incentives/Disincentives:

1. The contractor shall complete the relocation of the Boulder and White Rock Ditch or an adequate temporary conveyance mechanism in place to be located outside of the BNSF ROW in the Vicinity of the new BNSF bridge location by November 1, 2015. See Section 28 for costs related to non-performance.
2. All temporary easements have a 6 month term for completing the work upon beginning access onto the easement property. The contractor shall complete work within the temporary easements within 6 months.
3. The Iris Avenue 16" existing steel water transmission line can only be worked on between October 31 and April 15 without approval from Engineer.

Any disincentives (liquidated damages) assessed against the Contractor for failure to meet contract deadlines, or for other reasons herein described, shall be deducted from monies due the Contractor on the monthly pay estimates.

12. **SEQUENCE OF WORK –** The project sequence for drainageway projects typically is completed beginning from the downstream limit and working upstream; however, this project has some priorities and sequencing limitations that are noted herein.
The first priority on the project is to get the Boulder and White Rock Ditch relocated outside the BNSF right of Way so that the new BNSF bridge can be constructed with no conflicts with the irrigation ditch and its operations. This relocation can be a temporary configuration as an interim solution if necessary.

    Due to existing floodplain configuration, the construction of the 28th Street crossing should not be constructed until the downstream improvements are completed or additional measures to temporarily block flow from being routed through the crossing shall be implemented.

13. **ADDITIONAL INSURED –** The City of Boulder, Urban Drainage and Flood Control District, BNSF Railroad, UCAR and the Colorado Department of Transportation as well as each Grantor of permanent and temporary easements for work on their property shall be listed as an additional insured on the Contractor's General Liability and Automobile Liability policies on this project.

14. **NO LOCAL CONTRACTOR PREFERENCE** – There will be no local contractor preference on this project.

15. **FEDERAL AID FORMS** – Colorado Department of Transportation (CDOT) Form No. 606, 1413, and 1414 shall be submitted with the bid proposal. The CDOT Form 347, Certification of EEO Compliance, is no longer required to be submitted in the bid package. This form certified that the contractor/proposed subcontractors were in compliance with the Joint Reporting Committee EEO-1 form requirements. The EEO-1 Report must still be submitted to the Joint Reporting Committee if the contractors and subcontractors meet the eligibility requirements (29CFR 1602.7); we will, however, no longer require certification. For additional information regarding these federal requirements, please refer to: http://www.eeoc.gov/stats/jobpat/e1instruct.html

    Additionally, CDOT Forms 605, 621, 1415, and 1416 are included for the low bidder and shall be completed and submitted five calendar days of being the lowest apparent bidder.

16. **CONTRACTOR QUALIFICATIONS** – All contractors shall submit a completed City of Boulder **Form #2** - Contractor/Subcontractor Qualification Form with their bid. This form requires a roster of previous client contacts and project experience information for a minimum of three projects within the past five years. This form will be checked by the City prior to project award for completeness, accuracy, applicability and acceptability (by references) for similar past work. The City may also use its own experience with a contractor as a reference – even if the City of Boulder is not listed as a reference on the Form #2.
    The Contractor shall also submit completed **Form 20** (Subcontractor Listing), and **Form 21** (Supplier Listing) with the bid. **Failure to submit these forms and to meet the aforementioned requirements may be grounds for rejection of the bid.**

17. **UTILITY POTHOLING –** All possible utility conflicts with underground construction, that are identified after getting utility locates in the field, shall be brought to the attention of the Engineer. Upon agreement by the Engineer that a particular utility should be potholed, the Contractor shall schedule the work, and shall be compensated under Item 203 - Potholing. The contract includes utility potholing days anticipating potholing efforts will be needed during construction. The Contractor shall notify the Project Manager of any resulting utility conflicts in a timely manner so that any necessary design adjustments can be made prior to the contractor ordering materials and/or suffering delay damages.

18. **WORKING DAY LIMITATIONS** – Section 108.08 of the CDOT Standard Specifications apply with regard to work on holidays and holiday weekends. Work days are defined as from 7:00 A.M. – 5:00 P.M., Monday through Friday and as outlined in Section 108.08 of the CDOT Standard Specifications and the City of Boulder General conditions sections 403 & 404 unless approved by the Engineer. Additionally, no work is allowed throughout the project limits on any working day before, or the day of either a CU graduation day or a CU football home games without prior approval of the Engineer.

19. **CONSTRUCTION SCHEDULE –** Within five (5) working days of project award, the Contractor and the Engineer shall meet to discuss project and the initial schedule. Prior to the preconstruction conference, the Contractor will furnish the City with a construction

schedule in the form of a CPM, indicating the planned dates of work for each salient item of work.
The schedule will be regularly discussed at weekly construction meetings (day and time to be determined).

Any time extensions requested by the Contractor shall be justified by demonstrating the impact of any delays on the critical path item of work at the time the delay took place, and comparing the final completion date to the previous case. See CDOT specification Section 108 (and revisions) for additional information and requirements.

20. **PAVEMENT MARKINGS** - All temporary pavement marking materials and installation shall be completed by the Contractor as specified below. All pavement markings shall be placed in accordance with CDOT Standard Specification, Section 627 – Pavement Marking.
Standards for application concerning line configurations and color designations shall be as shown in the Manual on Uniform Traffic Control Devices unless otherwise specifically authorized by the Engineer. The City will aid the Contractor with the layout of markings; however, the Contractor is responsible for the final placement and string lining. Any errors in marking made by the Contractor shall be physically removed and replaced at no expense to the City. "Painting over" or "blacking out" is not acceptable. The Engineer shall approve the method of removal and replacement in advance of this work.

All temporary pavement marking and removal required for pedestrian and vehicular traffic during the work shall be the responsibility of the Contractor. The Contractor shall supply the paint material for the temporary pavement markings, and install them according to an approved MHT and the City's traffic engineer. Depending on the sequence of the work, lane striping may require removal of temporary striping and replacement on more than one occasion. The removal of temporary pavement markings will not be paid for separately but shall be included in Item 627 Pavement Marking Paint (Waterborne). Maintenance of pavement markings, including repainting of striping, shall not be paid separately.

All permanent longitudinal lines (all widths, colors and patterns) shall be completed by the City, as designated in the plans, either preformed plastic pavement marking or epoxy pavement marking paint with glass beads according to Section 627.

21. **SAWCUT JOINTS IN SIDEWALK/BIKEPATH** – All Concrete Sidewalk and Bike paths wider than six (6) feet shall have contraction joints saw cut per the City of Boulder specifications. All joints shall be sealed in accordance with CDOT Standard M-412.

22. **SCHEDULING/SEQUENCING REQUIREMENTS –** The Contractor shall phase all work to minimize impacts to traffic and accommodate temporary construction easements. The Contractor shall complete all work which affects any mode of traffic in any given project area noted above before moving into the next project area. Additionally, the Contractor shall schedule and sequence the work so that the duration of pedestrian, bicycle and vehicular traffic interruptions in any given area are minimized. The Contractor shall work diligently from the time an existing area is first disturbed to completion (final grading), before moving to the next.

The intent of this specification is to reasonably minimize lane closure impacts to the traveling public and to minimize visual and operational impacts to local businesses by avoiding the appearance of an "unfinished" work area. All reasonable scheduling requests, which satisfy these intents, will be considered by the City.

23. **STORM SEWER HARDWARE –** All proposed storm drain inlets shall be constructed according to the City's standards and additionally shall be equipped with #16 Inlet and Type R Inlet manhole covers castings permanently cast with a trout emblem and "DISPOSE NO WASTE, DRAINS TO CREEK" or approved equal. The Contractor shall submit cut sheets/shop drawings for approval a minimum of ten (10) days prior to scheduled construction.

24. **PERMITS** – It is the responsibility of the Contractor to abide by all applicable Federal, State and local permits and codes. The Contractor shall thoroughly acquaint him/herself with the details of each before beginning work.

25. **Section 701 of the General Conditions is amended to read in its entirety as follows:**

701. CONTRACTOR'S WARRANTY AND GUARANTEE

The Contractor's shall guarantee all work for a period of two (2) years after the date of project acceptance.

Performance indicators and corrective actions for these items of work are detailed in the corresponding sections of the contract documents.

If within ten (10) days after written notice by the project manager to the contractor, or its agent, requesting corrective actions pursuant to the contract documents, the contractor shall neglect to make or undertake with due diligence to do the same, the city may make corrective actions in accordance with the terms of the contractor's performance bond at the contractor's and/or surety's expense, provided, however, that in the case of emergency where, in the judgment of the project manager, delay would cause serious loss or damage, corrective actions may be made without notice being sent to the contractor.

The contractor warrants and guarantees to the city that all materials and equipment will be new, unless otherwise specified, suitable for the purpose intended and will be of the highest quality, new, merchantable, and fit for the purpose for which they are intended.

Contractor further warrants that it has full title to all equipment, components and other items conveyed to the city under the terms of this contract, that its transfer of such title to the city is rightful and that all such equipment, components and other items shall be transferred free and clear from all security interests, liens, or encumbrances, whatsoever. The contractor agrees to warrant and defend such title against all persons claiming the whole or any part thereof at no cost to the city.

All subcontractors', manufacturers' and suppliers' warranties and guarantees, expressed or implied, for any part of the work and any materials used therein, shall be obtained by the contractor for the benefit of the city whether or not such warranties have been assigned or otherwise transferred to

the city. The contractor shall assign or transfer such warranties and guarantees to the city if the city requests the contractor to do so.

The duties and obligations imposed by these general contract conditions and the rights and remedies available hereunder and, in particular but without limitation, the warranties, guarantees and obligations imposed upon the contractor and the remedies available to the city thereunder, shall be in addition to and not a limitation of any otherwise imposed or available by law, by special guarantee or other provisions of the contract documents.

Nothing herein shall be construed to establish a period of limitation with respect to any other obligation which the contractor might have under the contract documents. The establishment of the warranty period set forth above relates only to the specific obligations of the contractor to correct known defects in the work which are discovered and called to the contractor's attention during the warranty period, and has no relationship to the time within which its obligation to comply with the contract documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the contractor's liability with respect to its obligations and resulting damages. Nothing herein shall limit the city's right to seek recovery for latent defects which are not observable until after the warranty periods have run.

The contractor shall repair or replace all damaged or defective work immediately upon discovering any damage or defect, provided such damage or defect is not due to a design error caused by the city or an A/E hired by the city or an agent or employee thereof. The contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the construction manager, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage to the extent the above do not arise out of contractor's action or failure to act. The contractor shall promptly, without cost to the city and in accordance with the project manager's written instructions, either correct such defective work, or, if it has been rejected by the city, remove it from the site and replace it with non-defective work. The contractor's guarantee shall cover all materials and equipment incorporated in the work, and shall cover the work of the contractor and any subcontractors and their employees and agents engaged in the work.

As used in this contract, the terms "warranty" and "guarantee" shall be synonymous, and the terms "warranty period" and "guarantee period" shall be synonymous.

26. **WORK WITHIN BNSF RAILROAD ROW** – Any work within the RR right of way will require authorization from and coordination with the railroad as outlined in Exhibits "C" and "C-1". Flagging, PPE and all other requirements based on that Exhibit will be included in the contract price by the contractor. Any incidental costs based on BNSF requirements will also be paid for by the contractor. The contractor shall comply with the railroad's safety procedures and insurance obligations. The City will maintain and repair but not own the BWRD at its sole cost and expense.
Exhibit "C" (attached) are the BNSF requirements of the contractors on site

EXHIBIT "C-1" (attached) is an agreement between BNSF RAILWAY COMPANY and the CONTRACTOR and needs to be signed at bid time.

27. **BOULDER WHITE ROCK DITCH**

The Boulder and White Rock Irrigation Ditch ("Ditch") runs through the project site and requires relocation as part of the project scope. The Ditch historically carries water from March 1 through December 31, but can carry irrigation water year-round. In addition, the Ditch carries stormwater runoff year-round. The BNSF Railroad has the ability to construct a new bridge from February 1, 2016 to April 1, 2016. As a result, the contractor must have the new Boulder and White Rock irrigation ditch section realigned by January 31, 2016 or an adequate temporary conveyance mechanism in place unless an agreement is made with the railroad to modify this timeframe for construction of the railroad bridge. In addition, the contractor must stay out of the BNSF railroad right of way, with the exception of necessary work to tie in the new section of realigned ditch until the new railroad bridge is constructed.

It is the Contractor's responsibility to maintain uninterrupted irrigation water flow (135 cfs), and to continuously maintain storm water runoff for the entire duration of the contract. Contractor is required to construct a bypass mechanism to accommodate water to bypass around the Contractor's work area in an uninterrupted manner for the entire flow within the ditch up to the full capacity of the ditch at the location of the Contractor's work area. The Contractor shall submit a written method statement regarding his/her anticipated means of handling irrigation and stormwater flows a minimum of ten days prior to beginning work. Included in this statement shall be all pertinent drawings, details and calculations, including pipe sizes, grades and/or pump sizing (as well as max flow capacity) work schedule etc.

The City entered into an agreement with the Boulder and White Rock Ditch and Reservoir Company ("Ditch Company") dated the June 18, 2015 to allow for construction of improvements over, under and along the Ditch. In the event the bypass mechanism fails and the work results in an increase to the historical carriage or transit loss, the Contractor agrees to make any repairs to prevent the additional loss of water. In the event that the work causes loss of water to the Ditch Company due to any action of the Contractor, the Contractor agrees to replace any lost water to the Ditch Company. Replacement of water needs to be in the same irrigation season that the water is lost. The Contractor will first make a good-faith effort to obtain replacement water from sources other than the City. If no other sources are available to the Contractor, the City will lease use of replacement water to the Contractor from City water supplies to the extent such water supplies are available for lease in the City's sole discretion.

The contractor shall notify the City representative 10 days preceding work on the ditch and the City shall notify the ditch company five days preceding work on the ditch. If the construction of the facilities interrupts the Ditch Company's water supplies for any reason, the contractor shall pay as liquidated damages $10,000.00 per day for any day that the Ditch Company has requests for water from shareholders and cannot deliver water to such shareholders as a result of the construction of the Facilities. The ditch company will inspect and approve the new Ditch channel and has until June 1, 2016 for this inspection.

28. **EASEMENTS** – The project is being constructed utilizing various permanent and temporary easements. Please refer to the easement at each location for exact provisions. Temporary easements are for a 6 month duration and work shall be completed in that time once started. Every temporary construction easement (TCE) requires the contractor/city to give the owner 10 days' notice of the city's intent to occupy the TCE, and that most if not all expire six months from the date of that notice.

- **ARE-LEI (formally owned by Boulders Apartments Colorado, LLC) – PE-1 and TE-1 Temporary Construction Easement**
  i. Temporary Construction Easement expires 3 years after the date signed on the TCE document if construction has not commenced.
  ii. Access, Parking and Staging. The City's rights of ingress to and egress from Grantor's Property shall be limited to the locations and pathways described in the Easement Area. The City shall have the exclusive right to use up to eight (8) parking stalls within the Easement Area for the parking of contractor vehicles and the storage of construction equipment. The City shall be solely responsible for relocating the existing fencing of the dog park on the Grantor Property to the western edge of the Easement Area during the term of this easement agreement.
  iii. Retained Uses by Grantor. During the term of this easement agreement, Grantor shall not erect or construct, or allow to be erected or constructed, any building or other structure within the Easement Area which may interfere with the City's construction activities described herein, provided that Grantor reserves the right of ownership and use of the Easement Area insofar as said ownership, use and occupancy does not impair the rights granted to the City under this easement agreement. Without limiting the foregoing, the City agrees and acknowledges that all trails, pathways and parking areas within the Easement Area shall remain open to the residents of the Grantor Property at all times during the term of this easement agreement, except during such periods as portions thereof may need to be secured with fencing or otherwise, for the safety of such residents, consistent with generally accepted construction safety standards.
  iv. The City shall ensure that all construction activities will be fenced in accordance with generally accepted construction safety standards, and shall work to ensure that only such portions of the Easement Area as reasonably necessary for the then-current stage of the City's work hereunder are fenced.
  v. All work shall be performed in a way to reasonably minimize interference with the use, operation, and occupancy of Grantor's property.
  vi. The City shall ensure at all times that a lead project manager is available to Grantor for questions and coordination during the work anticipated hereunder.
  vii. The City's contractor conducting the work anticipated hereunder, shall maintain insurance coverage insuring Grantor against claims, demands or actions for personal injuries or death resulting from the use the Easement Area with limits of not less than Two Million Dollars ($2,000,000) any one occurrence, in an aggregate amount of Three Million Dollars ($3,000,000) and for damage to property in an amount of not less than Two Million Dollars ($2,000,000). Before commencing any construction activities within the Easement Area, the City shall deliver a certificate of insurance to the Grantor certifying that the insurance policy or policies required by this Section is in force.
  viii. Restoration/Maintenance of Landscaping. As a condition of the granting of this Temporary Easement the City covenants and agrees, at the City's sole cost and following completion of the City's activities described herein, to immediately remove all of the City's equipment and materials from the Easement Area and to restore the Easement Area and any other portions of Grantor's Property disturbed by the City's activities thereon to a level comparable to their original condition, including, without limitation, landscaping,

trees, plantings, sod, parking area surfaces, fences, or other improvements. Notwithstanding the foregoing, Grantor acknowledges that the City shall provide landscaping and plantings within the Wonderland creek floodplain area, and irrigate and warrant such landscaping and plantings, in accordance with the terms of the City's 404 Permit with the Army Corps of Engineers. The City hereby agrees that all landscaping within the Wonderland creek floodplain area installed by the City shall be maintained and, as necessary, replaced in good condition and order for the duration of the 404 wetlands permit issued to the city by the United States Army Corps of Engineers or the wetlands permit issued by the City of Boulder, whichever is longer. Grantor agrees that the City shall have a limited license to enter the Easement Area for purposes of such maintenance work during the duration thereof.

- **Aspen Grove – TE-2 and 3**
  i. During the term of the TE, contractor shall not stage construction activities or park construction related vehicles on asphalt or concrete in that area described in Exhibit "A" as TE-3.
  ii. During the term of the TE, contractor will construct temporary fencing depicted on Exhibit "B". Contractor may temporarily move fencing as construction needs dictate. Fencing must be around trees depicted on Exhibit "B" as well.
  iii. During the term of the TE, construction work hours shall be between 7:00 to 6:00 Monday through Friday and no construction work on all Federal or State of Colorado official holidays.
  iv. Contractor must contact the City Project Manager if any trees outside of the existing Drainage Easement will be removed. Grantor will be compensated by the City for these trees.
- **Meraly Brown – TE-4 not needed, taken off project**

- **WCT – TE-5 – None**

- **Manorcare – TE-6**
  Manorcare will provide the new sign (paid for by the City) that has to be installed by the Contractor. The city should provide the Contractor with the area where the new sign will be installed. Contractor should give the City or Manorcare reasonable notice as to when the replacement sign will need to be on site for installation. A temporary sign that meets City of Boulder signage requirement shall be installed upon the demolition of the existing sign structure. The replacement sign shall also meet the City of Boulder sign requirements.

- **Birchwood Drive Condo Assoc. PE and TE-7 – None**

- **UCAR – PE-1 and TE-1**
  The following conditions will be included in the temporary construction easement with UCAR:

  i. Contractor must indemnify and defend UCAR from and against third party claims arising out of work on the easement property.
  ii. Contractor must purchase and maintain adequate insurance, including commercial general liability and automobile liability insurance and
  iii. Contractor must name UCAR as an additional insured on its general liability and

automobile insurance policy.

iv. Certificates of insurance shall be filed with UCAR prior to commencement of work on UCAR property subject to the TCE.

v. Each insurance policy required by the insurance provisions of the TCE shall provide the required coverage and shall not be suspended, voided or canceled except after thirty (30) days prior written notice has been given to UCAR except where cancellation is for non-payment of premium, then ten (10) days prior notice may be given.

vi. UCAR TCE expires July 31, 2017 at the latest, as well (". . . shall expire six (6) months from the date of the aforementioned Notice and in any event, no later than thirty (30) days after completion of said construction or July 31, 2017, whichever is sooner

vii. Remove the two northern light poles entirely. Offer the power poles to UCAR for their use.

viii. Move the southeast light pole approximately 10 feet to the west (by the "no trespassing" sign and rotate so that the light is illuminating the parking area.

ix. Trench and install a conduit from the existing northeast light pole to the existing southwest pole for power to the relocated camera. UCAR will re-install the camera.

x. Install sod and tie in to existing irrigation system.

- **BNSF – RE-2 and RE-2A –** Exhibit "C" outlines contractor responsibilities and easement requirements.

i. City or contractor must arrange for relocation of fiber optic lines or other utility facilities.

ii. Before the contractor begins any excavation, the contractor shall telephone BNSF at 1-800-533-2891 to determine if fiber optic cable is buried anywhere on the affected BNSF premises and confer with BNSF with regard to any other overhead or underground utilities or services which may be on or near the site of the work. If any utilities are impacted by the work, contractor at its expense shall telephone the telecommunications and utilities companies involved, arrange for a cable locator, and make arrangements for relocation or other protection of the fiber optic cable or other utility prior to beginning any work on the premises.

iii. Prior to commencement of any work on BNSF property, contractor shall sign and return to BNSF Exhibit C-1 and comply with all terms in Exhibit C and all work on the project shall be performed in a manner that will not endanger the safety of the Railroad or interfere with the operation thereof.

iv. Contractor shall reimburse city or BNSF for work of an emergency nature caused by the contractor in connection with the project which BNSF deems is reasonably necessary for the immediate restoration of railroad operations, or for the protection of persons or BNSF property.

v. Prior to any maintenance work or repair of the property that requires contractor to be on, over or within the railroad ROW or the premises other than on the pedestrian/bike trail or any time when contractor desires to enter upon the premises outside the pedestrian/bike trail with any vehicle or equipment for any purpose, 5 days advance notice must be given to Railroad's Roadmaster at 303-480-6251. Said notice shall inform the Roadmaster of the date(s) of the proposed maintenance or

repair or desired vehicular or equipment access, the nature of the maintenance, repair or access to be performed and the manner in which these activities shall be performed.

vi. Contractor shall maintain in place for duration of any maintenance the insurance required in Exhibit C-1 and comply with all terms of Exhibit C-1 and C.

vii. All work on the premises shall be performed at such time and in such manner as to not interfere with the movement of trains or traffic upon the tracks of Railroad.

viii. The contractor or its subcontractors shall be totally responsible for all damage to the Railroad as a result of work on the project which shall include but not be limited to interference with the normal movement of trains.

ix. Railroad's engineer or designee may advise the contractor or contractor's site supervisor that an agent, servant or employee of the Contractor or of a subcontractor is working in an unsafe manner in which event Contractor's work site supervisor shall cause said agent, servant or employee to leave the work site and railroad property.

x. Contractor shall not enter upon or perform any work upon or within 25 feet of the centerline of the railroad's tracks unless and until the contractor executes and delivers to the railroad the Agreement between BNSF and the Contractor in the form of Exhibit C-1 and obtained railroad's approval of all railroad-required insurance.

xi. Contractor shall provide a lockable master battery disconnect switch on all operated or leased mobile equipment stored or parked at or adjacent to the BNSF easement during construction.

xii. Contractor must verify that the master battery disconnect switch is left in the off or disconnect position and padlocked when the equipment is left unattended.

xiii. No equipment shall be left unattended within 25 feet of the track centerline unless approval is obtained from the Responsible Railroad Project Representative.

xiv. Under no circumstances is equipment to be left unattended within 8'-6" of track centerline or any other position where it could be struck by a train or on-track equipment.

xv. Unattended equipment shall be shut off and left in gear, with brakes set. Remove keys and lock cabs, where so equipped. Buckets and blades need to be lowered to the ground. Where equipment has an enclosed cab, the installation of a lockable hasp on cab access doors is strongly encouraged.

- **Hayden Place OA – PE-3 and PE-3A and TE-3 and TE -3A and TE-3B**

i. Contractor may be required to deposit dirt from the excavation site to private property at 55th Street and Jay Road in Boulder County.

ii. Contractor must indemnify and defend Hayden Place Owner's Association from and against third party claims arising out of work on the easement property.

iii. Contractor must purchase and maintain adequate insurance, including commercial general liability and automobile liability insurance and contractor must name Hayden Place Owners Association as an additional insured on its general liability and automobile insurance policy.

iv. Certificates of insurance shall be filed with the City of Boulder Project Manager prior to commencement of work on Hayden Place Owner's Association property

subject to TE-3 and TE 3A.

v. Each insurance policy required by these insurance provisions of the TCE shall provide the required coverage and shall not be suspended, voided or canceled except after thirty (30) days prior written notice has been given to the City of Boulder Project Manager except where cancellation is for non-payment of premium, then ten (10) days prior notice may be given.

- **Boulder Housing Authority –TE-5 –** None

- **Cahalan Hayden –TE-6 REV**
  i. City agrees to repair or replace the existing parking area and sidewalk within the TE area.

- **Spring Creek HOA – PE7 and PE7A and TE-7 –** None

- **The Boulders HOA –PE8 and PE8A and PE-9 and TE-8A–** None

- **3393 Iris Ave – PE10 and TE 10**
  i. During the term and use of the Temporary Easement the City shall provide and maintain reasonable pedestrian and vehicle access between the Grantor's adjoining property and Iris Ave.

- **3333 Iris Egel – PE11 and TE-11**
  i. Grantor will ask contractor to replace the existing sidewalk up to their building while it is replacing the sidewalk for the project. This will be paid for by Grantor.

- **Geological Society of America – TE12 and TE13** – None

- **DellaCava –PE-15 and TE-14 and TE15**- None

29. **COORDINATION WITH OTHER CITY PROJECTS** – Several City projects will be under construction during the same general time period. Traffic control and delivery coordination will be necessary. Revision to Section 105 Cooperation Between Contractors includes known projects and activities in the vicinity of the project area and indicates that other activities that are currently unknown may also occur.

30. **TRAIL TRAFFIC CONTROL/DETOUR** – Sidewalks and multi-use paths are considered traffic corridors and should be signed and controlled as such. Please refer to City of Boulder standards for signage. Refer to Traffic control section, Section 630 and related revisions.

31. **WORK ON MANOR CARE PROPERTY** – Manor care is a retirement community with active residents. Jersey barriers or other physical means of protecting larger excavations near drive/parking as the parking area is confined and used regularly by residents and visitors.

32. **GEOTECHNICAL REPORTS** – Several geotechnical reports have been completed for the project and are attached to these special conditions for Contractor's review and use. These include Geotechnical Investigation Wonderland Creek Improvements Between 30th Street and Foothills Parkway Boulder Colorado, By CTL Thompson, Nov. 23 2011, Geotechnical Investigation Wonderland Creek Improvements Between Diagonal Highway 119 and Winding Trail Drive Boulder Colorado, By CTL Thompson, July 3 2013, Geotechnical Investigation BNSF Railway Bridge and Wonderland Creek Improvements South of Talisman Court and Talisman Place Boulder Colorado, By CTL Thompson, Jan. 24 2014.

33. **COORDINATION WITH ARTWORK – FORMLINER AND SEATING AREA** – Contractor to coordinate installation of artwork with artist hired by the City under a separate contract. Contractor shall include coordination with artist to facilitate the installation of artwork as outlined in the plans and per 504 Facing (Special).

34. **STORMWATER** – Contractor shall use the online software program Permitrack to fill out and file their 14 day and post-event inspections of their BMPs. Contractor shall comply with the City's 2016 MS4 permit requirements.

35. **FEDERAL FUNDING REQUIREMENTS** – Due to the Federal Funding coming from two separate accounts, the contractor's pay requests need to be separated for the work between 30th Street and Foothills Parkway and the work upstream of the Diagonal Highway.

36. 404 , 401 PERMITS AND CITY OF BOULDER WETLANDS PERMIT –

- The permittee agrees to contact the US Fish and Wildlife Service, Office of Migratory Birds, at (303) 236-8171, for permitting requirements prior to the removal or destruction of any bird nest.
- The permittee is responsible for ensuring that the Corps is notified of the location of any borrow site that will be used in conjunction with the construction of the authorized activity so that the Corps may evaluate the site for potential impacts to aquatic resources, historic properties, and endangered species. The permittee shall not initiate work at the borrow site in conjunction with the authorized activity until approval is received from the Corps.
- Invasive Aquatic Species: If heavy equipment is used for the subject project that was previously working in another stream, river, lake, pond, or wetland within 10 days of initiating work, one of the following procedures is necessary to prevent the spread of New Zealand Mud Snails and other aquatic hitchhikers:
    - (1) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and keep the equipment dry for 10 days; or
    - (2) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) shall spray/ soak equipment with either a 1:1 solution of Formula 409 household cleaner and water, or a solution of QUAT 4. Treated equipment must be kept moist for at least 10 minutes; or
    - (3) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray /soak equipment with water greater than 120 degrees F for at least 10 minutes.
- The permittee agrees that fuel storage tanks above ground shall be diked or curbed or other suitable means provided to prevent the spread of liquids in case of leakage in the tanks or piping.
- At least fifteen days prior to commencement of a project in a watercourse, which the Division has certified, or conditionally certified, the permittee shall notify the following:
    - Applicable Local Health Departments
    - Owners or operators of municipal and domestic water treatment intakes which are located within twenty miles downstream from the project site; and (c) Owners or operators of other intakes or diversions which are located within five miles downstream from the site of the project.
    - The permittee shall maintain a list of the persons and entities notified, including the date and form of notification.

CITY OF BOULDER SPECIAL CONDITIONS - SPECIFICATIONS FOR WATERLINE, STORM AND SANITARY SEWER

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SECTION 01150

MEASUREMENT AND PAYMENT

PART 1: GENERAL

1-1 Scope:

This section covers methods of measurement and payment for items of Work under this contract.

1-2 Requirements:

The total bid price shall cover all Work required by the Contract Documents. All costs in connection with the proper and successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction plant, equipment, tools; and performing all necessary labor and supervision to fully complete
the Work, shall be included in the unit and lump sum prices bid. All Work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of the Contractor and all costs in connection therewith shall be included in the prices bid.

1-3 Estimated Quantities for Unit Price Bid Items:

All estimated quantities stipulated in the Bid Form for unit price bid items are approximate and are to be used only (a) as a basis for estimating the probable cost of the Work and (b) for the purpose of comparing the bids submitted for the Work. The actual amounts of work performed and materials furnished for unit price bid items may differ from the estimated quantities. The basis of payment for work and materials bid as a unit price will be the actual amount of work done and materials furnished. The Contractor agrees that he will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts for unit price bid items.

1-4 Description of Bid Items:

The following is a general listing of contract bid items along with the work and materials included, but not limited to, in the unit price for each bid item:

A. 8", 12", and 16" P.V.C. Water Pipe, 16" Epoxy Lined Steel Pipe, & 3/4" Copper Pipe:

Pipe line items shall be paid on a lineal foot basis from end of pipe or center of fittings and shall include mobilization (unless described elsewhere in this section), the cost for obtaining and placing all pipe, joints and jointing materials and appurtenances thereto; locating existing pipelines and utilities; excavation; removal and disposal of spoil and/or surplus trench excavation material; removal or abandonment of existing pipe, fittings and valves; dewatering; couplings / sleeves; welding (steel pipe) polyethylene sheathing and other coatings; sheeting, shoring and/or bracing; bedding; backfilling; compaction; cleaning, flushing, testing and disinfection; temporary plugs; connections to existing utilities unless described elsewhere in this section; clean up; and other items as needed to complete the work except as called out separately in other bid items. Field measurement will determine the final pay quantities for this item.

B. Valves and Boxes*:*

These items shall be paid on a per each basis and shall include the cost for obtaining and placing all materials including valves, valve boxes, polyethylene sheathing, restraint glands, and support blocks for the complete installation of valves and all appurtenances thereto as shown on the drawings or specified.

C. Fittings:

All fittings (bends, tees, plugs, etc.) will not be paid for separately and shall be included as part of the cost per lineal foot of pipe and shall include the cost for obtaining and placing all materials including all thrust restraint with concrete thrust blocks, rodding or joint restraint glands, and polyethylene sheathing for the complete installation of the fittings and all appurtenances thereto as shown on the drawings or specified.

D. Tapping Sleeve and Valve:

Connections will not be paid for separately and shall be included as part of the cost per lineal foot of pipe or sprinkler system and shall include all materials needed to connect the new waterline to the existing or proposed system including the tapping sleeve and valve, thrust restraint, polyethylene sheathing, and all other materials or equipment necessary to make the connections as shown on the drawings or specified.

E. Cut-In-Tee/Cut-In-Cross/Solid Sleeve Connections to Existing Water System:

Connections will not be paid for separately and shall be included as part of the cost per lineal foot of pipe or sprinkler system and shall include all materials needed to connect the new waterline to the existing system including crosses, tees (valves for cut-in-tees and cross connections to be paid as separate item), couplings, sleeves, thrust restraint, polyethylene sheathing, dewatering, disinfecting connecting pipe and fittings, temporary fittings and all other materials or equipment necessary to make the connections as shown on the drawings or specified.

F. 6" Fire Hydrant Assembly:

This item shall be paid for on a per each basis and shall include the cost for obtaining and placing all materials, including gravel drain and thrust restraint, for the complete installation of the fire hydrant assembly and all appurtenances thereto as shown on the drawings or as specified. The fire hydrant assembly includes the installation of twenty (14) lineal feet of 6" diameter pipe from the anchoring tee or bend to the hydrant joint restraint, the 6" gate valve and box, polyethylene wrap, extension kit where required, test station for tracer wire, and the hydrant itself. Lateral pipe in excess of 14 lineal feet will be paid on a per 6" pipe lineal foot measurement.

G. Water Services (See 3/4" Copper Pipe):

This item shall be paid on a lineal foot basis and shall include the cost for obtaining and placing the service saddle (PVC only), corporation stop, insulator coupling (DIP only), service pipe, curb stops and boxes (if required), meter pits and appurtenances thereto, and making the connection to the water line. Field measurement will determine the final pay quantities for this item.

H. Temporary Water Service:

This item shall not be paid for and shall be included in the cost of the work and shall include all labor and materials required to disinfect, 24 hour monitor, maintain and install a temporary connection to the existing services, and abandonment and removal of the temporary connection upon reconnection of the permanent services. This item shall include a system layout submittal, connection to a hydrant, PRV, supply pipe or hose (pipe at driveways), trenching and/or cold patching across existing pavement, connection to the residence/business side of the existing meter yoke, individual and main shut off valves, fittings, insulation to protect from freezing, and all necessary appurtenances to provide uninterrupted water service to the affected properties.

I. Water Meter and Vault:

This item shall be paid on a per each basis and shall include all labor and materials required for the complete installation of the relocated or replaced water meter setting. This item shall include excavation, backfilling, new meter pit, lid, bell and yoke, removal and disposal of old meter pit and appurtenances, curb stop and box (if required), couplers, and freezing existing service line if necessary.

J. 2" Air and Vacuum Valve:

This item shall be paid on a per each basis and shall include all items associated with the City of Boulders Standard Combination Air Valve Manhole including but not limited to: corp stops, combination air valves, vent pipe, vent pipe cover, manhole footer, manhole, frame and cover, interior piping, excavation, backfill, cleanup and all necessary appurtenances for the complete installation as shown on the drawings or specified.

K. 8"and 10" P.V.C. Gravity Sewer Pipe:

Pipe line items shall be paid on a lineal foot basis through manholes and shall include the cost for obtaining and placing all pipe, joints and jointing materials and appurtenances thereto; locating existing pipelines and utilities; excavation; removal and disposal of soil and/or surplus trench excavation material; sheeting, shoring and/or bracing; by pass pumping**;** dewatering; bedding; backfilling of job excavated material; compaction; temporary plugs; cleaning and testing the new line; clean up; pedestrian traffic control; and other items as needed to complete the work except as called out separately in other bid items. Field measurement will determine the final pay quantities for this item.

L. New Sanitary Sewer Services:

This item will not be paid for separately and shall be included as part of the cost per lineal foot of pipe and shall include the cost for obtaining and placing all sanitary sewer service lines, joints and jointing materials and appurtenances thereto; making the connection of the new service line to the new main with a wye or tee connection as shown on the drawings or as specified.

M. Sewer Crossings:

Sanitary and storm sewer crossings will not be paid for separately and shall be included as part of the cost per lineal foot of pipe and shall include the cost for the complete installation as shown on the detail drawings to remove and replace existing sewer pipe with pressure class pipe; coupling to existing pipe, excavation, removal and disposal of spoil and/or surplus trench excavation material where necessary; sheeting, shoring and/or bracing; dewatering; bedding; backfill and compaction; and any special materials or facilities required or specified.

N. Manholes:

Manholes shall be paid on a per each basis and shall include the cost for obtaining and placing all materials for the complete installation of each manhole, including any special materials or facilities and the testing of new manholes in accordance with the technical specifications

O. Type C, C (Special), D (Special) Inlet:

This item shall be paid on a per each basis and shall include the cost for obtaining and placing all materials for the complete installation of the inlet. This item shall also include closed mesh grates.

P. Type R Inlet:

This item shall be paid on a per each basis and shall include the cost for obtaining and placing all materials for the complete installation of the inlet. This item shall also include curb and gutter transition section at each end plus the sidewalk section where required behind the inlet structure and transitions.

Q. (Single, and Triple) No. 16 Inlet

This item shall be paid on a per each basis and shall include the cost for obtaining and placing all materials for the complete installation of the inlet. This item shall include a curb and gutter transition section at each end plus the sidewalk section where required behind the inlet structure and transitions.

R. Concrete Encasement:
Encasement shall be paid on a Concrete Class D cubic yard basis and shall include all labor and materials necessary for reinforced encasement, bond breaker, stream or ditch diversion, dewatering, erosion control, rock and any other items necessary, as shown on the drawings, for the complete installation of the encasement. Field measurement will determine final pay quantities for this item.

S. 6”, 18”, 20”, & 28” Welded Steel Pipe (Casing Pipe):

This item shall be paid on a lineal foot basis and shall include all labor and materials necessary to install casing pipe including excavation, end seals; carrier pipe skids; carrier pipe joint restraint, casing pipe joint restraints; bedding, backfill and compaction. Field measurement will determine final pay quantities for this item.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1: GENERAL

1-1 Requirements:

A. Where required by the Specifications, the Contractor shall submit descriptive information that will enable the Project Manager to determine whether the Contractor's proposed materials, equipment, or methods of work are in general conformance to the design concept and in accordance with the Drawings and Specifications. The information submitted may consist of drawings, specifications, descriptive data, certificates, samples, test results, product data, and such other information, all as specifically required in the Specifications. In some instances, specified submittal information describes some, but not all, features of the material, equipment, or method of work. Features not requiring submittals shall be as specified.

B. Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment, or method of work shall be as described in the submittal. The Contractor shall verify that all features of all products conform to the requirements of the Specifications and Drawings. The Contractor shall ensure that there is no conflict with other submittals and notify the Project Manager in each case where its submittal may affect the Work of another Contractor or the City. The Contractor shall ensure coordination of submittals among the related crafts and subcontractors.

C. Submittals will be reviewed for overall design intent and returned to Contractor with action to be indicated by the Project Manager. It shall be the Contractor's responsibility to assure that previously accepted documents are destroyed when they are superseded by a resubmittal as such.

D. It shall be the Contractor's responsibility to insure that required items are corrected and resubmitted. Any work done before approval shall be at the Contractor's own risk.

1-2 Submittal Procedure:

A. Unless a different number is called for in the individual sections, three copies of each submittal and sample is required, all of which will be retained by the Project Manager. Contractor shall submit in addition, whatever copies he wants returned to him.

B. Submittals that are related to or affect each other shall be forwarded simultaneously as a package to facilitate coordinated review. Uncoordinated submittals will be rejected.

C. If the items or system proposed are acceptable but the major part of the individual drawings or documents are incomplete or require revision, the submittal will be returned with requirements for completion.

D. The right is reserved for the Project Manager to require submittals in addition to those called for in individual sections.

E. Submittals regarding material and equipment shall be submitted directly to the Project Manager and will be accompanied by a transmittal form. A separate form shall be used for each specific item, class of material, equipment, and items specified in separate, discrete Sections, for which the submittal is required. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.

F. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted. Original submittal numbers shall have the following format: "XXX-Y;" where "XXX" is the originally assigned submittal number and "Y" is a sequential letter assigned for resubmittals (i.e., A, B, or C being the first, second, and third resubmittals, respectively). Submittal 25B, for example, is the second resubmittal of Submittal 25. Submittals containing operating and maintenance information shall include the letters "O&M" following the submittal number.

G. If the Contractor proposes to provide material, equipment, or method of work that deviates from the Contract Documents, it shall indicate so under "deviations" on the transmittal form accompanying the submittal copies.

H. Submittals that do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

1-3 Review Procedure:

A. Submittals are specified for those features and characteristics of materials, equipment, and methods of operation that can be selected based on the Contractor's judgement of their conformance to the requirements of the Drawings and Specifications. Other features and characteristics are specified in a matter that enables the Contractor to determine acceptable options without submittals.

The review procedure is based on the Contractor's guarantee that all features and characteristics not requiring submittals conform to the Drawings and Specifications. Review shall not extend to means, methods, techniques, sequences, or procedures of construction, or to verifying quantities, dimensions, weights or gages, or fabrication processes (except where specifically indicated or required by the Specifications) of a separate item, and as such, will not indicate approval of the assembly in which the item functions.

B. Unless otherwise specified, within 14 calendar days after receipt of the submittal, the Project Manager shall review the submittal and return copies . The returned submittal shall indicate one of the following actions:

1. If the review indicates that the material, equipment, or work method complies with the Specifications, submittal copies will be marked "NO EXCEPTIONS TAKEN." In this event, the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.

2. If the review indicates limited corrections are required, copies will be marked "EXCEPTIONS AS NOTED." The Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in Operation and Maintenance data, a corrected copy shall be provided.

3. If the review indicates that the submittal is insufficient or contains incorrect data, copies will be marked "REVISE AND RESUBMIT." Except at its own risk, the Contractor shall note undertake work covered by this submittal until it has been revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "EXCEPTIONS AS NOTED."

4. If the review indicates that the material, equipment, or work method do not comply with the Specifications, copies of the submittal will be marked "REJECTED." Submittals with deviations that have not been identified clearly may be rejected. Except at its own risk, the Contractor shall not undertake the work covered by such submittals until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" or "EXCEPTIONS AS NOTED."

1-4 Shop Drawings:

A. The term "shop drawings" includes drawings, diagrams, layouts, schematic, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by Contractor to explain in detail specific portions of the work required by the Contract.

B. Contractor shall coordinate all such drawings, and review them for legibility, accuracy, completeness and compliance with contract requirements and shall indicate his approval thereon as evidence of such coordination and review. Shop drawings submitted to the Engineers without evidence of Contractor's approval will be returned for resubmission.

C. Shop drawings shall be clearly identified with the name and project number of this contract, and references to applicable specification paragraphs and contract Drawings. When catalog pages are submitted, applicable items shall be clearly identified.

D. Contractor shall stamp his approval on Shop Drawings prior to submission to the Project Manager as indication of his checking and verification of dimensions and coordination with interrelated items. Stamp shall read:

> "(Contractor's Name) represents that we have determined and verified all field dimensions and measurements, field construction criteria, materials, catalog numbers, and similar data, and that we have checked with the requirements of the Specifications and Drawings, the Contract Documents, and General Conditions".

Marks on drawings by Contractor shall not be in red. Any marks by Contractor shall be duplicated on all copies submitted.

E. If shop drawings show variations from contract requirements, Contractor shall describe such variations in writing, separate from the drawings, at time of submission. All such variations must be approved by the Project Manager. If Project Manager approves any such variations, he shall issue an appropriate Contract modification, except that, if the variation is minor and does not involve a change in price or in time of performance, a modification need not be issued.

F. Should the Contractor propose any item on his Shop Drawings, or incorporate an item into the work, and that item should subsequently prove to be defective or otherwise unsatisfactory, (regardless of the Engineer's preliminary review), the Contractor shall, at his own expense, replace the item with another item that will perform satisfactorily.

1-5 Operation and Maintenance Manuals:

For those items called for in individual sections, furnish three copies of operation and maintenance manuals. Each manual shall be bound in three-ring notebooks with permanent covers, and separators with index tabs. Operation and Maintenance Manuals shall include installation instructions, operating instructions, schematic for electrical and hydraulic systems, maintenance literature, lubrication requirements, and parts lists.

1-6 Certificates:

For those items called for in individual sections, furnish three certificates of compliance from manufacturers or suppliers certifying that materials or equipment being furnished under the Contract comply with the requirements of these specifications.

1-7 Samples:

Samples shall be sufficient size to clearly illustrate functional characteristics and full range of color, texture, and pattern.

1-8 Effect of Review of Contractor's Submittals:

Review of Drawings, data, methods of work, or information regarding materials or equipment the Contractor proposes to provide, shall not relieve the Contractor of its responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Engineer or the City, or by any officer or employee thereof, and the Contractor shall have no claim under the Contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed. A mark of "NO EXCEPTIONS TAKEN" or "EXCEPTIONS AS NOTED" shall mean that the City has no objection to the Contractor, upon its own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

END OF SECTION

DIVISION 2 - SITE WORK

SECTION 02200

EXCAVATION AND TRENCHING

PART 1: GENERAL

1-1 Scope:

This section covers excavation work and shall include the necessary clearing, grubbing, and preparation of the site; removal and disposal of all debris; stripping and stockpiling topsoil; excavation and trenching as required; the handling, storage, transportation, and disposal of all excavated material; all necessary sheeting, shoring, and protection work; preparation of subgrades; pumping and dewatering as necessary or required; protection of adjacent property; backfilling; pipe embedment; construction of fills and embankments; surfacing and grading; and other appurtenant work.

1-2 Reference Standards:

American Association of State Highway and Transportation Officials (AASHTO), American Society for Testing and Materials (ASTM), Colorado Department of Transportation (CDOT) Standard Specifications for Road and Bridge Construction.

1-3 Submittals:

Samples of all materials specified in this section shall be submitted to the Project Manager in accordance with Section 01300. The quantity of material samples required will be specified by the Project Manager. Where gradations or other material properties are specified, information certifying these properties shall also be submitted. All gradation and samples of materials submitted must be approved by the Project Manager before incorporated into the work.

1-4 Safety:

With reference to the terms and conditions of the construction standards for excavations set forth in the OSHA "Safety and Health Regulations for Construction", Chapter XVII of Title 29, CFR, Part 1926, the Contractor shall employ a competent person and, when necessary, a registered professional engineer, to act upon all pertinent matters of the work of this section.

1-5 Quality Assurance:

All tests required for preliminary review of materials shall be made by an acceptable independent testing laboratory at the expense of the Contractor. Two initial gradation tests shall be made for each type of pipe bedding, fill, or backfill material, and one additional gradation test shall be made for each additional 500 tons of each material. Initial moisture-density (Proctor) tests and relative density tests on the materials, and all in-place field density tests, shall be made at the expense of the City. Retests of samples failing initial tests shall be at the expense of the Contractor.

Subgrade surfaces shall be clean and free of loose material of any kind when concrete is placed thereon.

Backfilling and construction of fills and embankments during freezing weather shall not be done except by permission from the Project Manager. No backfill, fill, or embankment materials shall be installed on frozen surfaces, nor shall frozen materials, snow, or ice be placed in any backfill, fill, or embankment.

PART 2: MATERIALS

2-1 General:

All bedding and backfill material shall have the approval of the Project Manager and shall be included in the unit price for the pipe unless otherwise specified and indicated in the Bid. All bedding and backfill material shall be free of frozen material, organic material and debris.

2-2 Pipe Bedding:

Bedding materials both below and above the bottom of the pipe, classes of bedding to be used, and placement and compaction of bedding materials shall conform to the following requirements.

Bedding materials shall contain no cinders or other material which may cause pipe corrosion.

A. Concrete Encasement. Concrete encasement is not required unless improper trenching or unexpected trench conditions require its use as determined by the Project Manager.

B. Granular Bedding Material for Ductile Iron Pipe and PVC Pressure Pipe. Granular bedding material shall consist of washed chips, nominal size 3/8" meeting the following gradation:

Sieve Size	Percent Passing by Weight
1/2-inch	100
3/8-inch	85-100
No. 4	10-30
No. 8	0-10
No. 16	0-5

If approved by the Project Manager, squeegee sand conforming to the gradation in D. below may be used for ductile iron pipe only. All granular bedding material shall be placed in not more than 6" layers and compacted by slicing with a shovel or vibrating.

C. Granular Bedding Material for PVC and HDPE Sewer Pipe. This material shall be imported, crushed, angular quarry rock and meet the following gradation (ASTM D448, No. 67):

Sieve Size or Designation	Total Passing (% by Weight)
3/4 – inch	100
3/8 – inch	20-55
No. 8	0-10
No. 200	0-5

D. Granular Bedding Material for RCP Sewer Pipe. This material shall be squeegee sand meeting the following gradation:

Sieve Size	Percent Passing by Weight
3/8-inch	100
No. 200	0-5

2-3 Trench Backfill:

Trench backfill refers to material placed above the pipe bedding and shall be flowable fill as specified in Section 2-6. For trench excavations in excess of five feet in depth, 16 inches in width, and 20 feet in length, granular backfill material as specified in Section 2-7 may be used if approved by the Project Manager.

2-4 Stabilization Material:

Stabilization material shall be placed on suitably prepared subgrades and compacted by vibration. Stabilization material shall be crushed rock or gravel; shall be free from dust, clay, or trash; and shall be graded 1-1/2 inch to No. 4 as defined in ASTM C33 and shall be compacted to not less than 70 percent relative density as determined by ASTM D4253 and D4254.

2-5 Groundwater Barrier Material:

Groundwater barrier material shall meet AASHTO soil classification SC or CL, free from stones, organic material or debris, or flowable fill as specified in Section 2-6.

2-6 Flowable Fill:

Flowable fill shall meet the following requirements and shall be used for trench backfill when specified in the contract or by the Project Manager, or as a groundwater barrier.

Ingredients	Lbs./C.Y.	Kg/m^3
Cement	50	30
Coarse Aggregate (AASHTO No. 57 or 67)	1700	1009
Fine Aggregate (AASHTO M 6)	1845	1095
Water (39 Gallons) (147 L)	325 (or as needed)	193 (or as needed)

The amount of water shall be such that the flowable fill flows into place properly without excessive segregation. Approximately 39 gallons of water per cubic yard (193 L per m^3) of flowable fill is normally needed. Flowable fill shall have a slump of 6 to 8 inches per ASTM C143. Maximum allow time between batch mixing and placement shall be 90 minutes.

The contractor may use aggregate which does not meet the above specifications if the cement is increased to 100 pounds per cubic yard (lbs./C.Y.) (60 kg./m^3) and the aggregate conforms to the following gradation:

Sieve Size	% Passing
1 inch (25.0 mm)	100
No. 200	0 - 10

The contractor may substitute 30 lbs./C.Y. (18 kg/m^3) of cement and 30 lbs./C.Y. (18 kg/m^3) of fly ash for 50 lbs./C.Y. (30 kg/m^3) of cement or may substitute 60 lbs./C.Y. (36 kg/m^3) of cement and 60 lbs./C.Y. (36 kg/m^3) of fly ash for 100 lbs./C.Y. (60 kg/m^3) of cement.

The maximum depth of trench in which flowable fill may be used shall be 3 feet (1 m). With trench depths greater than 3 feet, a combination of backfill materials may be used. An aggregate base course material, compacted by traditional methods and equipment, may be used for depths exceeding the flowable fill limits, and topped off with a flowable fill cap of 3 feet in depth. Any damage resulting from the placing of the flowable fill, or from not providing sufficient consolidation shall be repaired at the contractor's expense.

'Quick' setting flowable fill may be used if approved by the Project Manager with mix design and materials submitted for approval per section 01300- Submittals.

2-7 Granular Backfill Material:

Granular backfill material shall be an imported graded material meeting CDOT section 703.08, Class 1 specifications.

Sieve Size	**Mass Percent Passing Square Mesh Sieves**
50mm (2")	100
4.75mm (No. 4)	30-100
300 µm (No. 50)	10-60
75 µm (No. 200)	5-20

If approved by the Project Manager, job excavated granular backfill material meeting CDOT Section 703.08, Class 2 structure backfill requirements, may be used. To be suitable for use, backfill shall be finely divided job excavated material free from debris, rubbish, clods, roots, brush, frozen lumps of earth, organic material and stones larger than 6 inches and with no more than 20 percent by weight passing the No. 200 sieve. Heavy, clayey gravels and soils shall be disposed of and replaced with approved granular backfill material.

PART 3: EXECUTION

3-1 Working Conditions:

Backfilling and construction of fills and embankments during freezing weather shall not be done except by permission from the Project Manager. No backfill, fill, or embankment materials shall be installed on frozen surfaces, nor shall frozen materials, snow, or ice be placed in any backfill, fill, or embankment.

3-2 Site Preparation:

All sites to be occupied by permanent construction or embankments shall be cleared of all logs, trees, roots, brush, tree trimmings, and other objectionable materials and debris. All stumps shall be grubbed. Subgrades for fills and embankments shall be cleaned and stripped of all surface vegetation, sod, and organic topsoil. All waste materials shall be removed from the site and disposed of by and at the expense of the Contractor.

In natural areas where excavation will occur, strip all topsoil, or, in the absence of topsoil, the top 6 inches of surface material and store separately from other excavated materials.

For concrete walks, roadways, parking areas and road crossings, saw cut existing pavement full depth to a true line before excavation.

3-3 Classification of Excavated Materials:

No classification of excavated materials will be made except as defined in Section 01150 Measurement and Payment. Excavation and trenching work shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the contract work, regardless of the type, character, composition, or condition thereof.

3-4 Unauthorized Excavation:

Except where otherwise authorized, indicated, or specified, all materials excavated below the bottom of concrete walls, footings, slabs on grade, and foundations shall be replaced, by and at the expense of the Contractor, with concrete placed at the same time monolithic with the concrete above.

3-5 Stabilization of Subgrades:

Subgrades for concrete structures and trench bottoms shall be firm, dense, and thoroughly compacted and consolidated; free from mud and muck; and sufficiently stable to remain firm and intact under the feet of the workers.

Subgrades for concrete structures or trench bottoms which are otherwise solid, but which become mucky on top due to construction operations, shall be reinforced with crushed rock or gravel. The stabilizing material shall be spread and compacted to a depth of not more than four inches; if the required depth exceeds four inches, the material shall be furnished and installed as specified for stabilization material. The finished elevation of stabilized subgrades shall not be above subgrade elevations indicated on the drawings.

3-6 Blasting:

Blasting or other use of explosives for excavation will not be permitted.

3-7 Shoring:

As needed, all excavations shall be properly sheeted and braced to meet Federal, State and local laws in regard to safe working conditions. The shoring shall be arranged so as not to place any stress on portions of the completed work until the general construction thereof has proceeded far enough to provide ample strength. Any damage to pipes or structures resulting from settlements, heaving, water or earth pressures, slides, caving, or other causes, due to lack of shoring, sheeting, or bracing, or due to failure of shoring, or due to improper shoring, or due to any other negligence on the part of the Contractor, shall be repaired by the Contractor at his own expense.

Shoring shall be removed as the work progresses, unless left in place by written order of the Project Manager. The Contractor will be paid for shoring so ordered left in place on the basis of invoice material cost only. Trench sheeting shall not be pulled before backfilling unless the pipe strength is sufficient to carry trench loads based on trench width to the back of sheeting, nor shall sheeting be pulled after backfilling. Where trench sheeting is left in place, such sheeting shall not be braced against the pipe, but shall be supported in a manner which will preclude concentrated loads or horizontal thrusts on the pipe. Cross braces installed above the pipe to support sheeting may be removed after pipe embedment has been completed.

3-8 Water Control and Dewatering:

Dewatering equipment shall be provided to remove and dispose of all surface water and groundwater entering excavations, trenches, or other parts of the work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or the pipe to be installed, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.

All excavations for concrete structures or trenches which extend down to or below groundwater shall be dewatered by lowering and keeping the groundwater level beneath such excavations 12 inches or more below the bottom of the excavation.

Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches to the greatest extent practicable without causing damage to adjacent property.

The Contractor shall be responsible for the condition of any existing pipe or conduit which he may use for drainage purposes, and all such pipe or conduit shall be left clean and free of sediment.

3-9 Trench Excavation:

Trenches shall be excavated so that pipes can be laid in accordance with the profiles, grades, elevations and minimum cover as shown on the drawings or specified herein. No trenches or excavation shall be left open after working hours.

A. Excavation in Streets and Other Paved Surfaces. The excavation in streets with asphalt paving must be confined to a minimum width as required to maintain a safe trench condition. The pavement shall be cut vertical and on a straight line.

B. Minimum Cover. Where pipe grades or elevations are not fixed by the contract drawings, trenches shall be excavated to a depth sufficient to provide a minimum depth of backfill cover over the top of the water pipe of 54 inches. Sanitary sewers require a minimum of 3 feet of cover; storm sewers require a minimum of 1.5 feet of cover.

C. Trench Widths. The minimum clear trench width measured at the top of the pipe barrel shall not be less than the outside pipe diameter, plus 12-inches.

For all pipe, the maximum clear trench width measured at a point 12-inches above the top of the pipe barrel shall be not greater than the trench width shown on the following table:

Pipe Diameter Inches	Maximum Trench Inches	Pipe Diameter Inches	Maximum Trench Inches
4	24	24	48
6	30	27	52
8	32	30	56
10	32	33	60
12	36	36	68
14	36	39	72
15	37	42	76
16	40	48	82
18	40	54	90
20	44	72	110
21	44		

If the stated maximum trench widths are exceeded, either through accident or otherwise, and if the Project Manager determines that the combined dead and live loads will exceed the design loadings on the pipe, the Contractor shall either cradle the pipe in concrete, or use a pipe of a stronger class, as required by the Project Manager. The cost of such remedial measures shall be entirely at the Contractor's expense.

Cutting trench banks on slopes to reduce earth load to prevent sliding and caving shall be done only in areas where the increased trench width will not interfere with surface features.

D. Trench Walls. The Contractor may slope or bench the trench sidewalls in areas where an increased trench width will not interfere with surfaces features or other utilities. Such sloping or benching shall terminate at a depth not lower than one foot above the top of the pipe barrel, and from that point down, the trench wall shall be vertical. The trenching operation, including the spoil bank and sloping of the trench sidewalls shall be confined to the width of the permanent and temporary rights-of-way, if any.

A clear area shall be maintained a sufficient distance back from the top

edge of the excavation to avoid overloading which may cause slides or caving of the trench walls. The excavated material shall be kept trimmed in such a manner as to be of as little inconvenience as possible to the public and adjoining property owners. Unless otherwise authorized by the Project Manager, all public thoroughfares and cross streets shall be kept open to traffic. Bridging shall be used when authorized by the Project Manager at street crossings, sidewalks and other points where necessary, to prevent serious interruption of travel and to provide access to fire hydrants and public and private premises.

E. Trench Depth. The trenches shall be excavated to such depths that the pipeline can be laid at the elevation of the grade lines shown on the Drawings, or at the depths or covers specified herein. If unauthorized over-excavation occurs, the Contractor shall place and compact stabilization material at no additional cost to the City.

The pipe trench shall be excavated to a depth as shown on the drawings below the bottom of the pipe and backfilled with the specified granular bedding material and compacted to the requirements of Section 3-10 or flowfilled.

F. Trench Preparation. The trench shall be excavated only so far in advance of pipe laying as permitted by the Project Manager. The trench wall shall be so braced that the workmen may work safely and efficiently. All trenches shall be drained so that pipe laying may take place in dewatered conditions. Trench preparation shall also conform to the details shown on the Drawings.

Trenches above a point 12-inches above the top of the pipe shall be of such extra width, when required, as will permit the convenient placing of timber supports, sheeting and bracing, and the handling of special units as necessary.

Bell holes in the trench bottom shall be provided at each joint to permit the jointing to be made properly and to prevent the pipe from bearing on the pipe bells.

After excavation, the trench bottom shall be uniformly graded and hand-shaped so that the pipe barrel (exclusive of the joint) will have uniform and continuous bearing on thoroughly compacted pipe bedding material throughout the length of the pipe. The trench grade shall permit the pipe spigot to be accurately centered in the preceding laid pipe joint, without lifting the pipe above the grade and without exceeding the permissible joint deflection. If it is necessary to raise the pipe subgrade, approved, compacted bedding material shall be used at the Contractor's expense.

G. Excavation Material. Excess excavated material suitable for backfill shall not be disposed of until all backfill operations are complete. If excavated material unsuitable for backfill is encountered, the excess material from other locations in the project shall be used for backfill at no additional cost to the City.

H. Rock Excavation. In the event of rock excavation, the bottom of the trench shall be lowered so that the bottom of the trench is 6 inches below the outside surface of the pipe. The space between the rock and the pipe shall be filled with granular bedding material as designated in Section 02200, 2-2 C or D. The bedding material shall be compacted to a density equal to or greater than 90% of the maximum laboratory density. During compaction, the bedding material shall be shaped to provide support along the full length of pipe.

3-10 Installation of Pipe Bedding:

Pipe bedding material shall consist of the material on which the pipe is placed as specified in Section 2-2. Bedding material shall be placed to the required elevation of the pipe invert. Tamping equipment shall be used to thoroughly tamp the bedding material. The moisture content of the material shall be within two (2) percent of optimum.

After bedding material and pipe have been placed and approved, the granular bedding material shall be installed to an elevation 12-inches above the top of the pipe. The granular bedding material shall be placed and compacted in distinct, separate lifts not to exceed 6-inches of loose depth; except that the first loose lift shall not be higher than the pipe centerline (springline). Compaction shall meet the above requirements utilizing T-bars or mechanical tamping equipment.

3-11 Installation of Trench Backfill:

Unless accurate results cannot be obtained, the compaction requirements shall conform to maximum dry density according to ASTM D698, Moisture-Density Relations of Soils (Standard Proctor). When the ASTM D698 test is not applicable, the percentage compaction requirements shall conform to ASTM D4253-00 (2006) Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

When required by the Project Manager the Contractor shall excavate backfilled trenches for purposes to perform compaction tests at locations and depths determined by the Project Manager. The Contractor shall be responsible for reinstalling and compacting the test excavations at no additional cost to the City.

All backfill above the bedding installation shall be carefully placed and compacted. Compaction shall be achieved with mechanical equipment suitable for the material being compacted, in 8-inch maximum loose lifts. Tamping equipment such as "hydro-hammer" or "drop-hammer" that creates excessive vibration outside of the area being compacted shall not be used in areas adjacent to existing structures and utilities. All compaction means must be approved in writing by the Project Manager. All backfill shall be compacted to 95% of maximum laboratory dry density or 70 percent relative density. The material shall be within 2.0 percent of optimum moisture content.

The Contractor may request approval of alternate means of compaction. Such request must be submitted to the Project Manager in writing. Approval of the compaction method will be made by the Project Manager only in writing. Use of specified or approved compaction methods does not relieve the Contractor from providing a complete project meeting the intent of this Specification.

A layer of backfill material not more than 8 inches deep may be placed over concrete arch encasement or concrete reaction blocking after the concrete has reached its initial set, to aid curing. No additional backfill shall be placed over arch encasement or blocking until the concrete has been in place for at least three days.

3-12 Structural Excavation and Backfill:

Excavations shall provide adequate working space and clearances for the work to be performed therein and for installation and removal of concrete forms. In no case shall excavation faces be undercut for extended footings.

The quality and moisture content of materials for backfill around and outside of structures shall conform to the requirements for materials used for earthfills and embankments. Backfill materials shall be deposited in layers not to exceed 8 inches in uncompacted thickness and compacted to at least 95 percent of maximum density at optimum moisture content as determined by ASTM D698. Compaction of structure backfill by rolling will be permitted, provided the desired compaction is obtained and damage to the structure is prevented. Compaction of structure backfill by inundation with water will not be permitted.

No backfill shall be deposited or compacted in water.

Particular care shall be taken to compact structure backfill which will be beneath pipes, drives, roads, parking areas, walks, curbs, gutters, or other surface construction or structures. In addition, wherever a trench is to pass through structure backfill, the structure backfill shall be placed and compacted to an elevation not less than 12 inches above the top of pipe elevation before the trench is excavated. Compacted areas, in each case, shall be adequate to support the item to be constructed or placed thereon.

3-13 Earthfills and Embankments:

To the maximum extent available, excess suitable material obtained from structure and trench excavations shall be used for construction of fills and embankments.

Additional material shall be provided as required. After preparation of the fill or embankment site, the subgrade shall be leveled and rolled so that surface materials of the subgrade will be compact and well bonded with the first layer of the fill or embankment.

All material deposited in fills and embankments shall be free from rocks or stones, brush, stumps, logs, roots, debris, and organic or other objectionable materials, and shall be wetted or dried as required and thoroughly mixed to ensure uniform moisture content. Fills and embankments shall be constructed in horizontal layers not exceeding eight inches in uncompacted thickness. Material deposited in piles or windrows by excavating and hauling equipment shall be spread and leveled prior to compaction. Each layer shall be thoroughly compacted to 95 percent of the maximum density at optimum moisture content as determined by ASTM D698. If the material fails to meet the density specified, compaction methods shall be altered.

3-14 Storage of Excavated Material:

Excavated material shall be stockpiled near the immediate construction area in a confined configuration delineated by traffic cones or vertical panels. For storage of excess excavated material suitable for backfill, the Contractor shall obtain and pay for a storage site. All transportation to and from storage site, loading, and temporary land/site acquisition is included in the work.

All excess excavated material at the completion of the work and all debris, stones, logs, stumps, roots, and other unsuitable materials shall be removed from the site and disposed of by, and at the expense of, the Contractor.

3-15 Restoration:

A. Streets and Roadways. Any pavements disturbed during construction shall be repaired in accordance with the Detail Drawings and Specifications

All streets and paved surfaces shall be restored within two (2) weeks of their excavation. All dirt and debris, including dust shall be removed from streets and paved surfaces within three (3) days of the restoration of streets and paved surfaces. Initial removal of dirt and debris shall be made using a vacuum sweeper, after which the paved surfaces shall be cleaned using water hoses.

B. Concrete Walks, Curb and Gutter, Fencing and Culverts. Restore all structures to conditions equal to or exceeding existing structures and according to local requirements.

C. Landscape. After other outside work has been finished, and backfilling and embankments completed and settled, all areas which are to be graded shall be brought to grade at the indicated elevations, slopes, and contours. All cuts, fills, embankments, and other areas which have been disturbed or damaged by construction operations shall be surfaced with topsoil to a depth of at least 4 inches. Topsoil shall be of a quality at least equal to the existing topsoil in adjacent areas, free from trash, stones, and debris, and well suited to support plant growth.

Use of graders or other power equipment will be permitted for final grading and dressing of slopes, provided the result is uniform and equivalent to hand work. All surfaces shall be graded to secure effective drainage. Unless otherwise indicated, a slope of at least one percent shall be provided.

Final grading and surfacing shall be smooth, even, and free from clods and stones larger than one inch in greatest dimension, weeds, brush, and other debris.

The top portion of backfill beneath established lawn areas shall be finished with at least 12 inches of topsoil corresponding to, or better than, that underlying adjoining lawn areas.

D. Other Items. The Project Manager will clarify restoration of other minor items as construction proceeds. Such items must be restored to equal or exceed existing conditions.

3-16 Cleanup:

Prior to final inspection and acceptance, the Contractor shall remove all rubbish and excess materials and leave area in a neat, satisfactory condition.

3-17 Trench Maintenance:

Trenches shall be maintained in a satisfactory condition and all places showing signs of settlement shall be filled and maintained during the life of the Contract and for a period of two years following the date of final acceptance of all work performed under the Contract. When the Contractor discovers or is notified by the City that any trench is not in compliance with the provision of this Contract, the Contractor shall correct such conditions at their expense. Any utilities and road surfacing damaged by such settlement shall be repaired by the Contractor to the satisfaction of the City. In addition, the Contractor shall be responsible for the cost to the City of all claims for damages due to settlement of backfilled areas.

END OF SECTION

SECTION 02515

MANHOLES, HANDHOLES, AND INLETS

PART 1: GENERAL

1-1 Scope:

This section covers the furnishing and installation of precast concrete manholes, storm sewer inlets and appurtenances.

1-2 Reference Standards:

American Society for Testing and Materials (ASTM) and American Association of State Highway and Transportation Officials (AASHTO).

1-3 Submittals:

In accordance with Section 01300, furnish manufacturer's certificates of compliance and installation recommendations.

PART 2: MATERIALS

2-1 Manholes:

Manholes shall be constructed of pre-cast concrete riser sections, in accordance with the detail drawing in the construction plans. The concrete sections shall conform to ASTM C478. The top section required for change of diameter shall be concentric cone or flat slab. Invert channel shall be smooth and semicircular in shape conforming to the inside of the adjacent sewer section. The minimum internal diameter of the manhole barrel shall be as follows for all manhole installations.

Pipe Size	M.H. Inner Dia.
24" and smaller	4' - 0'
27" - 36"	5' - 0"
42" - 48"	6' - 0"
54" and larger	Special Detail

The minimum internal diameter of the manhole barrel may also be determined by the number and size of pipes junctioning at a manhole. In such cases, the Director of Public Works may modify the minimum internal diameter of the manhole barrel as required.

To bring the manhole cover to the correct elevation, the adjustment section of each manhole shall be constructed of brick which is sound and true in shape and size and shall be Grade S-W from clay or shale.

Pre-cast concrete grade adjustment rings may be substituted for the brick. These rings shall be not less than 6 inches wide and furnished in heights to allow for 1- inch adjustment. Total adjustment height, with grade rings or bricks, shall not exceed 12 inches.

Handholes shall be constructed of a 48" x 30" x 18" precast vault, in accordance with the detail drawings in the construction plans. The concrete sections shall conform to ASTM C478. The top section shall be flat slab. The floor shall be smooth with square corners at the intersection of floor and walls.

2-2 Joints:

Precast manhole and inlet joints shall be made watertight with RUB'R-NEK, Kent Seal No. 2 or LO-MOD GEL material or approved equal. Diameter of gasket shall be as recommended by the manufacturer.

2-3 Frame and Cover:

Manhole frames and covers shall be of heavy duty traffic lids, Colorado Springs pattern, round base, 22-1/8 inch opening lids 1 inch thick, non-locking type with frame and cover weighing approximately 327 pounds. Cover and frame seat shall be machine finished to prevent any rocking of cover in its associated frame. Covers shall have the word "SEWER" for sanitary sewer manholes and “STORM SEWER” for storm sewer manholes clearly cast on their surface. Covers for other utility manholes shall also be marked with the appropriate utility designation. Frames and covers shall be CASTINGS, INC. MH 310 COVER B or approved equal.

2-4 Manhole Steps:

Manhole steps shall be built into and thoroughly anchored to the walls at time of fabrication and shall be positioned as shown on the drawings. The material for extruded aluminum steps shall conform to Federal Specifications QQ-A-200/8 for aluminum alloy 6061 T6510 or T6511. The material for cast aluminum steps shall conform to ASTM B26 for aluminum alloy 535.0-F and be equal to ALCOA No. 12653B. Aluminum steps shall have plastic inserts or be coated with bituminous paint to protect against corrosion with cement. Copolymer polypropylene coated steel steps Model PS-2-PF, as manufactured by M.A. Industries, are also approved.

2-5 Grout:

Grout shall be non-shrink type with aluminum filings; grout with iron filings is not acceptable. Grout shall be "Five Star Grout," "Embeco Grout" or equal.

2-6 Concrete:

Concrete for cast-in-place manhole bases shall have a 28-day compressive strength of not less than 3,000 psi. The maximum water content shall be 0.5 pounds of water per pound of cement. Entrained and entrapped air shall be between 4 and 9 percent. All reinforcement shall be standard deformed reinforcement conforming to the requirements set forth in ASTM, A615, Grade 60.

2-7 Inlets:

Inlets shall be constructed of reinforced concrete and shall conform to the dimensions and specifications as set forth in the Colorado Department of Transportation, Division of Highways, M Standards as shown on the drawings. Inlet steps shall be built into and thoroughly anchored to the walls at the time of inlet construction. These steps shall conform to the requirements for Manhole steps, and shall be positioned as shown on the drawings.

PART 3: EXECUTION

3-1 Manhole and Handhole Location:

Manholes and handholes shall be installed as shown on the drawings and in no case be placed at a spacing exceeding 500 feet in dense commercial/industrial areas and 1,000 feet elsewhere. In no case shall conduit bend radius exceed 180• between manholes. All cavities required for cable pulling purposes shall be constructed as load bearing manholes or handholes. Handholes shall not be placed in any traveled lane including road shoulders. At a minimum, manholes shall be installed at each street intersection.

3-2 Construction of Manholes:

Concrete construction shall conform to the requirements for reinforced concrete. Concrete bases shall be poured on undisturbed ground. Pipe sections shall be flush on the inside of the structural wall (except as noted below) and project outside sufficiently for proper connection to the next pipe section. All pipelines into a manhole or an inlet shall have a joint located no more than 12-inches from the exterior wall. Where incoming pipes enter a storm drain manhole or inlet at a elevation three (3) feet or greater above the base, the incoming pipe shall project two (2) inches inside the inlet or manhole. Grout all annular spaces around the pipe opening.

The ground surface below precast concrete bases shall be excavated six (6) inches below the elevation of the bottom of the base and backfilled with gravel or other

approved material. The gravel shall be carefully leveled and smoothed as to give uniform support to the precast base over its entire area. The precast base shall be set at the proper location to center the manhole.

The invert channels of manholes shall be smooth and semicircular in shape, conforming to the inside of the incoming and outgoing sewer pipelines. Changes in direction of flow shall be made with a smooth curve of as large a radius as the size of the manhole will permit. Where differences of 24 inches or less in invert elevations are called for, sloped flow channels shall be formed so the water does not undergo a vertical drop. A drop manhole shall be installed where the specified distance in the manhole inverts exceeds 24 inches. The inlet channels may be formed directly in the concrete of the manhole base. The floor of the manhole outside of the channel shall be smooth and shall slope towards the channel not less than one (1) inch per foot nor more than two (2) inches per foot. The manhole covers shall be set with a final elevation of 1/4- inch below finished grade in roadways and 1 - 2 inches above grade outside of roadways, unless otherwise directed. When a manhole is located in the pavement area, it shall not be constructed to final grade until the pavement has been completed, unless directed otherwise by the Project Manager.

Install joint material per manufacturer's instructions such that no voids are present. Grout all joints inside and outside after manhole assembly is completed.

Gaskets for connecting PVC and HDPE pipe to manhole sections shall be specifically manufactured for that purpose. The gasket shall provide for at least 5 bearing points on the pipe surface. The interior circumference of the gasket shall be approximately 5% less than the exterior circumference of the pipe. The gasket shall be as manufactured by Hamilton Kent Mfg. Co. of Kent, Ohio, or approved equal. Grout all annular spaces around pipe openings.

Stubs shall be provided at manholes when so shown on the drawings. Such stubs shall be sealed with a removable plug. Plugs shall be specifically manufactured for the pipelines in which they are to be installed. The plug shall be constructed of a material approved by the Project Manager and shall provide a permanent water-tight installation.

3-3 Adjusting Frames and Covers:

When grade adjustment of an existing structure is specified, remove frames and covers and reconstruct as required. Reset cleaned frames at the indicated elevation. Prior to final acceptance, clean structures of accumulations of silt, debris, or foreign matter.

3-4 Miscellaneous:

All steel inside manholes shall be galvanized and bared spots shall be treated with zinc rich paint.

Manholes and handholes shall have galvanized pulling eyes in opposite walls below the centerline of each conduit bank.

Conduits shall be sealed after cable has been installed using Johns-Manville ADuxseal@, Inmont Corporation APermagum@ or equal. Sealant shall be forced into conduits to a minimum depth equal to the conduit diameter.

3-5 Testing Manholes:
Refer to Section 02701.

END OF SECTION

SECTION 02527

REINFORCED CONCRETE PIPE

PART 1: GENERAL

1-1 Scope:

This section covers the furnishing and installation of reinforced concrete pipe and appurtenances for culverts, storm drains and sewers in the pipe diameter size range of 12" to 144".

1-2 Reference Standards:

All piping and fittings shall be of the type and materials specified herein or shown on the drawings and all materials shall be new and unused. All pipe sizes and all references to pipe diameter on the drawings or in the specifications are intended to be nominal diameter, and shall be interpreted as such.

Work covered by this section will not be accepted until specified tests and backfilling connected with the work have been completed satisfactorily. Any section of storm sewer line that is found defective in tests, materials, alignment, grade, or joints before acceptance shall be corrected to the satisfaction of the Project Manager without additional cost to the City.

A copy of the manufacturer's installation recommendations for each kind of pipe must be provided to each foreman and inspector prior to construction and must be followed during construction unless otherwise instructed.

1-3 Submittals:

Submittals shall be required for all reinforced concrete pipe, end sections, joint material, and any other materials used for the installation of reinforced concrete pipe. Submittals shall be approved by the Project Manager prior to delivery to the job site. The Contractor shall be required to submit drawings, specifications, and other data showing complete details of the design, fabrication and construction of the reinforced concrete pipe to the Project Manager for review before manufacture of the pipe begins. These submittals shall include data on all materials proposed to be used in the pipe, the size and location of each cage of the reinforcement, joint details including reinforcement, gasket details, and test results on materials, joints and pipe.

1-4 Quality Assurance:

Manufacturer’s certificates of compliance in accordance with ASTM C76 and installation recommendations shall be provided.

The pipe will be tested by the manufacturer based on the 3-edge bearing test for both the 0.01 inch crack and the ultimate strength as set forth in ASTM C-497 and at the Contractors own cost. Said cost shall include the pipe, testing, and report to the engineer, the pipe shall be tested at the manufacturer's plant. Not more than one percent of the number of pipe lengths, but no fewer than 2 pipes, for each size of pipe, will be tested. The Engineer may select the pieces to be tested.

PART 2: MATERIALS

2-1 Reinforced Concrete Pipe:

The reinforced concrete pipe shall comply with the requirements of ASTM C76. The pipe shall be Class III unless noted otherwise on the drawing. The cement for the pipe shall conform to the requirements set forth in ASTM 150 and shall be type II and shall have a minimum compressive strength of 4,000 psi. All wall thicknesses shall be those established in "Wall B" in Table 3, of said C76 specification, and the reinforcement shall be shown in the same "Wall B". Each joint of pipe shall be 7'-6" or greater in length.

No elliptical reinforcement will be permitted except for any elliptical reinforced concrete pipe designated on the construction plans.

Lifting holes will not be permitted in any of the pipe.

The following shall be clearly marked on the interior surface of the pipe:

- ASTM Specification
- Date of manufacture
- Class and size
- Name or trademark of Manufacturer

The joint design shall be tongue and groove, or bell and spigot. Joints for the circular reinforced concrete pipe shall be all rubber gasket conforming to ASTM C-443, latest revision. The gasket shall be attached to the spigot of the pipe and shall make the joint flexible and watertight. The Contractor may use butyl mastic joint sealant in rope or trowel applied form in lieu of rubber gaskets for circular pipe if approved in writing by the Project Manager. For all non-circular pipe and culverts, butyl mastic joint sealant may be used. The Contractor shall submit test results and material specifications on the sealant to the Project Manager before the Project Manager gives written approval of its use. This sealant must be made specifically for permanently sealing joints in tongue and groove concrete sewer pipe, must adhere tightly to the pipe surface, and form a tight flexible joint. The gaskets or sealants shall be installed as directed by the manufacturer of the pipe.

Flared end sections, bends and tees shall comply with the requirements of ASTM C76 and shall be the same class and shall have the same joint design as the pipe described above.

Visual inspections of all materials will be made at the job site, and pipe will be rejected on account of any deficiencies covered by ASTM Specification Designation C76 or on account of the following:

- Porous spots, inside or outside, having a greater area than 10 square inches and a depth of more than 1/4 inch.
- Patched or repair of porous spots or other defects that are not approved by the Engineer.
- Exposure of reinforcement which indicates the reinforcement has been replaced.

PART 3: EXECUTION

3-1 Laying Pipe:

All materials shall be carefully lowered into the trench piece-by-piece by means of a derrick, ropes or other suitable tools or equipment, in such a manner as to prevent damage. Under no circumstances shall materials be dropped or dumped into the trench. All pipe shall be inspected for defects prior to installation. Any defective, damaged or unsound pipe shall be rejected.

All foreign matter or dirt shall be removed from the inside of the pipe and fittings before it is lowered into its position in the trench.

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the trench. If the pipe-laying crew cannot put the pipe into the trench and in place without getting dirt into it, the Project Manager may require that before lowering the pipe into the trench a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipes.

An approved snug-fitting stopper or plug shall be installed in each pipe immediately after it is laid and prior to any further excavating, or backfilling. All openings along the line of the main shall be securely closed as directed and in the suspension of work at any time, stoppers shall be placed to prevent dirt or other substances from entering the main. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe.

Pipes shall be laid to a true line and at uniform rates of grade between manholes as shown on the drawings. Fine grading to the bottom of the barrel shall proceed ahead of the pipe laying. The grade shall be accurately established for each joint by laser beam. The laser beam shall be checked with a level each time it is moved and each day before construction proceeds, and thereafter as required to assure that it is set at the correct alignment. If any errors of grade are observed, pipe laying shall stop until the grade is corrected.

Holes shall be dug for the pipe bells and coupling bands and the material placed along the preceding pipe laid. The pipe shall be supported for the bottom 90 degrees and throughout its length (except for the minimum distance necessary at the bell holes) as shown on the drawings. Bell holes shall be adequate to make the joint, but no larger than necessary so that maximum support on undisturbed ground will be provided for the pipe. In no event shall the weight of the pipe be resting on the bell. The remainder of the pipe shall be surrounded to at least the mid-point of the pipe with granular bedding material, shovel placed and hand tamped, to fill completely all spaces under and adjacent to the pipe.

Pipe laying should proceed upgrade with the spigot ends pointed in the direction of flow. No pipe shall be laid in water or when the trench conditions are unsuitable for such work, except by written permission of the Project Manager. The Contractor shall make all connections of pipe to the manholes which have previously been constructed. When connecting to existing sewers, the Contractor shall take every precaution necessary to prevent dirt or debris from entering the existing lines.

Bedding shall be placed under and on both sides of the pipe as each length of sewer pipe is installed.

3-2 Joining Pipe:

Use method of joining conduit sections that ensures that ends are fully entered and inner surfaces are flush and even. The equipment used to force the joints together must be adequate enough to overcome the gasket pressure involved.

Just prior to joining the pipes, the ends of the pipe shall be thoroughly cleaned with a wire brush to remove all foreign substances which may have adhered to the pipe surface. All dust and dirt shall be removed with a clean rag. A lubricating solution which is not injurious to the gasket or concrete, such as flax soap or water glass, shall be liberally applied to the gasket groove and to the entire surface of the bell ring. Following this operation, a thin film of lubricant shall be applied to the gasket which shall then be snapped into place in the groove, after which a small diameter smooth steel rod shall be inserted between the gasket and groove and run completely around the gasket to equalize the gasket tension.

In the event that any foreign matter becomes imbedded in the lubricant, or the lubricant becomes contaminated by water or other substances before the joint is started, the area affected shall be re-cleaned and new lubricant shall be applied. The pipe being jointed shall be carefully moved into position, line and grade checked, and, as the spigot end is started into the bell of the section previously laid the gasket position shall be checked to ensure uniform entry in to the bell at all points.

3-3 Testing and Flushing Pipe:

Prior to acceptance of each section of storm sewer line, the Contractor shall jet clean all sewers up through 18 inches in diameter. Larger storm sewers shall be cleaned by other appropriate methods approved by the City. All dirt and debris shall be prevented from entering the existing storm sewer system by means of water tight plugs or other suitable methods.

When the City cleans the mains by rodding, jetting, or both, the City shall assess the Contractor for the cleaning at a set per foot charge with a minimum dollar amount.

The City will televise all mains, and the City will bill the Contractor for the televising at a set per foot charge with a minimum dollar amount. Any defects found during the televising will be repaired, in a manner approved by the City.

Any visible infiltration, which the City's authorized representative considers to be the result of poor installation of the specified materials, shall be repaired in a manner approved by the City before the work will be accepted.

Before acceptance of the work, the City's authorized representative will survey the manhole invert and surface elevations. Any inverts of surface elevations not meeting the design plans shall not be approved and shall be redone to the satisfaction of the City.

Upon completion of the contract, the City will carefully inspect all sewers and appurtenances. Any unsatisfactory work shall be removed and replaced in a proper manner. The invert of sewer and manholes shall be left smooth, clean, and free from any obstructions throughout the entire line. Manhole rings and covers must be raised to finished grade before the acceptance of the sewer.

Additional testing required for reinforced concrete pipe used in sanitary sewer installations shall be as specified in Section 02701.

END OF SECTION

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SECTION 02601

TESTING OF WATER PIPELINES

PART 1: GENERAL

1-1 Scope:

The work of this section consists of hydrostatic pressure testing of water pipe.

PART 2: MATERIALS

2-1 Test Equipment:

The Contractor shall provide all necessary test equipment including test pumps, pipe, connectors, meters, gauges, instruments, and other equipment required. Pressure gauges used shall be graduated in increments not greater than five (5) psi and shall have a range of approximately twice the test pressure. Gauges, meters and other instruments shall be calibrated prior to testing.

PART 3: EXECUTION

3-1 Notification and Witness:

The Contractor shall notify the Project Manager of all tests at least 48 hours prior to testing so the Project Manager can witness the tests.

The pipe may be subjected to hydrostatic pressure and inspected and tested for leakage at any convenient time after the trench has been backfilled as permitted by the Project Manager. Where any section is provided with concrete thrust blocks, the pressure test shall not be made until at least two days have elapsed after the concrete was installed.

3-2 Pressure Test:

All new pipe shall be pressure tested prior to connection to the existing system. All pipe shall be tested at a pressure of 150 psi at the lowest point in each section or 1-1/2 times the working pressure, whichever is greater.

Prior to testing, all equipment which could be damaged by the test pressure shall be isolated or removed. This equipment shall be replaced in the system after testing is complete. All pipe and appurtenances shall be backfilled unless otherwise permitted by the Project Manager.

The Contractor shall slowly fill the pipe with water prior to testing and remove all air

from the piping system. Each valved section, unless otherwise directed by the Project Manager, shall be tested prior to connection to the existing system. The duration of each pressure test shall be at least two (2) continuous hours. Test time will be accrued only while full test pressure is on the system. All water used in testing the pipelines shall be provided by the Contractor from a potable water source.

The specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Project Manager. The Contractor shall furnish all necessary labor, equipment, connection plugs and corporation stops to the pipeline to perform the test.

No testing shall be permitted against valves or fittings that are part of the existing system unless specifically approved by the Project Manager. Any cracked or defective pipe, fittings, valves, or hydrants discovered during the pressure test shall be removed and replaced by the Contractor at his expense. The test shall be repeated until the test is satisfactory to the Project Manager.

3-3 Leakage Test:

A leakage test shall be conducted after the pressure test has been completed unless the pressure test indicates that there are no leaks. The contractor shall furnish the pump, pipe, connections, meters and all other necessary apparatus, and shall furnish all necessary assistance to conduct the test. The duration of each leakage test shall be two hours, and, during the test, the main shall be subjected to a hydrostatic pressure specified.

No pipeline installation will be accepted until the leakage is less than the amount computed by the following formula:

$$L = \frac{SD(P)^{0.5}}{133{,}200}$$

L = Allowable leakage in gallons (*per hour*) S =
Tested length of pipe (feet)
D = Nominal diameter of pipe (inches)
P = Average test pressure during the test (psi)

The Contractor shall, at his own expense, locate and repair the points of leakage until the leakage is within the specified allowance.

END OF SECTION

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SECTION
02615

STEEL PIPE

PART 1: GENERAL

1-1 Scope:

This section covers steel pipe 6 inches in diameter and larger, together with fittings, specials, and appurtenances.

Steel pipe smaller than 6 inches in diameter, miscellaneous small piping, pipe supports, cathodic protection, pressure and leakage tests, and cleaning and disinfection are covered in other sections.

Pipe trenching, bedding, and backfill shall be done in accordance with Section 02200. Steel piping shall be furnished and installed complete with all fittings, specials jointing materials, appurtenances, and accessories indicated on the drawings or otherwise required for proper installation and functioning of the piping.

1-2 Reference Standards:

Except as modified or supplemented herein, all steel pipe, fittings, and specials shall conform to the applicable requirements of the following standards:

American Water Works Association (AWWA)
American National Standards Institute (ANSI)
American Society for Testing and Materials
(ASTM) American Society of Mechanical
Engineers (ASME)

1-3 Submittals:

Submit certificates of compliance and manufacturer's literature on all materials used in the work in accordance with Section 01300.

PART 2: MATERIALS

2-1 Pipe Design:

Steel pipe, fittings, and specials may be either fabricated or mill type. In either case, all items shall be fabricated to the sizes, dimensions, and shapes indicated on the drawings or specified herein.

The specified size of fabricated pipe, fittings, and specials shall be the nominal inside diameter, in inches, where 12 inches and smaller in size, and the actual inside diameter of pipe lining, where 14 inches and larger in size. Where stab joint pipe is permitted and two or more pipe wall thicknesses are required for the same size pipe, pipe size may be adjusted slightly to allow the different classes of pipe to be stabbed together.

The specified size of mill pipe, fittings, and specials shall be the nominal pipe size as set forth in ANSI/ASME B36.10.

A. Pipe Wall Thickness. The pipe wall thickness shall be determined by the pipe fabricator using the following formula, except that all pipe shall have a wall

$$t = \frac{PD}{2s}$$

thickness of at least 1/4 inch:
where:

t = The pipe wall thickness in inches.

s = The allowable fiber stress in psi which shall not exceed 50 percent of the yield strength of the steel plate at working pressure or 75 percent of the yield strength at shop test pressure.

P = The pipe working pressure or shop test pressure in psi.

D = The pipe outside diameter, in inches, of straight pipe sections or the larger outside diameter of tapered sections.

B. Fitting Dimensions. Unless otherwise permitted by the Engineer, the dimensions of steel pipe fittings shall be as indicated on the drawings.

C. Reinforcement of Fittings and Specials. All bends, fittings, branch connections, reducers, and special sections shall be reinforced, or the wall thickness shall be increased, so that the combined stresses due to internal pressure (circumferential and longitudinal) and bending will not exceed 67 percent of the yield strength of the pipe material.

Whether or not indicated on the drawings, reinforcements or additional wall thickness shall be provided as required to ensure that the combined stresses do not exceed the specified maximum. Unless otherwise indicated or directed, the internal pressure shall be the specified shop test pressure for the piping adjacent to the item in question, and the dead load shall be equal to the pipe full of water.

Wall thicknesses of reducing sections shall be not less than the required thicknesses for the larger ends.

D. Joints. Acceptable joints of the type indicated on the drawings and as specified herein shall be provided for all pipe installations in the locations indicated or approved by the Project Manager. To facilitate installation, additional field-welded or mechanically coupled joints may be provided. Additional field joints shall be kept to a minimum, and their location shall be acceptable to the Project Manager. Field-welded joints shall not be used in pipe smaller than 27 inches, except in locations where the interior coating can be satisfactorily repaired and inspected.

2-2 Pipe Materials:

A. All Pipe, Fittings, ANSI/AWWA C200. All steel shall be fully killed and Specials made to a fine austenitic grain size practice.

B. Flanged Joints

Flanges	ANSI/AWWA C207, and be the slip-on type, except where otherwise permitted or required.
Dimensions and drilling	ANSI/AWWA C207, Class F, where indicated on the drawings, specified, or required to match existing or equipment flanges.
Blind Flanges	ANSI/AWWA C207, unless otherwise indicated on the drawings or specified.
Gaskets	ANSI/AWWA C207 full-face type, John Crane "Style 999" neoprene, 1/8 inch thick, for field test pressures up to 250 psi; ring type, John Crane "Style 4160" compressed aramid fiber sheet, 1/16 inch thick, for field test pressures above 250 psi. The products of other manufacturers and other products of the manufacturer named herein will not be acceptable unless a certificate of product suitability is submitted as set forth in the Drawings and Data paragraph herein.
Insulated Flanges	
Flanges	As specified herein, except bolt holes shall be enlarged as required to accept bolt insulating sleeves.

Insulation Kits	As manufactured by Central Plastics or PSI Industries
Insulating Gaskets	Type E, pyrox 1E glass reinforced shall be: epoxy, 1/8 inch thick, with Buna-N sealing element
Bolt Insulating	Mylar, 1/32 inch thick. Sleeves
Insulating Washers	Phenolic laminate, 1/8 inch thick, one for each flange bolt
Backing Washers	Steel, 1/8 inch thick, two for each flange bolt.

C. Flange Bolting

Materials	ANSI/AWWA C207
Type	Bolt and nut; bolt-stud and two nuts permitted for 1 inch and larger.
Bolts and Bolt-studs	
Length	Such that ends project 1/4 inch to 2 inch beyond surface of nuts and
Ends	Chamfered or rounded.
Threading	ANSI/ASME B1.1, coarse thread series, Class 2A fit. Bolt-studs may be threaded full length.
Bolt Head Dimensions	ANSI B18.2.1; regular pattern for conform tusker, heavy pattern for hexagonal.
Nuts	
Dimensions	Hexagonal conforming to ANSI/ASME B18.2.2, heavy, semifinished pattern.
Threading	ANSI/ASME B1.1, coarse thread series, Class 2B fit.

D. Stab Joints Bell-and-spigot with rubber gasket as sole element depended upon for water tightness.

Bells and Spigots	Rolled groove, Carnegie shape, or fabricated type, as required or permitted.

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Rubber Gasket	Continuous O-ring; ANSI/AWWA C200, Section 3.6, except basic polymer shall be synthetic rubber. Natural rubber will not be acceptable.

E. Mechanical Couplings

Insulating	Baker "Series 216", Dresser "Style 39", or Smith Blair "416"; without pipe stop.
Reducing	Baker "Series 220", Dresser "Style 62", or Smith Blair "413" and "415"; without pipe stop.
All Others	Baker "Series 200", Dresser "Style 38", or Smith Blair "411 Flexible Coupling"; without pipe stop.

F. Restrained Joints — Of the type indicated on the drawings or specified.

Lugs or Collars	ASTM A283, Grade B or C; or ASTM A36. Tie Bolts

ASTM A193, Grade B7.

Threading	ANSI/ASME B1.1, Class 2A fit, coarse thread series for 7/8 inch and smaller, and 8-thread series for 1 inch and larger, and
Ends	Chamfered or rounded.
Nuts	Hexagonal, ASTM A194, Grade 2H or better.
Threading	As specified for tie bolts except Class 2B fit.
Dimensions	ANSI/ASME B18.2.2, heavy semi finished pattern.
Flat Washers	Hardened steel, ASTM A325.

G. Small Branch Connections

Pipe Nipples	Seamless black steel pipe, ASTM A53, standard weight(Schedule 40).

Welding Fittings

Threaded Outlets	Bonney "Thredolets", Porter AW-S Teelets", or Vogt "Weld Couplets", or
Welded Outlets	Bonney "Weldolets", Porter "W-S Teelets", or Vogt "Weld Couplets".

H. Coatings and Linings

Rust-inhibitive Primer	Ameron "Amercoat 3153A Universal Primer", Cook "391-N-167 Barrier Primer", Kop-Coat "340 Gold Primer", Tnemec "37-77 Chem-Prime", or Valspar "13-R-28 Chromox Primer".
Rust-preventive Compound	Houghton "Rust Veto 344".
Coal Tar Enamel	ANSI/AWWA C203.
Liquid Epoxy	ANSI/AWWA C210.
Tape Coating	ANSI/AWWA C209 and C214. Cement Mortar

ANSI/AWWA C205 and C602.

Cement	ASTM C150, Type II.
Sand	ANSI/AWWA C205, Section 2.3, except sand for field-applied lining shall pass a 16 mesh sieve.
Epoxy Bonding Agent	ASTM C881, Type II, moisture-insensitive and suitable for service conditions.
Latex Admixture	Protex Industries "Probond Vinyl".
Thixotropic	MIL-C-18480; Kop-Coat
Coal Tar	"Bitumastic No.50" or Tnemec "46-450 Heavy Tnemecol".

I. Bituminous Filler for	Plastic asphalt roof cement, Wall Fittings asbestos-Free; ASTM D4586, Type II.

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J. Watertight Pipe Sleeve	Thunderline Corporation "Link Seal",insulating type with modular rubber sealing elements, nonmetallic pressure plates, and, galvanized bolts and nuts.
K. Anchor Bolts	ASTM A307.

2-3 Shop Inspection and Testing:

Except as otherwise indicated or acceptable to the Project Manager, all materials furnished and work performed shall be inspected and tested by the pipe manufacturer in accordance with ANSI/AWWA C200. All costs in connection with such inspection and testing shall be borne by the Contractor.

Copies of all test reports shall be submitted as set forth in the submittals section.

The City reserves the right to sample and test any pipe after delivery and to reject all pipe represented by any sample which fails to comply with the specified requirements.

A. City's Inspection at the Shop. If the City elects to inspect any work performed or materials furnished, as permitted under Section 1.4 of ANSI/AWWA C200, all costs in connection with the City's inspector will be paid for by the City. Additional weld test specimens shall be furnished to the City's inspector for an independent testing laboratory whenever, in the judgment of the City's inspector, a satisfactory weld is not being made. Test specimens shall also be furnished when the City's inspector desires. The entire cost of obtaining, inspecting, and testing of such additional specimen plates, welds, or materials will be borne by the City. If any specimen is found not to conform to the specified requirements, materials represented by the specimen will be rejected. The expense of all subsequent tests, due to failure of original specimens to comply with the specifications, shall be the responsibility of the Contractor.

Work to be performed by the City's inspector at the fabricating shop will include checking of flange alignment after welding to the pipe and tolerances of stab joints.

In addition to making or witnessing all specified tests and submitting reports to the Project Manager as may be required, the City's inspector will make written reports to the Contractor concerning all materials rejected, noting the reason for each rejection.

Inspection by the City's inspector, or failure to provide inspections, shall not relieve the Contractor of his responsibility to provide materials and perform the work in accordance with the Contract Documents.

B. Welding Procedures, Welder Qualifications, and Testing. All welding procedures, welders, welding operators, and tackers shall be qualified in accordance with AWS D1.1 and as defined in ANSI/AWWA C200. All qualifications shall be in accordance with all-position pipe tests as defined in Section 5 of AWS D1.1.

All shop welds on steel pipe and fittings shall be ultrasonically tested by the fabricator, by qualified and certified operators. Shop ultrasonic weld tests shall be in accordance with Section 9 of API 5L, 37th Edition. All costs for shop ultrasonic testing shall be paid for by the Contractor. One copy of all ultrasonic test reports shall be furnished to the Contractor and the Project Manager. Personnel performing visual inspection of welds shall be qualified and currently certified as Certified Welding Inspectors (CWI) in accordance with AWS QC1, Standard for Qualification and Certification of Welding Inspectors. Personnel performing ultrasonic and radiographic tests shall be qualified and certified to the requirements of SNT-TC-1A.

Nondestructive examination procedures shall be submitted in accordance with the requirements of the submittals section at the time welding procedures are submitted. Records of inspection, nondestructive examination, and material certification shall be furnished to the Project Manager.

All costs for shop weld inspection shall be paid for by the Contractor.

2-4 Ends of Sections:

A. For Field Welding. Ends of pipe, fittings, and specials for joints butt-welded in the field shall have the ends beveled for butt welding in accordance with the governing standards.

Ends of pipe, fittings, and specials for field-welded lap joints shall have both the bell and the spigot expanded by pressing (not rolling) to obtain the required shape and the required welding tolerances.

B. For Fitting with Flanges. Ends to be fitted with slip-on flanges shall be prepared to accommodate the flanges in accordance with the governing standards.

C. For Stab Joints. Stab joints shall be designed so that the gasket will maintain a watertight joint under all conditions of service, including expansion, contraction, and earth settlement. The gasket shall not support the entire weight of the pipe. Spigot ends shall have a groove to retain the gasket. Pipe ends shall be self-centering without the aid of the gasket.

D. For Mechanical Couplings. Ends to be joined by mechanical couplings shall be plain end type in accordance with the governing standard. In addition, the welds on ends to be joined by couplings without pipe stops shall be ground flush to permit slipping the coupling in at least one direction to clear the pipe joint.

E. For Connection to Dissimilar Pipe Materials. Steel pipe connections to buried or submerged concrete pipe or cast iron pipe shall be made with insulated flanges.

2-5 Seams:

Except for seamless mill-type pipe, all piping shall be made from steel plates rolled into cylinders or sections thereof with the longitudinal seams butt-welded, or shall be spirally formed and butt-welded. There shall be not more than two longitudinal seams. Girth seams shall be butt-welded and shall be spaced not closer than 10 feet apart except in specials and fittings.

2-6 Pipe Lengths:

Straight pipe sections shall be 40 foot lengths unless otherwise indicated on the drawings.

All pipe to be connected with mechanical couplings shall be fabricated so that the space between pipe ends within the couplings will not exceed the allowable as recommended by the coupling manufacturer but will be at least 2
inch.

2-7 Small Branch Connections:

Branch connections 2-1/2 inches and smaller shall be made with welding fittings with threaded outlets. Where there is some doubt as to the exact outlet size desired, but it is known that the size will be less than 1 inch, a 1 inch outlet shall be provided and reducing bushings used as required.

Branch connections 3 inches through 12 inches in size shall be made with pipe nipples or with welding fittings with welded outlets. Pipe nipples and welding fittings shall be welded to the pipe shell and reinforced as required to meet design and test requirements.

Small branch connections shall be located so as not to interfere with joints, supports, or other details and shall be provided with caps or plugs to protect threads during shipping and handling.

2-8 Drains and Vents:

In interior locations, drains and vents shall be provided at the locations and in the sizes indicated on the drawings. Pipe used for drain and vent piping shall be ASTM A53 standard weight, black steel pipe. Drain valves shall be hose valves. Vent valves shall be resilient seat globe valves. Drain and vent valves shall comply with the requirements of the miscellaneous valves section.

2-9 Flanged Joints:

Flange faces shall be normal to the pipe axis. Angular deflection (layback) of the flange faces shall not exceed the allowable set forth in Section 4.3 of ANSI/AWWA C207. All flanges, after welding to the pipe, shall be refaced, if necessary, to prevent distortion of connecting valve bodies from excessive flange bolt tightening and to prevent leakage at the joint.

Pipe lengths and dimensions and drilling of flanges shall be coordinated with the lengths and flanges for valves, pumps, and other equipment to be installed in the piping. All mating flanges shall have the same diameter and drilling and shall be suitable for the pressures to which they will be subjected.

Flanges shall be of the slip-on type, except that welding-neck or slip-on flanges welded to short lengths of pipe shall be used where installation of flanges in the field is permitted or required.

Insulated flanged joints shall be installed where indicated on the drawings. In addition to one full-faced insulating gasket, the flange insulating assembly for each insulated flanged joint shall consist of one full-length sleeve, one insulating washer, and two backing washers for each flange bolt. The insulating gasket ID shall be 1/8 inch less than the ID of the flange in which it is installed. The insulated flanged joint accessories shall be installed in accordance with the instructions and recommendations of the manufacturer.

2-10 Stab Joints:

Rubber-gasketed bell-and-spigot (stab type) steel pipe shall be furnished where indicated or specified. The design of the rubber-gasketed bell-and-spigot joints shall be subject to review and acceptance by the Project Manager.

The difference in circumferential measurements between the outside of the spigot end and the inside of the bell shall be not more than 0.12 inch. Bends in the pipe wall forming each bell shall have a radius of at least 15 times the pipe wall thickness.

The Contractor shall obtain from the fabricator and shall submit certification indicating that the pipe joints will successfully withstand working pressures and test pressures equal to those specified, and documentation that joints of the type proposed have performed satisfactorily under similar conditions.

Gasket installation and other jointing operations shall conform to the instructions and recommendations of the pipe manufacturer. All joint surfaces shall be lubricated with heavy vegetable soap solution immediately before the joint is completed. Lubricant shall be suitable for use in potable water, shall be stored in closed containers, and shall be kept clean. Measurements shall be taken at the joints after installation to ensure that the specified clearances have not been exceeded at any point.

2-11 Mechanical Couplings:

The middle ring of each mechanical coupling shall have a thickness at least equal to the wall thickness specified herein for the size of pipe on which the coupling is to be used. The length of each middle ring shall be not less than 10 inches for 36 inch and larger pipe and not less than 7 inches for pipe smaller than 36 inch size.

The interior surfaces of the middle rings of all mechanical couplings and the remaining surfaces of all components of submerged or buried mechanical couplings, including bolts, nuts, and washers, shall be prepared for painting in accordance with instructions of the paint manufacturer and shall then be coated with liquid epoxy in accordance with ANSI/AWWA C210. The remaining components of mechanical couplings which are to be installed in exposed or interior locations shall be cleaned and shop primed with the manufacturer's standard rust-inhibitive primer.

2-12 Restrained Joints:

Restrained joints shall be flanged, welded, or harnessed, as specified or indicated on the drawings.

Where indicated on the drawings, mechanically coupled or stab-type joints shall be restrained with harness bolts and lugs or collars. Joint harnesses shall conform to the details indicated on the drawings. Lugs or collars shall be shop welded to the pipe and coated as specified for the adjacent pipe.

2-13 Welded Joints:

All welds shall be sound and free from embedded scale or slag, shall have tensile strength across the weld not less than that of the thinner of the connected sections, and shall be watertight.

Butt welds shall be used for all welded joints in pipe assemblies and in the fabrication of bends and other specials. Field-welded joints, where permitted, shall be either butt-welded or lap-welded.

Field welding of joints shall conform to ANSI/AWWA C206. Single field-welded butt joints with outside backing rings may be used for pipe larger than 27 inches in diameter. Backing rings will not be permitted for 27 inch and smaller pipe. Butt straps shall be welded on both the inside and outside of the pipe and at each end of the pipe and strap to avoid stress multiplication.

Field-welded lap joints shall have fillet welds both inside and outside to avoid stress multiplication. The outside weld may be a seal weld.

A. Welding Procedures, Welder Qualifications, and Testing. Shop inspection and testing shall be in accordance with the shop inspection and testing provisions herein. Field welding procedures, welders, welding operators, and tackers shall be qualified in accordance with AWS D1.1 and as defined in Section 3 of ANSI/AWWA C206 or ANSI/AWWA C200, as applicable. All qualifications shall be in accordance with all-position pipe tests as defined in Section 5 of AWS D1.1.

For field welding, the welder qualification testing shall be performed at the project site. Previous qualifications will not be accepted. The Contractor shall provide the services of an independent testing laboratory to perform the welder qualification onsite. Copies of all test data and certifications shall be provided to the Project Manager. All costs for welder qualification testing shall be paid for by the Contractor.

Upon completion of each field-welded joint, the welding operator shall mark his regularly assigned identification number and the last two numbers of the year in which the work was completed, or the Contractor may have a records system that traces a welder's work completion to a specific joint. Steel stamping directly on piping will not be permitted unless "low stress" die stamps, such as interrupted dot or round nose types, are used.

Field welds will be randomly inspected and tested by an independent testing laboratory as directed by the Project Manager. Field lap welds will be inspected by magnetic particle or dye penetration methods. Field butt welds will be inspected in accordance with the requirements of API 1104 by the radiographic method and the acceptance criteria of API 1104. The Contractor shall inform the Project Manager before completed weld joints are to be backfilled so that the joint may be inspected. The Contractor shall assume all costs of exposing backfilled joints for inspection when backfilling preceded the inspection.

Personnel performing visual inspection of welds shall be qualified and currently certified as Certified Welding Inspectors (CWI) in accordance with AWS QC1,

Standard for Qualification and Certification of Welding Inspectors. Personnel performing nondestructive tests shall be qualified and certified to the requirements of SNT-TC-1A.

The Project Manager may also order nondestructive testing by an independent testing laboratory in addition to any testing specified herein.

Except as otherwise specified herein, all costs for the independent testing laboratory to inspect and test field welds will be paid for by the City. If the weld is defective, the inspection costs shall be paid for by the Contractor. Defective welds shall be repaired and retested at the Contractor's expense.

Test reports of all laboratory tests shall be submitted as provided in the quality control section.

2-14 Pipe Anchors, Blocking, Encasement, Hangers and Supports:

Pipe anchors, blocking, hangers, and supports shall be fabricated in accordance with the requirements of the pipe supports section and the details indicated on the drawings and shall be furnished and installed complete with all concrete bases, anchor bolts and nuts, plates, rods, and other accessories required for proper support of the piping. All piping shall be rigidly supported and anchored so that there is no movement or visible sagging between supports. Where the details must be modified to fit the piping and structures, all such modifications shall be subject to acceptance by the Project Manager. Unless otherwise permitted, lugs required for lateral or longitudinal anchorage shall be shop welded to the pipe.

Concrete reaction anchorage, blocking, encasements, and supports shall be provided as indicated on the drawings or as otherwise permitted by the Project Manager. Concrete for anchorages, blocking, encasements, and supports shall conform to the requirements of the cast-in-place concrete section.

2-15 Protective Coatings and Linings:

All steel pipe, fittings, specials, wall fittings, and accessories shall be lined, coated, or wrapped as specified herein.

A. Type of Coating and Lining. Surface preparation shall be in accordance with the coating or lining manufacturer's instructions. Types of protective coating and lining shall be as follows:

Exterior Surfaces Underground, C214, Including Those Encased in Concrete	Tape coating, ANSI/AWWA as modified herein.

Interior Surfaces	Cement mortar, ANSI/AWWA C205.
Pipe Joints	
Couplings	Shop coating as specified for each type of coupling. Field coating as specified for ends of sections.
Ends of Sections	As specified herein.
Machined Surfaces	Rust-preventive compound.

B. Field Coating and Repair of Coatings and Linings. Entry into the pipe pipeline for application of interior linings to unlined ends shall be from open ends or through access manholes, except as otherwise permitted by the Project Manager.

Field repair of shop-applied exterior coatings and interior linings shall conform to the following:

For Field-welded Joints

Cement Mortar

Hold back coating and lining 4 inches from joint. Field repair in accordance with Appendix A of ANSI/AWWA C205 as modified herein.

Tape Coating

Hold back at least 4 inches from joint. Field repair in accordance with ANSI/AWWA C209, except the total applied tape thickness shall be not less than 80 mils.

For Flanged Joints

Extend lining to ends of pipe. The coating of exterior surfaces is covered in the painting section.

For Stab Joints

Cement Mortar

Hold back the coating on spigots and the lining in bells from joints as specified for coal tar enamel coatings in ANSI/AWWA C203. Field repair in accordance with Appendix A of ANSI/AWWA C205 as modified herein.

Tape Coating

Hold back the coating on spigots as specified for coal tar enamel in ANSI/AWWA C203. Field repair in accordance with ANSI/AWWA C209.

For Mechanically Coupled Joints

Cement Mortar

Hold back coating 16 inches from joints; paint exposed surfaces with 2.5 mil dry-film thickness of Type B primer in accordance with ANSI/AWWA C203. Lining shall extend to end of pipe. Field coat exterior surfaces with 35 mil dry-film thickness of thixotropic coal tar. Repair of lining at joints not required.

Tape Coating

Hold back coating 16 inches from joints; paint exposed surfaces with 2.5 mil dry-film thickness of Type B primer in accordance with ANSI/AWWA C203. Field coat exterior surfaces with 35 mil dry-film thickness of thixotropic coal tar. Repair of lining at joints not required.

C. Modifications to the Governing Standards.

1. Shop-applied Cement Mortar Lining. Unless otherwise acceptable to the Project Manager, cement mortar lining for all 36 inch and smaller steel pipe shall be shop applied. Except as modified herein, shop-applied mortar linings shall comply with ANSI/AWWA C205.

a. Specials. Wire fabric reinforcement shall be used in lining of fittings and specials in accordance with Section 4.5 of ANSI/AWWA C205.

b. Field Repair. Field repair of inside joint surfaces shall be performed in accordance with Appendix A, Paragraph A2 of ANSI/AWWA C205, except that an epoxy bonding agent and latex admixture shall be used in conjunction with the sand and cement mortar. The addition of lime or pozzolan will not be permitted.

The exposed steel shall be thoroughly cleaned and all grease shall be removed. A coat of epoxy bonding agent shall be applied over the area to be lined in accordance with the manufacturer's recommendations. A coat of soupy mixture of cement and water shall be applied over the epoxy after it becomes tacky. Cement mortar to which the latex admixture has been added shall then be packed into the area to be patched and screeded off level with the adjacent cement mortar lining. The patched area shall be given an initial floating with a wood float, followed by a steel trowel finish.

Defective or damaged shop-applied cement mortar linings shall be removed, surfaces cleaned, and the lining repaired as specified above for joint repair.

c. Adjacent to Valves. Steel pipe installed adjacent to butterfly valves shall be provided with tapered cement mortar lining so that the valve disc will not interfere with the lining material during valve operation.

2. Shop-applied Tape Coat. Except as modified or supplemented herein, shop-applied tape coating shall comply with ANSI/AWWA C214. The tape coating system shall be composed of four layers consisting of a primer layer, one inner layer of tape for corrosion protection, and two outer layers of tape for mechanical protection. The total thickness of the tape coating system shall be not less than 80 mils. The outer layer of tape shall be white.

D. Field Inspection. All shop-applied exterior tape coatings on pipe, fittings, or specials shall be electrically inspected for holidays and other defects, and repaired if necessary. All electrical inspection shall be made in accordance with Section 2.14.12 of ANSI/AWWA C203. Inspection and repair of exterior coatings shall be performed by and at the expense of the Contractor, after receipt of the pipe, fittings, or specials on the job and before installation. Electrical inspection of exterior tape coatings after installation of the pipe, fitting, or special in the trench shall be made where, in the opinion of the Project Manager, the coating may have been damaged by handling during installation.

2-16 Provisions for Future Cathodic Protection:

Provisions shall be made for the future cathodic protection of underground steel pipelines. An insulated type joint shall be provided at each branch connection to an existing or future water line, each connection between concrete pipe or ductile iron pipe, and where indicated on the drawings. An electrical bond shall be provided across all other gasketed pipeline joints. Test lead stations, for monitoring the activity of electrical currents on the pipeline, shall be provided at each insulated joint, at each end of a casing pipe, at 1,000 foot intervals, and where indicated on the drawings.

A. Insulated Joints. Insulated joints shall be of the insulated flange type and shall be provided where indicated on the drawings or specified. After installation is completed, protective coatings shall be provided around the joint as specified herein.

B. Electrical Bond Across Rubber-gasketed Joints. Two electrical bonding cables shall be provided to and across each mechanical coupling and across each rubber-gasketed stab joint. Before the field joint coating is applied to mechanical couplings, two small areas of metal surface shall be exposed on the pipe on each side of the coupling, on the middle ring, and on each follower ring. Before the field joint coating is applied to stab joints, two small areas of metal surface shall be exposed on each side of the joint. Each area shall be thoroughly cleaned, and two cathodic protection cables shall be bonded to the pipe on either side of the joint and also to the middle ring and follower rings for mechanically coupled joints. Each cable shall be bonded by the thermite process. The completed connections and exposed metal surface shall be coated as specified for field repair of coatings.

C. Electrical Bond Across Valves and Flanges. Two electrical bonding cables shall be provided across valves and flanged connections other than insulated flanges. The electrical bond shall be provided as specified for bond across rubber-gasketed joints.

D. Bonding Cables. Bonding cable and test lead wires shall be not less than No.6
AWG, Type CP copper cathodic protection cable provided with low density, high molecular weight polyethylene insulation.

E. Test Lead Stations. Test lead stations shall be provided where specified or indicated. Test lead stations shall be in accordance with the details indicated on Figure 2-02615 included at the end of this section, and as specified herein. The test lead wires shall be terminated at the ground surface in a standard connection box in a protected location acceptable to the Project Manager. Standard connection boxes for test lead stations shall be C.P. Test

Services "NM-7" plastic terminal boxes, 18 inches long, 5 inch inside diameter, with a cast iron locking lid and a terminal block with seven terminals. Each connection box shall have the inscription "CP TEST" cast into its cover.

2-17 Handling:

Pipe, fittings, specials, and appurtenances shall at all times be handled and stored in a manner that will ensure installation in sound, undamaged condition.

2-18 Cleaning:

The interior of all pipe and fittings shall be thoroughly cleaned of all foreign matter before being installed and shall be kept clean until the work has been accepted.

Precautions shall be taken to ensure that foreign matter does not enter the pipe during jointing, lining repair, or inspection operations.

PART 3: EXECUTION

3-1 Alignment and Grade:

Pipe shall be laid to the lines and grades indicated on the drawings. Pipelines or runs intended to be straight shall be laid straight. Curves in stab joint pipe may be formed by opening the joint. Maximum joint openings and deflections shall be 1-1/2 degrees. In welded pipe, deflections up to 4-1/2 degrees may be made by shop-mitering one end of one pipe. Deflections up to 22-1/2 degrees may be made by shop-mitering the ends of two adjacent sections of pipe by equal amounts. Deflections greater than 22-1/2 degrees shall be made by use of fabricated bends.

High points which allow air to collect in pipelines will not be permitted unless an air release valve is indicated on the drawings at that location.

For pipelines in areas where the terrain is relatively flat and grade must be closely controlled, laser beam equipment, surveying instruments, or other suitable methods shall be used to maintain alignment and grade. At least one elevation reading shall be taken on each length of pipe. If laser beam equipment is used, periodic elevation measurements shall be made with surveying instruments to verify accuracy of grades. If such measurements indicate thermal deflection of the laser beam due to differences between ground temperature and the air temperature within the pipe, precautions shall be taken to prevent or minimize further thermal deflections.

3-2 Installation:

A. Buried Piping. All trenching, embedment, and backfilling for buried piping shall conform to the requirements of Section 02200 and the details indicated on the drawings.

Whenever pipe laying is stopped, the open end of the line shall be sealed with a watertight plug. All water in the trench shall be removed prior to removing the plug.

Pipe embedment and backfilling shall closely follow the installation and jointing of steel pipe in the trench to prevent flotation of the pipe by water which may enter the trench and to prevent longitudinal movement caused by thermal expansion or contraction of the pipe. Not more than 160 feet of restrained joint pipe shall be exposed at any time ahead of the backfilling in any section of trench. The backfill adjacent to each field joint may be temporarily omitted to provide adequate space for field coating the joints. Closure welds on restrained joint pipe shall be made during the cool part of the day.

B. Out-of-round Pipe. Pipe which deviates from a true circle by more than 1 percent shall be laid with its larger diameter vertical, or struts or jacks on continuous head and sill timbers may be used to correct the vertical diameter where permitted by the Project Manager. Struts or jacks shall be left in place until the joints at each end have been completed and until the pipe embedment and backfilling for the section have been completed to at least 12 inches above the top of the pipe. Final inspection, repair, and checking of interior lining shall be performed after the struts or jacks have been removed.

C. Flanged Joints. Care shall be taken in bolting flanged joints so that there is no restraint on the opposite end of the piece which would prevent pressure from being evenly and uniformly applied upon the gasket. The pipe or fitting must be free to move in any direction while bolting. Bolts shall be gradually tightened in a crisscross pattern, to ensure a uniform rate of gasket compression around the entire flange.

Special care shall be taken when connecting to pumping equipment to ensure that piping stresses are not transmitted to the pump flanges. All connecting piping shall be permanently supported so that accurate matching of bolt holes and uniform contact over the entire surface of flanges are obtained before any bolts are installed in the flanges. In addition, pump connection piping shall be free to move parallel to its longitudinal center line while the bolts are being tightened. Each pump shall be leveled, aligned, and wedged into position which will fit the connecting piping, but shall not be grouted until

the initial fitting and alignment of the pipe so that the pump may be shifted on its foundation if necessary to properly install the connecting piping. Each pump shall, however, be grouted before final bolting of the connecting piping. After final alignment and bolting, the pump connections shall be tested for applied piping stresses by loosening the flange bolts which, if the piping is properly installed, should result in no movement of the piping relative to the pump or opening of the pump connection joints.

D. Couplings. Surfaces of pipe ends and couplings which contact the sealing gasket shall be clean and free from foreign material when the coupling is installed on the pipe. Wrenches used in bolting couplings shall be of a type and size recommended by the coupling manufacturer. All bolts shall be tightened approximately the same amount, with all parts of the coupling square and symmetrical with the pipe. Following installation, the exterior coating of each coupling shall be touched up or reprimed.

3-3 Connections with Existing Piping:

Connections between new work and existing piping shall be made using fittings suitable for the conditions encountered. Each connection with an existing pipe shall be made at a time and under conditions which will least interfere with service to customers, and as authorized by the City.

Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations without damage to adjacent property.

Special care shall be taken to prevent contamination when dewatering, cutting into, and making connections with existing potable water piping. Trench water, mud, or other contaminating substances shall not be permitted to enter the lines. The interior of all pipe, fittings, and valves installed in such connections shall be thoroughly cleaned and then swabbed with, or dipped in, chlorine solution having a chlorine content of 200 milligrams per liter.

3-4 Concrete Encasement:

Concrete encasement shall be installed as indicated on the drawings. Concrete and reinforcing steel shall be as specified in Section 03300. All pipe to be encased shall be suitably supported and blocked in proper position, and shall be anchored to prevent flotation.

3-5 Hydrostatic Tests:

After installation, steel piping shall be tested for defective workmanship and materials by being subjected to a hydrostatic test as specified in Section 02601.

3-6 Leakage:

All steel piping shall be watertight and free from leaks. Each leak which is discovered within the correction period stipulated in the General Conditions shall be repaired by and at the expense of the Contractor.

3-7 Disinfection:

After installation, steel piping shall be disinfected as specified in Section 02675 - Disinfection of Water Pipe.

3-8 Drawings and Data:

Drawings, specifications, installation schedules, welding procedures and welder qualifications, and other data showing complete details of the fabrication, construction, weld locations, joint details and certification, and installation of pipe, fittings, specials, and connections, together with complete data covering all materials proposed for use, shall be submitted in accordance with Section 01300.

Submittals shall indicate the ASTM designation for the material from which each class of pipe is fabricated.

In addition to the markings, as specified under the governing standard, the Contractor's drawings shall include a complete laying schedule with piece description to show where each numbered pipe, fitting, or special is to be installed. The numbers indicated on the drawings shall correspond with those painted on the pipe.

If the flange gasket materials to be provided are other than the materials set forth herein, the Contractor shall obtain and submit a written statement from the gasket material manufacturer certifying that the gasket material or materials are compatible with the flanged joints specified herein and are recommended for the specified field test pressure.

END OF SECTION

SECTION 02616

POLYVINYL CHLORIDE (PVC) SEWER PIPE

PART 1: GENERAL

1-1 Scope:

This section covers the furnishing and installation of polyvinyl chloride (PVC) non-pressure pipe and appurtenances for storm drains, sanitary sewer mains and sewer services in the pipe diameter size range of 4" to 15".

1-2 Reference Standards:

References, American Society for Testing and Materials (ASTM).

1-3 Submittals:

In accordance with Section 01300, submit certificates of compliance and manufacturer's installation instruction or guides, and literature.

1-4 Product Handling:

Handle pipe and fittings to insure delivery in a sound, undamaged condition. Do not store materials on the ground. Use covers to protect materials from direct sunlight.

PART 2: MATERIALS

2-1 PVC Pipe:

The 4 to 15-inch diameter pipe shall be type PSM polyvinyl chloride (PVC) pipe and shall be suitable for gravity sewer service. The pipe material shall be PVC plastic having a cell classification of 12454-B or 12454-C or 13364-B (with a minimum tensile modules of 500,000 psi) as defined ASTM D1784. All PVC pipe and fittings shall meet or exceed all of the material requirements of ASTM D3034 and thickness requirements of SDR 35.

Provisions must be made for contraction and expansion at each joint with a rubber ring and integral thickened bell as part of each joint. Gaskets shall conform to ASTM F477. Pipe shall be supplied in laying lengths of 19-1/2 to 20 feet. All pipe and fittings shall be assembled with a non-toxic lubricant. Each length of pipe and all fittings shall have marked on the exterior the following:

- Manufacturer's Name or Trademark
- Nominal Pipe Size
- PVC Cell Classification (e.g. 12454-B)
- Legend - Type PSM SDR-35 Sewer Pipe
- ASTM - D3034

All fittings and plugs to be used with the PVC pipe shall be those manufactured by the manufacturer of the pipe. Each special fitting shall be a completely manufactured unit with either bells or spigots on each connection that are an exact duplication of the bells and spigots on the pipeline. Fittings with any other type of connections will not be accepted.

2-2 Plugs:

Plugs shall be specifically manufactured for the pipelines in which they are to be installed. The plug shall be constructed of a material approved by the Project Manager and shall provide a permanent water-tight installation without permanently sealing the joint.

2-3 Couplings:

Couplings shall be used only where shown on the drawings or where approved in writing by the Project Manager. The Contractor shall provide a description of an exact location of any couplings used.

Flexible couplings shall consist of a rubber gasket or boot with stainless steel tightening bands. The coupling shall conform to requirements of ASTM C425 and shall be "FERNCO"#1056 series, or approved equal.

2-4 Grout:

Grout shall be a non-shrink type with aluminum filings; grouts with iron filings are not acceptable. Group shall be "Five Star Grout," "Embeco Grout" or equal. The Contractor may substitute a 2-component, 100% solids epoxy resin (Sikadur Hi-Mod LV) for the specified grout.

Grout used for sealing service connections shall be a 2-component, waterproof epoxy grout specifically manufactured for this application. The grout shall adhere to any of the dissimilar materials.

2-5 Sealants:

Sealants used on manholes or pipe connections shall be equal to SIKAFLEX-la, a one component polyurethane base, elastomeric sealant. When required due to moisture or immersion, provide SIKAFLEX 429 primer for application onto the substrate according to manufacturer's recommendation.

PART 3: EXECUTION

3-1 General:

Each pipe length and fitting interior, interior surface of bells, and exterior surface of spigots shall be cleaned of all foreign material before placing it in the trench and shall be kept clean all times thereafter. Each item must also be examined for cracks and other defects before installation.

Pipe shall be cut, only whenever necessary, to conform to location of manholes or connections. All cuts shall be straight, true, and at right angles to the axis of the pipe unless otherwise noted or directed by the Project Manager. The cutting process shall leave a smooth end without damaging the pipe. All burrs shall be removed from the ends of cut pipe, and the end lightly rasped or filed. All tools used in cutting pipe shall be subject to the Project Manager's approval.

Pipe laying shall proceed with the spigot ends of pipe pointing in the direction of the flow, unless otherwise approved by the Project Manager. Each pipe length shall be laid true to line and grade in such manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets to the flow line. Pipe shall be laid in an unwatered trench and shall not be used for draining water from the trench.

Whenever the pipe is left unattended or pipe laying is not in progress, temporary plugs shall be installed at all openings. Temporary pugs shall be watertight and of such design as to prevent debris and animals from entering the pipe. All temporary plugs shall be subject to approval of the Project Manager.

The Contractor shall install the materials in accordance with the manufacturer's recommendations. If there is a conflict between the Contract Documents and the manufacturer's instructions, the Contractor shall obtain resolution from the Project Manager before proceeding with the work.

3-2 Pipe Installation:

A. Pipe Laying. No deflection in the joints shall be allowed. All pipe shall be fully supported by the full length of pipe barrel without support by the bell mounding.

When curved sewers are indicated on the drawings, the alignment curve shall be accomplished by installing the pipes on uniform curves by deflecting the pipe barrel. The minimum curves are shown below:

Pipe Diameter Inches	Minimum Radius Feet	Offset 20' length Inches
4	150	16
6	200	12
8	250	10
10	300	8
12	350	7
15	400	6

B. Pipe Joints. The outside of the spigot and the inside of the bell shall be thoroughly wiped clean. Set the rubber ring in the bell with the marked edge facing toward the end of the bell. Lubricate the spigot end using a thin film of the manufacturer-supplied lubricant. Push the pipe spigot into the bell. Position the completed joint so that the mark on the pipe end is in line with the end of the bell.

Bevel the end of the pipe with a beveling tool after the pipe is field cut. Place a clearly visible position mark at the correct distance from the end of the field-cut pipe.

3-3 Connection of Pipe to Concrete Manhole Base:

The pipe shall be encased in the concrete for the manhole base as detailed on the Drawings and special provisions shall be made for water tightness of the connection.

The exterior circumference of the pipe where encased in concrete for water tightness shall be uniformly roughened or scarified by sanding with coarse sandpaper or emery cloth for a minimum of 6-inches encased length.

Additionally, gasket as specified elsewhere shall be stretched onto the PVC pipe to form a weep ring where encased in concrete. Any alteration to the above specified methods for PVC pipe connection to concrete shall be submitted to the Project Manager for approval.

3-4 Grouting:

Any opening between manhole wall and pipe made by the Contractor, or designated elsewhere, shall be closed watertight with grout. The opening shall be of sufficient size to accommodate the pipe, "O" rings, and grout. The grout shall extend no less than the full width of the manhole barrel.

Channels that have been cut into concrete bases shall be smoothed to the specified contour with grout. The grout shall extend no less than the full width of the manhole barrel.

3-5 Temporary Plugs:

Where required on drawings and at the end of each sewer service, the pipe shall be sealed with a removable plug. Plugs shall be specifically manufactured for the pipelines in which they are to be installed. The plug shall be constructed of a material approved by the Project Manager and shall provide a permanent watertight installation without permanently sealing the joint.

3-6 Sewer Services:

Sewer service pipelines are to be installed in accordance with the details set forth on the Drawings and with appropriate installation requirements of this Specification.

The general location of the service lines is shown on the Drawings. Actual locations of these pipelines are to be determined in the field by the Project Manager prior to main pipeline construction. It shall be the Contractor's responsibility to notify the Project Manager prior to constructing each main pipeline so that the Project Manager may have adequate time to determine the final location of each service tee or wye fitting to be installed in the main pipeline. Failure of the Contractor to properly notify the Project Manager as noted above will result in the Contractor's removal of any portion of the main pipeline which is necessary to install the fittings in their proper location as determined by the Project Manager.

The Contractor will be allowed to tap and install a service saddle to new sewer pipelines only at those locations approved in writing by the Project Manager. Connections onto PVC pipelines shall be made only by boring or drilling with equipment designed for this purpose. Connections shall not be made by impact equipment. The Contractor shall request, in writing, Project Manager approval of methods and equipment he proposes to use for connections.

The Contractor shall remove from the pipeline all debris created by making connections before the service line is connected.

Service line saddle connections shall be attached to the main line with an epoxy bonding agent. The bonding agent shall be applied to a clean, dry surface. The connection shall remain dry until the bonding material has set, depending upon environmental conditions. Backfill around the connection shall not be attempted until the material has hardened and been accepted by the Project Manager.

At the end of all sewer services, the Contractor shall provide plugs and furnish and set 2 marker posts. One marker post shall be buried a minimum of 3 feet and shall extend a minimum of 2 feet above the ground surface and shall have a piece of green flagging at the top or be painted green. The second marker shall extend from the end of the service to 18" below the existing surface. The marker posts shall be wood 2 x 4's, 4 x 4's or #4 rebar.

3-7 Backfill and Restoration of Surface Conditions:

Backfill and restoration of surface conditions shall be as specified in Section 02200.

3-8 Testing:

Testing shall be as specified in Section 02701.

END OF SECTION

SECTION 02619

POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

PART 1: GENERAL

1-1 Scope:

This section covers the furnishing and installation of polyvinyl chloride (PVC) and molecularly oriented PVC (PVCO) pressure pipe and appurtenances for potable water mains and fire lines in the pipe diameter size range of 4" to 16".

1-2 Reference Standards:

American Society for Testing and Materials (ASTM)
American National Standards Institute (ANSI), American
Water Works Association (AWWA), Federal
Specifications (FS),
National Sanitation Foundation (NSF)

1-3 Submittals:

In accordance with Section 01300, submit manufacturer's literature for all products specified in this section and certificates of compliance for PVC pipe.

1-4 Product Handling:

Handle pipe carefully to ensure delivery in a sound, undamaged condition. Inspect pipe for cracks, dents, abrasions, bleaching from improper storage, gauges or other flaws. Project Manager will reject damaged pipe on site. Contractor shall replace damaged pipe at no additional expense to the City. Pipe shall not be stored directly on ground, and ends must be sealed until use.

PART 2: MATERIALS

2-1 PVC Pressure Pipe:

Unless revised on the Drawings the polyvinyl chloride (PVC) pipe shall be Class 300, and shall conform to AWWA C900-07 or C909-09, "Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch, for Water" or similar and equal to Class 200 and conform to AWWA C905-10, "Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 in. through 48- inch". All Class 300 pipe shall meet the dimension requirements of DR14 for 12-in. pipe and smaller and DR 18 for 14-in. pipe and larger, and have an equivalent ductile-iron pipe outside diameter.

The pipe shall be extruded from NSF Approved Class 12454-A or 12454-B compound conforming to requirements of ASTM D1784 (latest revision) and be of the integral bell and spigot joint design, unless otherwise specified.

Pipe that has been improperly stored with evidence of exposure to ultraviolet radiation and subsequent degradation will be rejected.

Provisions must be made for contraction and expansion at each joint with a factory installed elastomeric ring. The bell shall consist of an integral thickened wall section with an elastomeric ring that meets the requirements of ASTM F477. The wall thickness in the bell section shall conform to ASTM D 3139. Pipe shall be supplied in laying lengths of 20 feet. All pipe and fittings shall be assembled with a non-toxic lubricant. Each length of pipe shall have marked on the exterior the following:

- Nominal size and OD base
- Material Code Designation
- Dimension Ratio number "DR 14" or "DR 18"
- AWWA Pressure Class "PC 300"
- AWWA Designation, AWWA C900, C909 or C905
- Name or Trademark of Manufacturer
- National Sanitation Foundation Seal for Potable Water

The fittings shall be fusion epoxy lined and coated ductile-iron or cast-iron conforming to the requirements set forth in ANSI A21.11-90, gasketed per AWWA C111 or ANSI 21.53-88, and casting per AWWA C153. Cast-iron fittings 12-inch size and smaller shall be Class 250, and fittings larger than 12 inches shall be Class 150. The interior and exterior of the fittings shall be epoxy coated. The fittings shall have mechanical joint ends in accordance with ANSI A21.11, unless otherwise specified. Tee head bolts, hexagon nuts and washers shall be corrosion resistant ASTM A-276 Type 316L stainless steel coated with an anti galling compound, or fluorocarbon coated “NSS Industries” Cor-Blue, “Star Pipe Products” Core Blue, or equivalent.

2-2 Polyethylene Encasement:

All pipeline fittings and appurtenances shall be encased in polyethylene film in accordance with the requirements of ANSI A21.5, AWWA C105.

2-3 Tracer Wire:

Tracer wire shall be AWG size #10, UL type UF or USE cable, with single annealed bare copper conductor suitable for detecting buried facilities. Insulation material shall be High Molecular Weight Polyethylene (HMW-PE) with 0.045” nominal thickness.

Test stations shall be CP Test Services, Glenn Series Glenn-4 with locking lid, 31/2 x 4", or approved equal.

2-4 Fitting and Joint Restraint:

All fitting and joints shall be restrained from movement due to hydraulic forces as specified herein and as shown on the Drawings. Concrete for thrust blocks is specified in the thrust block detail drawing. Where designated on the Drawings or where existing conditions do not permit the use of concrete thrust blocks as approved by the Project Manager, individual restraint systems shall be provided as follows:

Alternative A: **Full length threaded tie rods** may be used. Threaded rods shall be Type 316Lstainless steel coated with an anti galling compound. Connecting T-bolts and nuts shall be Type 316L stainless steel coated with an anti galling compound or corrosion resistant fluorocarbon coated such as "NSS Industries" Cor-Blue or "Star Pipe Products" Core Blue, or equivalent.
The number and diameter of tie rods shall be as shown on the detail drawings.

Alternative B: **Follower gland type mechanical joint restraint systems** may be used for 16" diameter pipe and smaller. Restraint rings shall be manufactured of ductile iron conforming to ASTM A536, Grade 65-45-12 with a factory applied fusion epoxy coating. The mechanical joint follower gland shall be incorporated into the restraint. Connecting T-bolts and nuts shall be as required in Alternative A.

Alternative C *(for connecting 12" diameter and smaller mechanical joint valves and fittings only):* **Bolt through positive restraint mechanisms** may be used for connections 12" and smaller, but may not be used for pipe attachment or fire hydrant connections. Adaptor body shall be made of ductile iron, conforming to ASTM A536 80-55-06 with styrene butadiene rubber gastkets conforming to AWWA C111, and connecting bolts and nuts as required in Alternative A.

Restraint devices for PVC pipe bell and spigot joints may be used, if approved by the Project Manager, for sizes 4" to 16". Devices shall be of ductile iron conforming to ASTM A536 as specified above with connecting bolts and rods as required in Alternative A.

Restraint devices shall be used at all mechanical joint bends, valves, tees and fittings, in addition to concrete kickblocks where required.

Mechanical joint restraint devices shall be required for the following installations:

- Fire Hydrants
- Fireline Connections
- Three inch and larger domestic line connections
- Reducers
- Vertical and Horizontal Offsets (all angles)
- Bends, Line Valves, and Fittings

- Bulkheads and Plugs
- Bored casing carrier pipe
- When, in the opinion of the Project Manager, the bearing capacity of the soil is not sufficient to provide adequate restraint.

The restraint mechanism shall consist of: numerous individually activated gripping surfaces to maximize restraint capability; or a series of machined serrations, designed to grip the entire pipe surface; or a system that is integral to the gasket. For twist-off nut-type designs, the nuts shall be sized the same as tee head bolts, and be used to insure proper actuating of restraining devices. When the nut is sheared off, a standard hex nut shall remain. All devices shall have a working pressure of at least 200 psi with a minimum safety factor of 2:1.

Follower gland type joint restraint devices shall be of the type listed below:

- "EBAA Iron, Inc." Megalug 2000 PV Series (4"-16")
  Megalug 1600 Series for PVC (4"-12")Pipe Bell Joints
  Megalug 2800 Series for PVC (14" and larger)
- "Star" Domestic PVC Stargrip Series 4000 (4"-12") Domestic 1100C Bell Restrainers Series 1100 for PVC Pipe Bell Joints
- "U.S. Pipe" MJ FIELD LOK Gasket with MJ FIELD LOK Gland, series PV (4"–12")
- "Romac Industries" PVC RomaGrip Series, specify fusion bonded epoxy
  Required device if using C909 PVC

Bolt through mechanical joint restraint devices shall be of the type listed below:

- "Infact Corporation." Foster Adaptor (4"-12") specify fusion bonded epoxy.
  Note: "Infact" Standard Foster Adaptor Accessory Pak will be required for restraining C153 compact fittings and valves

2-5 Water Services:

Water services shall be installed as indicated on the Drawings and as specified in Section 02620.

2-6 Connections to the Existing System:

Operation of the existing system must at all times remain under the control of the City. The Contractor shall not operate valves or hydrants on the system without permission from the City.

All points at which the existing water systems are to be disconnected and connected to the new mains are shown on the Drawings.

The Contractor shall take precautions as necessary to minimize interruption of all utility services and will be responsible for restoration of service. The Contractor shall schedule existing valve locates with the City at least three days before scheduling a shutoff and shall at that time determine those customers affected. The City does not guarantee a "dry" shut down.

Unless otherwise specified, at any time a customer on the existing system will be deprived of a supply of water, the Contractor shall advise such customer in writing 48 hours in advance of when the supply will be disconnected and when the supply will again be available. Notices shall be delivered by hand to each resident or business by the contractor. If the occupant cannot be personally contacted, the written notice shall be left at the door.

PART 3: EXECUTION

3-1 General:

Install pipe to the grades and lines shown on the Drawings and in accordance with pipe manufacturer's specifications. Rest each section upon the pipe bed for full length of the barrel with recesses excavated to accommodate joints. Remove and re-lay any length that has had its line, grade, or joint disturbed after laying. Thoroughly clean pipe interiors of sawdust and foreign matter before lowering into trench. Replace with new pipe any section of pipe found damaged or defective.

3-2 Installation of PVC Pipelines:

Except as specified herein or unless specifically authorized by the Project Manager, all pipe shall be laid as follows:

A. Pipe Laying. Pipe shall be laid with bell ends facing in the direction of laying. No deflection in the joints shall be allowed. Whenever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions or to plumb valve operators, the pipe itself may be uniformly curved as shown in the table below.

Approximate Pipe Size	Offset in 20-Foot Length	Radius of Curve
4"	24"	120'
6"	16"	160'
8"	12"	250'
10"	10"	300'
12"	8"	400'

Pipe deflection for curvature shall not be permitted at temperatures less than 32°ambient temperature.

When pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the Project Manager.

The cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat manner without damage to the pipe so as to leave a smooth end at right angles to the axis of the pipe. The flame cutting of pipe by means of an oxyacetylene torch will not be allowed. Bevel the end of the pipe with a beveling tool after the pipe is field cut. Place a clearly visible position mark at the correct distance from the end of the field cut pipe. Beveled pipe ends shall not be used for insertion into valves or fittings.

Tracer wire shall be attached to the pipe as directed in subsection 3-4.

B. Jointing of Bell and Spigot. The outside of the spigot and the inside of the bell shall be wiped thoroughly clean. Lubricate the spigot end using a thin film of the manufacturer-supplied lubricant. Push the pipe spigot into the bell manually, with blocking and bar, or with special jacks. Position the completed joint so that the mark on the pipe end is in line with the end of the bell. Pipe joint shall not be assembled using power or trenching equipment.

3-3 Installation of Thrust Restraint:

Concrete thrust blocks shall be poured between undisturbed solid ground and the fitting or joint to be anchored; the area of bearing on the undisturbed trench wall shall be that shown on the thrust block detail or directed by the Project Manager. A polyethylene bond breaker shall be placed over the fitting before placing concrete to ensure accessibility for repair.

Full length tie rods between joints with pipe clamps shall be assembled using clamps on

each side of pipe bells with tie rods extending the full pipe length for the dimensions shown on the drawings each direction from the restrained fitting, valve or joint. Clamps shall be installed tight enough to prevent twisting around the pipe. A washer shall be used at each clamp and tie rods shall be located on each side of the pipe. The tie rod nut should first be hand tightened with a 12 inch wrench (approximately 50-100 foot-pounds torque). Threaded tie rods shall extend two full threads past each nut in the final position.

Follower gland mechanical joint type joint restraint systems shall be assembled according to manufacturer's instructions per AWWA C600. The maximum allowable joint deflection is five degrees.

3-4 Installation of Tracer Wire:

Tracer wire shall be spirally wrapped around the pipe exterior as it is installed in the trench with two (2) wraps minimum per twenty (20) feet of pipe. Splices due to breaks in wire continuity shall be made by stripping insulation from each wire with wire stripper pliers. Wires shall be joined with a solderless connector, 3M Direct Bury Splice kit or approved equal, in accordance with manufacturer's instructions. The solderless connector shall be covered with Emmerson Electric Seal-AConn II putty or approved equal.

The wire shall form a continuous electrical circuit between any two (2) contact points on the new pipeline, including branch lines and fire hydrant laterals. Wire shall be stubbed out to the point where the new pipe connects to the existing main unless otherwise directed by the Project Manager. Where the wire terminates at a point where there is not an installed wire, the ends of the wire shall be stripped bare a minimum of eighteen (18) inches and grounded into the native trench bank soil material.

Wire shall be extended to each fire hydrant installed and looped through a test station. Tracer wire shall not be coiled in a water valve box. Wire shall not be cut at the test station or connected to the test station leads. Test station shall only serve as an access point for the wire. After backfill and compaction the tracer wire shall be tested for signal continuity by the contractor, at his/her expense, in the presence of the Project Manager. If a direct connection is not indicated, the Contractor shall locate the break and restore the integrity of the wire at his/her cost. The continuity test must be accepted by the Project Manager prior to paving.

Special care shall be taken to avoid contact between tracer wire and steel gas service lines.

3-5 Testing:

Testing of PVC pressure pipe shall be as specified in Section 02601.

3-6 Backfill and Restoration of Surface Conditions:

Backfill and restoration of surface conditions shall be as specified in Section 02200.

3-7 Disinfection of Potable Pipelines:

PVC pressure pipe shall be disinfected as specified Section 02675.

END OF SECTION

SECTION 02620

WATER SERVICES

PART 1: GENERAL

1-1 Scope:

This section covers the furnishing and installation of copper water services and fittings, water meters, corporation stops, and other required materials in the diameter size range of ¾" to 2" for potable water supply.

1-2 Reference Standards:

American Water Works Association (AWWA), American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), and manufacturers' printed recommendations.

1-3 Submittals:

In accordance with Section 01300, supply certificates of compliance and manufacturer's literature.

1-4 Product Handling:

Handle pipe carefully to ensure delivery in a sound, undamaged condition. Contractor shall replace damaged pipe at no additional expense to the City. Do not store material directly on the ground. Adequately support piping.

PART 2: MATERIALS

2-1 Pipe:

Type K copper, soft drawn in accordance with ASTM B88.

2-2 Fittings:

Use straight three part union copper flare nut type fittings (both ends) to match pipe such as "Mueller" H-15400, "Ford" C22, or approved equal. Grip type compression couplings such as "Ford" Grip Joint Connector, "Mueller" 110 or approved equal may be used. Use bends such as "Mueller" H-15525, "Ford" L22, or approved equal.

2-3 Corporation Stops:

Ground key corporation stops shall have an AWWA standard taper thread inlet with copper flare straight connection outlet such as "Mueller" H-15000, "Ford" F600, or approved equal.

2-4 Water Meter Pits and Connections:

Meter pits, 1" and smaller, shall be heavy body, 20" diameter, manufactured from 100% recycled polyethylene, with ½" wall thickness, such as "DFW" 2036HB or approved equal. Meter pit, frost lid, cover, interior piping and yoke may be purchased from the City of Boulder.

2-5 Service Saddles:

Corporation stops require the installation of a bronze or brass bodied service saddle with 304L stainless steel double straps and studs, similar and equal to "Mueller" BR 2 S series or "McDonald" 3855 series for cast iron or PVC. All saddles require an AWWA tapered thread (CC) outlet. No direct taps to PVC pipe shall be allowed.

2-6 Tapping Machine:

The tapping machine for PVC pipe shall have a shell type (hole) core cutting tool which retains the coupon cut and is designed to accommodate DR 14 Class 200
C900 pipe wall thickness. The machine shall have a standard ratchet handle on the boring bar and the cutting controlled and accomplished with a feed nut or feed screw and yoke. For DIP pipe, a combined drill and tap tool shall be used.

2-7 Insulators (DIP Only):

Insulator couplings shall be installed at the inlet end of the corporation stop and shall be "Ford Service Insulators" or an approved equal for service lines.

PART 3: EXECUTION

3-1 General:

Size as shown, lay to grades and lines in accordance with pipe manufacturer's specifications. Thoroughly clean pipe interiors of foreign matter before placing into trench. Replace with new pipe any laid section of pipe found damaged or defective. All pipe fittings, valves, and appurtenances shall be installed according to manufacturer's instructions.

3-2 Service Tapping:

For PVC and CIP waterlines, service saddles shall provide full support around the circumference of the pipe with even tightening on both sides to avoid overstressing. The maximum size of corporation stop used with a saddle is 2". Direct tapping is allowed on DIP waterlines only for taps 1" and smaller using a combination drill and tap machine. Service clamps on DIP shall be required for taps larger than 2". Service connections to all ferrous mains shall be electrically insulated by means of a City approved insulating fitting.

Corporation stops shall be installed with the appropriate tapping machine in the presence of the Project Manager after the waterline has been pressure tested. Maximum drill sizes shall be 11/16" for ¾"taps, 15/16" for 1" taps, 1 7/16" for 1
½" taps, and 1 7/8" for 2" taps. Taps shall be made at an angle of 45° down from the top of the pipe on the same side of main as the building being served. Taps shall have a minimum of 18" of separation from bells, service taps or fittings. The service pipe shall be supported in a wide S-curve with enough slack to allow for backfill settlement and pipe expansion and contraction.

PVC pipe shall not be tapped when the ambient temperature is less than 40° F. Only

smooth jaw wrenches shall be allowed for use with corporation stop bodies.
The wrench shall be positioned as close as possible to the threads being tightened to avoid excessive strain or bending moment on the body.

When reconnecting an existing service to a new waterline, the existing copper service line must be cut back, the old flare nut removed and a new copper flare connection made. Pipe dope must be used on threaded fittings.

All bedding, pipe zone backfill, compaction, polyethylene sheathing and other details of the water pipeline construction shall be returned to original condition after service connections are completed.

3-3 Pipe Cutting and Flaring:

Cutting and flaring shall be done neatly by methods which do not damage the pipe. The newly cut end of the copper pipe shall have the inside edge scraped clean with a pen knife and an emery cloth used to remove burrs prior to flaring. Prior to flaring, the copper tubing shall be inserted through the connection nut fully into the body. Properly sized flaring tools shall be used and the tool shall be "spun" during the flare process to ensure even penetration.

3-4 Separation of Water and Sanitary Sewer Services:
The water service pipe shall have a minimum of ten (10) feet horizontal

separation from any sanitary sewer service . If the horizontal separation criteria cannot be met, with the approval of the Project Manager the water service pipe may be placed over the sanitary service with at least eighteen (18) inches of vertical separation from the top of the sewer line, at its highest point to the bottom of the water pipe. One joint-free, continuous section of copper pipe must be used.

3-5 Water Meters:

For new installations, water meters shall be installed by the City. Water meter pits may be purchased from the City and installed by the Contractor with the location determined by the Project Manager prior to installation.

3-6 Testing:

Testing of water service pipe shall be as specified in Section 02601.

3-7 Backfill and Restoration of Surface Conditions:

Backfill and restoration of surface conditions shall be as specified in Section 02200.

3-8 Disinfection of Potable Pipelines:

Water service pipe shall be disinfected as specified Section 02675.

END OF SECTION

SECTION 02621

TEMPORARY WATER SERVICE

PART 1: GENERAL

1-1 Scope:

This section covers the furnishing, testing, installation and removal of temporary water bypass piping for potable domestic water services and fire lines, 4 inch diameter and larger, for fire protection service to structures.

1-2 Reference Standards:

American Water Works Association (AWWA)
Federal Specifications (FS)
National Sanitation Foundation (NSF)

1-3 Submittals:

In accordance with Section 01300, submit manufacturer's literature for all products specified in this section and certificates of compliance for pipe and fittings. The Contractor shall submit a bypass plan for approval from the Project Manager at the preconstruction conference.

PART 2: MATERIALS

2-1 Pipe and Fittings:

Pipe material and fittings shall be clean, free of rust, dirt, debris and foreign material and shall be assembled with a nontoxic adhesive. Pipe and fittings shall bear the imprint of the ANSI/NSF 61 approval for potable water, or equal. All materials shall be capable of withstanding a minimum of 1½ times the water system maximum operating pressure. All bypass piping shall be sized to provide adequate service volume with a minimum pressure of 40 psi.

A pressure regulating valve (PRV) will be required at all fire hydrant connections.

PART 3: EXECUTION

3-1 General:

Install piping as shown on the submittal drawing and in accordance with manufacturer's specifications.

3-2 Installation of Temporary Water Service Pipe and Appurtenances:

Unless specifically authorized by the Project Manager, all temporary water service piping shall be installed as follows:

The location of the bypass piping shall be approved by the Project Manager and must be placed within the Right of Way, either in the flowline of the curb, along the back edge of the sidewalk, or as specified. Water meters shall be removed and individually tagged with the corresponding street address and safely stored by the contractor. Special precautions must be taken when removing meter lids with sensor wiring. Meter pits must be covered. An orange highway cone or Type 1 barricade shall be placed over or next to connections.

Tee connections at every meter pit will be required with small diameter pressure rated hose connecting the tee to the residence side of the meter yolk. Valving on the main bypass line will be required at the terminal end and periodically along the line as approved by the Project Manager. All bolted connections shall have the bolt ends facing downwards toward the roadway surface.

A PRV shall be required at all fire hydrant connections.

Trenching and cold mix asphalt patching will be required where piping crosses paved surfaces. Crossings at driveways and walks shall require a ramp of pre formed rubber or tar paper with cold mix asphalt. The ramp system shall be approved by the Project Manager

The contractor shall be responsible for all bypass operations and maintenance 24 hours a day throughout the contract period until the temporary service provisions are removed. Any and all leaks shall be repaired or replaced immediately by the contractor at their expense. Any damages to structures, automobiles, service lines, water meter assemblies shall be repaired or replaced at the contractor's expense. Temporary service lines shall be insulated when applicable to prevent freezing. Should freezing weather make it necessary for the Contractor to discharge water from the bypass pipe into the gutter or storm sewer, to prevent freezing, install a Watts No. 8 atmospheric hose bib vacuum breaker such that the discharge water passes through the breaker and into the curb or inlet. No additional cost will be paid to the Contractor for extra labor that inclement weather may cause.

3-3 Unlocated Water Service Lines:

Additional water service taps, not shown on the drawings, may exist that will require service from the bypass system. Immediately upon discovery, the contractor shall provide temporary service by connection to the bypass piping with minimum interruption of service.

3-4 Temporary Fireline Bypass and Connection:

The contractor shall be responsible for determining existing fireline location and size and shall provide the Project Manager with a plan for an adequate connection to meet fireflow demand. Excavate to the pipe along the course of the fireline to make the necessary connection, restraining all fittings, in such a manner that will allow backflushing of the fireline after testing. The temporary connection shall be free from leaks and safe for the workers, inspectors and general public. The contractor shall take the responsibility to inform building managers, property owners and the Boulder Fire Department, or other fire protection agency, prior to making the temporary connection.

3-5 Disinfection of Temporary Piping:

Piping and appurtenances shall be disinfected as specified in Section 02675.

END OF SECTION

GATE VALVES

PART 1: GENERAL

1-1 Scope:

This section covers the furnishing and installation of gate valves and appurtenances for potable water service in the pipe diameter size range of 4" to 16".

1-2 Reference Standards:

American Water Works Association (AWWA).

1-3 Submittals:

In accordance with Section 01300, supply certificates of compliance and manufacturer's literature.

PART 2: MATERIALS

2-1 Gate Valves:

Gate valves shall be iron-bodied with mechanical joint ends, epoxy coated, resilient wedge, with non-rising stems and double or triple O ring stuffing box, conforming to AWWA C509-09. Valves shall open counterclockwise with a 250
PSIG maximum working pressure. All valves shall have one 2 inch square operating nut and a bronze stem.

All stuffing box and bonnet nuts and bolts shall be constructed of corrosion resistant stainless steel Type 304/316.

2-2 Valve Boxes:

Valve boxes shall be of cast iron of the three piece screw type. Extensions shall be the screw type and bases shall be No. 6 round or oval. Shafts shall be 5 1/4 inches diameter. They shall be East Jordan Iron Works 8560 #160 bases, 8560 valve boxes with a heavy duty load rating, and an estimated weight of 40lb, and a
6800 cover, or approved equal, bearing the word "Water" on top. Valve boxes shall be considered integral units, and shall have at least six inches adjustment above and below specified depth of cover over pipe.

2-3 Special Wrenches and Keys:

All tools needed to operate valve and to open valve box lid shall be furnished by the Contractor. Key lengths shall be approved by the Project Manager.

PART 3: EXECUTION

3-1 Gate Valves:

Install in the lines as indicated on the drawings, unless otherwise directed, and set plumb on a firm base. All foreign matter shall be removed from the interior prior to installation.

3-2 Valve Boxes:

Install over the gate valves unless otherwise directed, with base section centered over valve and resting on well-compacted backfill. Top section shall be set as to allow equal movement above and below finished grade. Final elevation shall be 1/4-inch below finished grade in roadways and above grade outside of roadways, unless otherwise directed. Top of base section shall be approximately on line with nut at top of valve stem, and the entire assembly shall be plumb. Should flowable fill be a requirement, valve boxes shall be triple wrapped with polyethylene material.

3-3 Tests:

Gate valve tests shall be with and part of the tests on the companion water lines.

3-4 Disinfection:

Gate valve disinfection shall be with and part of the disinfection to the companion water line.

END OF SECTION

SECTION 02643

TAPPING SLEEVE AND VALVE

PART 1: GENERAL

1-1 Scope:

This section covers the furnishing and installation of tapping sleeves and valves for potable water service in the pipe diameter size range of 4" to 12".

1-2 Reference Standards:

American Water Works Association (AWWA).

1-3 Submittals:

In accordance with Section 01300, supply certificates of compliance and manufacturer's literature.

PART 2: MATERIALS

2-1 General:

All tapping sleeves shall be constructed of stainless steel that meets or exceeds ASTM A240 Type 304 UNS designated S30400. Tapping sleeves shall be “Romac Industries” SST, “Mueller” H-304L, “Ford” FTSS, “JCM” 432 or approved equal.

Valve boxes and special wrenches and keys shall be as specified in Section 02641.

2-2 Tapping Sleeve:

Tapping sleeves shall be stainless steel body with flanged outlet. Outlet flange dimensions and drilling shall comply with ANSI B16.1 CL125 and recessed to MSS SP-60 to receive tapping valves. Flanges shall be fabricated from stainless steel and dimensions shall conform to AWWA Standard C207, Class D.

2-3 Gaskets:

Gaskets shall be “waffle” design, compounded from new materials, and the shape of cross-section of gasket shall provide adequate seal for the design pressure specifications. Gaskets shall be shop glued to the groove provided in the body section of the flange.

2-4 Fasteners:

Bolts, hex nuts and washers shall be 304 Stainless Steel and coated with an anti- galling compound.

2-5 Testing Outlet:

A 3/4 inch NPT by welded coupling shall be attached to the outlet nozzle of each tapping sleeve assembly complete with a 3/4 inch square head pipe plug.

2-6 Tapping Valves:

Tapping valves shall be epoxy coated resilient wedge gate valves such as "Mueller" T-2360 series or equal. Valve boxes shall be as specified in Section 02641. Each tapping valve shall be provided with a flanged inlet end designed, faced and drilled for attachment to the outlet flange of the tapping sleeve; an outlet end provided with a tapping flange for attachment of a standard drilling machine; and a mechanical joint bell end for connection to the branch main. The size of the waterway shall include the appropriate clearance for the diameter of the tapping machine cutter recommended by the valve manufacturer. Bonnet and stuffing box bolts and nuts shall be stainless steel.

PART 3: EXECUTION

3-1 Tapping Valves:

Install in the lines as indicated on the drawings, unless otherwise directed, and set plumb on a firm base. All foreign matter shall be removed from the interior prior to installation. Valve shall be securely bolted to the tapping sleeve in accordance with the manufacturer's instructions using stainless steel or "NSS Industries" Cor- Blue or approved equal fasteners.

3-2 Tests:

Tapping valve tests shall be with and part of the tests of the companion waterlines.

3-3 Disinfection:

Tapping valve disinfection shall be with and part of the disinfection of the companion waterline.

END OF SECTION

02643-2

SECTION 02645

FIRE HYDRANTS

PART 1: GENERAL

1-1 Scope:

This section covers the furnishing and installation of fire hydrants for potable water service.

1-2 Certification:

Furnish an affidavit from the manufacture that the hydrant conforms to AWWA Standard C502-05.

1-3 Submittals:

In accordance with Section 01300, furnish catalog cuts, complete maintenance data and assembly drawings.

PART 2: MATERIALS

2-1 General:

Hydrants shall comply with AWWA Standard C502.

2-2 Hydrants:

The fire hydrants shall be “Mueller” Super Centurion 250 A-423, “CLOW” Medallion 395", the “CLOW” Medallion shall be a higher pressure rating with chain tagged "heavy duty", or “Waterous" Pacer WB 67-250 DI, with mechanical joint bottom connection and have the following requirements:

- Inlet Pipe: 6-inch, mechanical joint inlet shoe and accessories
- Trench Depth: 4.5-feet cover Note: standard shipping depth is 5.0”
- Operating Nut: 1-1/2-inch Pentagon National Standard Threads
- Open: Left (CCW)
- Connection: Two 2-1/2-inch hose nozzles and one 5 1/4 inch pumper nozzle
- Threads: National Standard Hose Threads
- Pressure: 150 psi working pressure, 300 psi pressure
- Hydrants shall be provided with traffic break-off flange.
- The mechanical joint bolts and nuts shall be anti galling coated stainless steel or “NSS” Cor-Blue or equivalent.
- Shoe nuts and bolts shall be corrosion resistant stainless steel, Grade 304.

- Color shall be Rustoleum No. 831 "restful green" or “KWAL” hydrant green except for bonnet, weather caps and nozzle caps, which must be Rustoleum No. 2766 "reflectorized white".
- Set of spare break-off parts shall be furnished.

PART 3: EXECUTION

3-1 Excavation, Backfill and Installation:

Perform in accordance with the applicable provisions of Section 02200. Where applicable, hydrants shall be installed with pumper outlet facing the adjacent roadway or parking area. Set hydrants at such elevations that the connecting pipe shall drain to the main with a grade of not less than 1 percent, and upon a concrete foundation not less than 6 inches thick and 18 inches square. The centerline of nozzles shall be at least 18 inches and not more than 24” above finished grade. The thrust block shall be poured between the undisturbed solid ground and the hydrant as shown on the detail drawing. Lateral pipe shall be restrained between the hydrant shoe and companion valve by means of follower gland joint restraint devices. Extensions shall be of one solid unit in length. Unit lengths cannot be combined to raise hydrant to desired level.

3-2 Drainage Aggregate and Backfill:

Place not less than 1/3 cubic-yard of approved clean gravel or crushed rock around the base of each hydrant and 12" over the top of the supply pipe to insure drainage. A layer of 30-pound asphalt-saturated felt paper or heavy vinyl sheet shall be placed over gravel to keep backfill material from sifting into gravel. Thoroughly compact the backfill around hydrants, to the grade line, in an approved manner.

3-3 Operations Check:

Clean hydrant interiors of all foreign matter before installation. Stuffing boxes shall be tightened and the hydrant inspected in opened and closed positions to see that all parts are in working condition.

3-4 General:

Hydrants shall be tagged "out of service" until the water system is operational. It is the responsibility of the Contractor to notify Boulder Police Communications,
303 441-4444, regarding the location of the tagged hydrants.

END OF SECTION

SECTION 02675

DISINFECTION OF WATERLINES

PART 1: GENERAL

1-1 Description:

The work of this section consists of the disinfection of all portions of the potable water system, including buried piping, valves, hydrants, and stops, and any portion of the existing connecting system that might have become contaminated during construction activities, including temporary water service piping.

Care shall be taken to prevent contaminating materials from entering the water mains during construction or repair. Such materials that may accidentally enter the main shall be removed by flushing. This flushing shall be done prior to disinfection unless the tablet method of disinfection is used. If, in the opinion of the Engineer, the contaminated material that has entered cannot be removed by flushing, the interior of the pipe shall be cleaned by mechanical means and swabbed with a 1% hypochlorite solution.

1-2 Reference Standards:

American Water Works Association (AWWA C651-92)

1-3 Submittals:

In accordance with Section 01300. Submit plan for gathering, transport and disposal of chlorine solutions and surplus materials after use.

PART 2: MATERIALS

2-1 Chlorinating Material:

The chlorinating material shall either be a hypochlorite solution, tablets or granules.

2-2 Tablet Attachment:

The hypochlorite tablets shall be fastened to the top of the pipe using Permatex No. 1.

PART 3: EXECUTION

3-1 Disinfection:

Upon completion of the water pipeline installation and prior to connecting to the city system, all new pipe, valves, hydrants, etc. shall be thoroughly flushed and disinfected, using a continuous-feed method of hypochlorite and water mixture, hypochlorite tablets, or granules in accordance with AWWA Standard C-651, latest revision.

To obtain the required chlorine residual, the number of tablets per 20 foot pipe joint length shall be as follows:

- 6" diameter pipe = 3 tablets
- 8" diameter pipe = 4 tablets
- 12" diameter pipe = 7 tablets

The chlorinating material shall be introduced into the water lines and distribution systems in a manner approved by the Project Manager. After a contact period of not less than 24 hours, the treated water in the lines shall contain not less than 10 mg/liter chlorine using the continuous-feed method or 25 mg/l chlorine using the tablet or granular method throughout the length of the line. The system shall be flushed after successful completion of disinfection with clean water until the residual chlorine content is not greater than 1.0 mg/liter. All valves in lines being disinfected, except those being used as bulkheads, shall be opened and closed several times during the contact period. During flushing and disinfection the Contractor shall make sure that none of the disinfection solution enters any existing water main.

3-2 Flushing and Dechlorination:

Flushing shall be done through a fire hydrant, blow off, or water service with a velocity of at least 2.5 feet per second. The Contractor shall be required to provide a venturi device, such as "Pollard" chemical injector, or dechlorination diffuser, such as "Pollard" LPD-250 Super D-CHLOR Kit, with a pitot opening to measure discharge flow rates. Ascorbic acid or Sodium Sulfite tablets shall be used for neutralizing the superchlorinated water. Flushing will be accomplished in such a manner that no erosion will occur, or damage to street, fish, animals, plants or other property.

For cuts and repairs to the existing system, when it is impractical to rechlorinate with the slug or continuous feed method, all fittings, valves, couplings and pipe spools shall be swabbed with a 5% sodium hypochlorite solution (Clorox), just prior to installation. One 5g tablet dissolved in 10 liters of water may also be used.

3-2 Bacteriological Examination:

After the system has been thoroughly flushed and before the new water line is connected to the distribution system, samples shall be taken from representative points in the system at intervals of 1200 feet, in sterile bottles treated with Sodium Thiosulfate. Samples will be submitted to the City Drinking Water Program staff, or designated certified laboratory, for bacteriological examination. Submitted samples shall meet all City and State bacteriological standards, showing the absence of both coliform and heterotrophic bacterial growths. If the initial disinfection fails to produce satisfactory bacteriological results, the new main shall be reflushed and resampled. High turbidities require flushing. If check samples also fail to produce acceptable results, the main shall be rechlorinated by the continuous feed or slug method until satisfactory results are obtained.

3-3 Disposal of Solution:

This shall be the Contractor's responsibility. He shall notify and obtain the approval of the Project Manager. The solution and flushing water shall be neutralized and disposed of through a venturi device or dechlorination diffuser. The solution and flushing water shall not be dumped into any lakes, streams, waterways, irrigation ditches or storm water drainage systems. If wasted water cannot be safely discharged through a diffusing dechlorinator device, a reducing agent shall be applied to the wasted water to thoroughly neutralize it and then it may be pumped into a nearby sanitary sewer manhole.

END OF SECTION

SECTION
02701

TESTING OF SEWER PIPELINES AND MANHOLES

PART 1: GENERAL

1-1 Scope:

This section covers the testing of gravity sewer pipelines and manholes including sanitary sewer and storm drains.

PART 2: MATERIALS

2-1 General:

The Contractor shall provide equipment and material specifically designed for air testing sewers. Air testing or exfiltration testing shall be required of all sanitary sewer lines prior to acceptance. The test method, or methods, to be used must be approved by the Project Manager.

PART 3: EXECUTION

3-1 Notification and Witness:

The contractor shall notify the Project Manager of the proposed testing method allowing sufficient time to review, respond and revise the proposed testing. Notification of proposed test methodology a minimum of one week prior to testing is required. Rejection, by the Project Manager, of a test method deemed unsuitable will require the contractor to submit an alternative method.

The Contractor shall notify the Project Manager of all tests at least 48 hours prior to testing so that the Project Manager can witness the tests.

The pipe may be tested for leakage at any convenient time after the trench has been partially backfilled, except at the joints, or backfilled as permitted by the Project Manager. Where any section is provided with concrete thrust blocks, the pressure test shall not be made until at least two days have elapsed after the concrete was installed.

3-2 Testing Procedures:

A. General. The Contractor shall flush the pipelines, as the work progresses, by means that are in accordance with good practice, to insure that earth, sand, rocks, or other foreign materials are removed from the interior of the

pipeline. Care shall be taken to insure that foreign material is not transported

downstream into the existing system.

B. Alignment and Grade. Sewer pipelines will be checked by the Project Manager to determine whether any displacement of the pipe has occurred after the trench has been bedded to an elevation 6-inches above the pipe and tamped as specified. The test will be as follows:

A light will be flashed between manholes, or if the manholes have not as yet been constructed, between the locations of the manholes, by means of a flashlight or by reflecting sunlight with a mirror. If the illuminated interior of the pipeline shows poor alignment, displaced pipe, earth, or other debris in the pipe, or any other kinds of defects, the defects, determined by the Project Manager, shall be remedied by the Contractor at his own expense. Test will be repeated after completion of backfilling and any poor alignment, displaced pipe, or other defects, determined by the Project Manager, shall be corrected by the Contractor at his own expense.

For sewers on curved alignment, between manholes, or location of manholes if not constructed, after the pipe has been laid and the backfill has been placed above the pipe, a heavy rubber ball shall be passed through the pipe. The outside diameter of the ball shall be the same as the inside diameter of the sewer pipe. The ball shall be placed at the upper manhole of the sewer to be cleaned. A head of water shall be placed against the ball to force the ball through the sewer and debris flushed from the line shall be collected at the lower manhole, or its location. The ball shall be secured by a line to control the rate at which the ball is allowed to pass through the sewer.

C. Air Tests. Air testing of sanitary sewer pipes shall be done on all sections of pipe between manholes. The pipe shall be cleaned and may be wetted before air testing. The section of pipeline being tested shall be plugged at each manhole with pneumatic balls.

Low pressure air shall be introduced into the plugged line until an internal pressure of 4 psig greater than the average back pressure of any ground water pressure that may submerge the pipe. At least two minutes shall pass to allow air temperature to stabilize before the test time is started.

No pipeline installation will be accepted if the pressure drops 0.5 psig or more during the time and for the length of pipe indicated below:

(1) Pipe Diameter (in.)	(2) Minimum Time for Lengths of Pipe Equal to or Less than Col. 3 (min:sec.)	(3) Maximum Length of Pipe for Minimum Time in Col. 2 (ft.)	(4) Minimum Time for Lengths Greater than Col. 3 L=Length of Pipe(ft) (sec)
4	1:53	597	0.190xL
6	2:5	398	0.42xL
8	3:47	298	0.76xL
10	4:43	239	1087xL
12	5:40	199	1.709xL
15	7:05	159	2.671xL

Air testing of larger pipeline sizes may be approved by the Project Manager. The time allowable for a 0.5 psi pressure drop for larger diameter pipes will be calculated according to the following formula:

t = 0.472
*d

where d = pipe diameter in inches, and t = time in minutes.

If the pipeline installation fails the air test, repairs shall be made and the pipe shall be retested until it passes the air test.

D. Deflection. All PVC non-pressure pipes shall be tested for vertical deflection after placement and compaction of backfill. The maximum deflection allowed is
5
%

Method of testing shall be by deflectometer of the rigid GO/NO-GO type device. Any and all pipe with vertical defection greater than the allowable shall be excavated, and removed from the pipeline, replaced, backfilled and compacted as specified, and retested at the Contractor's expense.

E. Television. All PVC non-pressure pipes shall be televised. Any defects found during televising shall be repaired.

F. Exfiltration Test: Sanitary sewer pipes and manholes may be leak tested using the exfiltration test when the air or vacuum testing is impractical.

The test section shall be bulkheaded and the pipe subjected to a hydrostatic

pressure produced by a head of water at a depth of two (2) feet above the crown of the sewer at the upper manhole under the test. In areas where ground water exists, this head of water shall be two (2) feet above the existing water table.

The head of water shall be maintained for a period of one (1) hour during which it is presumed that full absorption of the pipe body has taken place, and thereafter for further period of one (1) hour for the actual test of leakage. During this one (1) hour test period, the measured maximum allowable rate of exfiltration for any section of sewer, including service stubs, shall not be greater than 200 gallons per inch of pipe diameter per mile of pipe per day. To determine the allowable leakage in manholes, the manholes shall be treated as pipe of equivalent diameter.

If the pipeline installation fails the exfiltration test, repairs shall be made and the pipe shall be retested until it passes the exfiltration test. All repairs or pipe replacements required to meet the leakage Specifications must be acceptable to the Owner.

The contractor shall furnish all material and labor required to perform the test. The contractor shall assist the Owner in making measurements required by the test. The contractor shall receive no additional compensation for making the leakage tests or corrective work necessary to reduce leakage below the maximum allowed by the Specifications.

3-3 Sanitary Sewer Manholes:

A. General. During the construction of the manholes, the Contractor shall, in accordance with good practice, insure that no earth, sand, rocks or other foreign material exists on the joint surfaces during assembly of the sections. The Project Manager shall check each manhole to determine whether the manhole fulfills the requirements of the Drawings and Specifications.

The Project Manager shall visually check each manhole, both exterior and interior, for flaws, cracks, holes, or other inadequacies which might affect the operation or water-tight integrity of the manhole. Should any inadequacies be found, the Contractor, at his own expense, shall make any repairs deemed necessary by the Project Manager.

B. Vacuum Testing. When required by the project manager, manholes shall be vacuum tested with the following procedure:

1. Each manhole shall be tested immediately after assembly and prior to backfilling.

2. All lift holes shall be plugged with an approved non-shrink grout.

3. No grout will be placed in the horizontal joints before testing.

4. All pipes entering the manhole shall be plugged, taking care to securely brace the plugs from being drawn into the manhole.

5. The test head shall be placed at the inside of the top of the cone section and the seal inflated in accordance with the manufacturer's recommendation.

6. A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum drop to 9 inches. The manhole shall pass if the time is greater than 60 seconds for 1 48" diameter manhole, 75 seconds for 60", and 90 seconds for 72".

7. If the manhole fails the initial test, necessary repairs shall be made with a non-shrink grout while the vacuum is still being drawn. Retesting shall proceed until a satisfactory test is obtained.

END OF SECTION

Disadvantaged Business Enterprise (DBE) Contract Goal

This is a federally-assisted construction project. As described in the CDOT DBE Standard Special Provision, the Bidder shall make good faith efforts to meet the following contract goal:

7.5% Percent DBE participation.

COMMENCEMENT AND COMPLETION OF WORK (WORKING OR CALENDAR DATE)

The Contractor shall commence work under the Contract on or before the 15th day following Contract execution or the 30th day following the date of award, whichever comes later, unless such time for beginning the work is changed by the Chief Engineer in the "Notice to Proceed." The Contractor shall complete all work within 730 calendar days in accordance with the "Notice to Proceed." No work will be allowed on Saturdays or Sundays except for special conditions and shall be approved by the City of Boulder prior to working on weekends. Phasing shall be provided in the contractor's schedule.

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Subsection 108.03 shall include the following:

Salient features for this project are:

(1) Greenways Multi-Use Path
(2) BNSF Railroad Bridge for Trail Underpass (By Others)
(3) Boulder and White Rock Ditch Relocation
(4) Wonderland Creek Flood Mitigation Improvements
(5) Concrete Box Culvert Crossings at Spring Creek Place, Iris Avenue, Kalmia Avenue, and 28th Street.

ON THE JOB TRAINING CONTRACT GOAL

The Department has determined that On the Job Training shall be provided to trainees with the goal of developing full journey workers in the types of trade or classification involved. The contract goal for On the Job Trainees working in an approved training plan in this Contract has been established as follows:

Minimum number of total On the Job Training required **2,240 hours.**

REVISION OF SECTION 102 - PROJECT PLANS AND OTHER DATA

Section 102 of the Standard Specifications is hereby revised for this project as follows:

Subsection 102.05 shall include the following:

Autocad files are available to assist with bidding. These electronic documents shall be utilized only for the purposes of bidding and evaluating the larger aspects of earthwork such as general quantities, earthwork balance, mass haul, phasing, stockpiling, etc. They shall not be used to determine tie-ins, exact elevations, and other such detailed aspects of the work. These documents may be obtained by contacting the Project Engineer listed in the Notice to Bidders, who will provide the files upon receiving a waiver of liability form that is completed by the contractor.

After the proposals have been opened, the low responsible bidder may obtain from the City of Boulder at no cost: 10 sets of plans and special provisions; and if available for the project, one set of full-size cross sections, one set of full-size major structure plan sheets, and one set of computer output data. If the low bidder has not picked up the plans and other available data by 4:00 p.m. on the second Friday after bid opening, they will be sent to the Project Engineer in charge of the project. Additional sets of plans and other available data may be purchased on a cash sale basis from the City of Boulder at current reproduction prices. Subcontractors and suppliers may obtain plans and other data from the successful bidder or they may purchase copies on a cash sale basis from the City of Boulder at current reproduction prices.

END OF SECTION

REVISION OF SECTION 105 - ORDER OF PRECEDENCE

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Subsection 105.08 shall be revised as follows:

This work shall be done in accordance with the following, and in case of discrepancy the order of precedence shall be as follows:

1. Project Special Provisions
2. Detailed Plans
3. Project Standard Special Provisions
4. CDOT Specifications for Road and Bridge Construction 2011
5. City of Boulder General Conditions
6. Standard Plans
7. The latest revision of the Manual on Uniform Traffic Control Devices for Streets and Highways published by the FHWA and adopted by CDOT

END OF SECTION

REVISION OF SECTION 105 - COOPERATION BETWEEN CONTRACTORS

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Subsection 105.10 shall include the following:

Other construction agencies may be working in the vicinity of the project. The Contractor shall conduct the work so as not to interfere with or hinder the progress or completion of the work being performed by other agencies or contractors. All traffic control conflicts that arise between the needs of the various construction contractors and other agencies shall be brought to the attention of the Engineer. The Engineer shall decide the method of resolution.

Projects known to be in the area of the project include but are not limited to the following:

- 28th Street Multi-Use Path Improvements – Iris to Yarmouth.
- 28th Street Lane Widening and Multi-Use Path project – Valmont to Glenwood
- Foothills Highway and Valmont Improvements
- Diagonal Highway Improvements

The projects listed above will require contractors to be working in the area. There may be other contractors (including private) that are not known to the City at this time. It is the responsibility of the Contractor to coordinate the work with all contractors working in or near the work zone before, during and after the work, as required.

END OF SECTION

REVISION OF SECTION 106 - CONFORMITY TO THE CONTRACT OF HOT MIX ASPHALT

Section 106 of the Standard Special Provisions is hereby revised for this project as follows:

Subsection 106.05 shall include the following:

For this project, Contractor process control testing of hot mix asphalt is mandatory.

END OF SECTION

REVISION OF SECTION 107 - PERFORMANCE OF SAFETY CRITICAL WORK

Section 107 of the Standard Specifications is hereby revised as follows:

Add subsection 107.061 immediately following subsection 107.06 as follows:

107.061 Performance of Safety Critical Work. The following work elements are considered safety critical work for this project:

(1) Temporary works: falsework, shoring that exceeds 5 feet in height, cofferdams, and temporary bridges
(2) Excavation and embankment adjacent to the roadways.

The Contractor shall submit, for record purposes only, an initial detailed construction plan that addresses safe construction of each of the safety critical elements. When the specifications already require an erection plan, a bridge removal plan, or a removal of portion of bridge plan, it shall be included as a part of this plan. The detailed construction plan shall be submitted two weeks prior to the safety critical element conference described below. The construction plan shall be stamped "Approved for Construction" and signed by the Contractor. The construction plan will not be approved by the Engineer.

The Construction Plan shall include the following:
(1) Safety Critical Element for which the plan is being prepared and submitted.
(2) Contractor or subcontractor responsible for the plan preparation and the work.
(3) Schedule, procedures, equipment, and sequence of operations, that comply with the working hour limitations
(4) Temporary works required: falsework, bracing, shoring, etc.
(5) Additional actions that will be taken to ensure that the work will be performed safely.
(6) Names and qualifications of workers who will be in responsible charge of the work:
   A. Years of experience performing similar work
   B. Training taken in performing similar work
   C. Certifications earned in performing similar work
(7) Names and qualifications of workers operating cranes or other lifting equipment
   A. Years of experience performing similar work
   B. Training taken in performing similar work
   C. Certifications earned in performing similar work

(8) The construction plan shall address how the Contractor will handle contingencies such as:
   A. Unplanned events (storms, traffic accidents, etc.)
   B. Structural elements that don't fit or line up
   C. Work that cannot be completed in time for the roadway to be reopened to traffic
   D. Replacement of workers who don't perform the work safely
   E. Equipment failure
   F. Other potential difficulties inherent in the type of work being performed

(9) Name and qualifications of Contractor's person designated to determine and notify the Engineer in writing when it is safe to open a route to traffic after it has been closed for safety critical work.

(10) Erection plan or bridge removal plan when submitted as required elsewhere by the specifications. Plan requirements that overlap with above requirements may be submitted only once.

A safety critical element conference shall be held two weeks prior to beginning construction on each safety critical element. The Engineer, the Contractor, the safety critical element subcontractors, and the Contractor's Engineer shall attend the conference. Required pre-erection conferences or bridge removal conferences may be included as a part of this conference.

After the safety critical element conference, and prior to beginning work on the safety critical element, the Contractor shall submit a final construction plan to the Engineer for record purposes only. The Contractor's Engineer shall sign and seal temporary works, such as falsework, shoring etc., related to construction plans for the safety critical elements, Temporary Works and Excavation and embankment adjacent to the roadways. The final construction plan shall be stamped "Approved for Construction" and signed by the Contractor.

The Contractor shall perform safety critical work only when the Engineer is on the project site. The Contractor's Engineer shall be on site to inspect and provide written approval of safety critical work for which he provided signed and sealed construction details. Unless otherwise directed or approved, the Contractor's Engineer need not be on site during the actual performance of safety critical work, but shall be present to conduct inspection for written approval of the safety critical work.

When ordered by the Engineer, the Contractor shall immediately stop safety critical work that is being performed in an unsafe manner or will result in an unsafe situation for the traveling public. Prior to stopping work, the Contractor shall make the situation safe for work stoppage. The Contractor shall submit an acceptable plan to correct the unsafe process before the Engineer will authorize resumption of the work.

When ordered by the Engineer, the Contractor shall remove workers from the project that are performing the safety critical work in a manner that creates an unsafe situation for the public in accordance with subsection 108.05.

Should an unplanned event occur or the safety critical operation deviate from the submitted plan, the Contractor shall immediately cease operations on the safety critical element, except for performing any work necessary to ensure worksite safety, and provide proper protection of the work and the traveling public. If the Contractor intends to modify the submitted plan, he shall submit a revised plan to the Engineer prior to resuming operations.

All costs associated with the preparation and implementation of each safety critical element construction plan will not be measured and paid for separately, but shall be included in the work.

Nothing in the section shall be construed to relieve the Contractor from ultimate liability for unsafe or negligent acts or to be a waiver of the Colorado Governmental Immunity Act on behalf of the Department.

END OF SECTION

REVISION OF SECTION 108 - SPECIALTY ITEMS

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Subsection 108.01 shall include the following:

The following items are designated as "Specialty Items" for this project:

Specialty Items

(1) Chevo Studios Art form liners. This will require coordination with the General Contractor for these installations.
(2) Furnish and Installation of a prefabricated pedestrian bridge.
(3) Water and Sanitary sewer relocations
(4) Restrictor Plate fabrication and installation at the existing Foothills Parkway triple cell box culvert.
(5) Construction of the Canopy Structures at the BNSF Bridge/Trail underpass
(6) Boulder and White Rock Ditch Company Diversion Structure with Slide Gates

END OF SECTION

REVISION OF SECTION 201 - CLEARING AND GRUBBING

Section 201 of the Standard Specifications is hereby revised for this project as follows:

Subsection 201.01 shall include the following:

Clearing and grubbing includes the removal and disposal of the miscellaneous debris within the project limits to include: trees 6-inches in diameter or less, branches, trunks, shrubs, all tree stumps regardless of size (unless otherwise paid for separately as indicated in the plans), trimming of trees, plant materials, miscellaneous landscaping materials, sod, riprap, rock cobble, and all other materials within the work area not otherwise listed as a pay item. Trees that are 6-inches in diameter or less are included in this item. All stumps shall be removed at time of tree removal. This work also includes the preservation from injury or defacement of all vegetation and objects designated to remain. The Contractor and Engineer shall establish environmental limits during walk through. No trees, shrubs, plants, grasses, and other vegetation shall be removed until marked and approved by the Engineer. Trees shall only be removed no earlier than three months of beginning work within the area.

Subsection 201.02 shall include the following:

The removal and trimming of all trees shall be in accordance with Project Special Provision, Revision of Section 202 - Removal and Trimming of Trees.

Subsection 201.04 shall include the following:

Pay Item	Pay Unit
Clearing and Grubbing	Lump Sum

Trimming of trees, removal of trees 6-inches in diameter or less (measured 3 feet above adjacent ground), the removal of branches, trunks, shrubs, plant materials, miscellaneous landscaping materials, and sod will not be paid for separately but shall be included in the work. Chipping, hauling, and disposal of removed materials will not be paid for separately but shall be included in the work.

END OF SECTION

REVISION OF SECTION 202 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.01 shall include the following:

This work shall include the removal of the volleyball court and the flagstone memorial /seating area. This work shall also include removal of Ground Signs. This work shall also include removal of Ground Signs (Special), which is for the removal of the Manor Care Facility Sign located at the southeast corner of the 28th Street and Palo Parkway intersection. This work shall include the removal of abandoned utilities.

Subsection 202.02 shall include the following:

Utilities lines abandoned by individual utility owners as specified in the Utilities section of these specifications shall be removed when encountered. Contractor shall coordinate with individual utility owners to verify that encountered utilities have been abandoned and can be removed. Contractor shall only remove abandoned utilities that are in direct conflict with the proposed improvements unless otherwise directed by the engineer. Abandoned utilities shall be removed a minimum distance of 2 feet away from proposed improvements or finished grade. Removed utility lines shall become property of the contractor.

Plugging the culvert at 34th Street shall include all forming, concrete, and rebar necessary to complete the work.

Subsection 202.03 shall include the following:

The volleyball court materials shall be offered to UCAR for their continued use. If the materials are desired to be salvaged by UCAR the contractor shall utilize removal methods that preserve the integrity of the materials and the ability to reuse the materials. If UCAR declines wanting the materials, they shall become the contractor's property and shall be disposed of properly.

The flagstone memorial/ seating area shall be salvaged and stored for reconstruction at a new location as designated on the plans. The contractor shall store the materials in the contractor's staging and storage area until ready for the reconstruction.

The contractor shall notify Manor Care to inform them that the Removal of Ground Sign (Special) will be removed at least one week prior to conducting that work.

The contractor shall remove all ground signs designated for removal and deliver the signs to the City of Boulder Sign Shop. Contact Scott Baker 303-413-7122 to coordinate this effort.

END OF SECTION

REVISION OF SECTION 202 - REMOVAL AND TRIMMING OF TREES

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.02 shall include the following:

This work includes the removal (as detailed in the plans by each) and the pruning of trees as directed by the Engineer. This work includes the preservation from injury or defacement of all vegetation and objects designated to remain.

The project is located within the quarantined area for the Emerald Ash Borer, which restricts the movement of deciduous woody debris to prevent the spread of the Emerald Ash Borer. All wood from deciduous tree removals must stay within the quarantine area or meet quarantine restrictions per compliance agreements. Information on the quarantine, including a map of the quarantine area, can be found at www.EABColorado.com.

The Engineer will establish environmental limits. All trees, shrubs, plants, grasses, and other vegetative materials shall remain, except as designated by the Engineer.

Prior to beginning any construction, removal, or pruning of encroaching vegetation (as determined by the Engineer) shall be completed.

Once all directed clearing, and pruning is completed and accepted, no additional clearing, cutting, or pruning will be allowed unless approved, in writing, by the Engineer.

This work shall be done by a Contractor or subcontractor who is a qualified arborist and a member of the National Arborist Association. There shall be at least one certified arborist on the job at all times. The firm's or individual's name and qualifications shall be submitted at the preconstruction conference for the Engineer's approval. A list of references and other clients shall be included with the qualifications statement. A written description of work methods and time schedules shall be submitted and approved in writing by the Engineer prior to work commencing.

Tree removals shall be done in small increments and not before other project work requires a given tree's removal. Tree removals required in order to perform other items of work in a given area of the project shall not be completed more than two weeks in advance of the other work's start.

Access for the removal or pruning of trees will be extremely limited. Trees shall be felled at the risk of the Contractor. Strict limits of disturbance will be defined and shall be adhered to.

Branches on trees or shrubs shall be removed as directed by the Engineer. All pruning shall be done by skilled workmen. All work shall be done according to the following requirements:

(1) Tree pruning and removal work is to follow standards established by the National Arborist Association. Pruning shall be done with proper, sharp, clean tools in such a manner as to preserve the health and natural character of the tree.
(2) All final cuts shall be made outside of the branch collar. Cuts shall not be flush with the trunk and shall not leave a protruding stub.

(3) To avoid damage to property and to assure safety, large branches (>6" in diameter) shall be lowered to the ground using ropes. To avoid bark stripping, all branches 2 inches in diameter and larger shall be cut using the 3-cut method.
(4) Tools used on trees known or found to be diseased shall be treated with a disinfected such as alcohol, Lysol or Clorox between cuts within one tree and before cuts are made on other trees.
(5) Significant structural weaknesses such as cracks, cavities or split crotches shall be reported to the Engineer.
(6) When heading back branches, the Contractor shall use the drop-crotch method pruning the branch back to a healthy lateral branch. The lateral branch shall be at least one-third the size of the parent branch. Smaller limbs and twigs shall be removed in such a manner so as to leave the foliage pattern evenly distributed.
(7) When heading back a branch not more than one-third of the total area shall be reduced at a single operation.
(8) Climbing spikes shall not be used on trees not scheduled for removal.

All brush, branches, limbs, and foliage smaller than 3 inches in diameter shall be chipped into mulch and stockpiled at a designated site. The trunks and limbs 3 inches and larger shall be cut into less than 6 foot lengths and hauled to a designated site. All stumps shall be removed as part of the work at the same time as tree removal. In addition removal of tree shall include all root systems in conflict with proposed construction. All chippings, trunks, limbs, stumps, and roots shall become the contractor's property and shall be disposed of properly.

Subsection 202.12 shall include the following:

Pay Item	**Pay Unit**
Removal of Tree	Each

Chipping, stockpiling mulch, and hauling and stockpiling trunks and limbs will not be paid for separately but shall be included in the work. Removal of trees less than 6 inches (measured 3 feet above adjacent ground) in diameter and all stumps will not be paid for separately but shall be paid for as lump sum under the clearing and grubbing item.

All clearing and grubbing directed by the Engineer will be paid for as lump sum under the clearing and grubbing item.

END OF SECTION

REVISION OF SECTION 202 - REMOVAL OF FIRE HYDRANT

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.01 shall include the following:

This work shall also include the removal of fire hydrants, connection pipes, joints, thrust blocks, and installation of closure flanges or new pipe sections required to restore the mainlines to full working condition. All fire hydrants shall be delivered to the City of Boulder waterline maintenance yard.

Subsection 202.02 shall include the following:

All work affecting waterline shall be performed in accordance with the City of Boulder, Design and Construction Standards, latest edition. Pits or excavations which result from removals shall be filled with an approved material and compacted. All backfill shall conform to the requirements of Sections 203 and 206.

1. Contractor performing hydrant removal shall be notified of the presence of lead coatings on the hydrant prior to removal.

2. Contractor performing removal is responsible for compliance with all local, State, and federal regulations regarding work involving lead-containing coatings. This includes both environmental compliance (e.g., US EPA waste handling, transportation and disposal) and occupational compliance (e.g., OSHA employee notification and monitoring). Applicable regulations include, but are not limited to:

   A. OSHA – 29 CFR 1926.59 – Hazard Communication
   B. OSHA – 29 CFR 1926.62 – Lead
   C. OSHA – 29 CFR 1926.103 – Respiratory Protection

3. All waste and debris from the removal activity, and any painted components of the hydrant that will be disposed must be assumed to be hazardous waste or tested under 40 CFR Part 261 to determine if they are a hazardous waste(s) in accordance with the EPA's Resource Conservation and Recovery Act (RCRA).

4. If the solid waste material(s) is hazardous based on the RCRA testing, or if the contractor chooses to assume the waste is hazardous, the contractor shall comply with all waste handling and disposal criteria per the RCRA regulation. Alternatively, the applicable hydrant and components may be sold to another party (e.g., a recycler) with proper notification as to the nature of the components and the waste determination (see below).

5. If the material is handled as hazardous waste, the contractor shall use an appropriately licensed waste hauler that will dispose of the hazardous waste at an appropriate facility. The contractor shall provide the name of the waste ERO Resources hauler and landfill that will be used for disposal of hazardous wastes prior to the commencement of removal activities.

6. If the hydrant components will be recycled or otherwise reused, the recycling facility or agency reusing the materials must be notified by the contractor of the presence of lead-containing coatings. Proper records of any such transaction should be maintained including a complete bill of sale and appropriate notification of the nature of the components and the waste determination. Note that the contractor *is not* the owner of the hydrant components and is not responsible for the ultimate disposition of the waste: this responsibility belongs to the owner of the waste and cannot be transferred unless the hydrant component ownership changes.

7. The contractor shall provide the following documentation at the end of the hydrant removal activities, as appropriate:
   A. Waste manifests from hazardous waste disposal;
   B. Bill of sale and notification letter provided to recycling facility or agency that will be reusing the components, and;
   C. Certification statement that all work was performed in accordance with applicable local, state, and federal regulations, including results of any OSHA compliance air monitoring performed during the removal.

All waterline work shall be subject to inspection and acceptance by the City of Boulder Utilities. Prior to backfilling any waterline work the Contractor shall contact the following to schedule inspections:

Steven Buckbee (303) 441-4273

Subsection 202.11 shall include the following:

Removal of fire hydrant will be measured by each fire hydrant and assembly, removed and accepted by the Engineer.

Subsection 202.12 shall include the following:

Removal of fire hydrant will be paid for at the accepted contract unit price for all work specified herein.

Payment will be made under:

Pay Item	**Pay Unit**
Removal of Fire Hydrant	Each

Payment for removal of fire hydrant shall be full compensation for all labor, equipment and materials required to complete the work including excavations, saw-cutting, removals of hydrants, riser pipe, fittings and thrust blocks, backfill and disposal, installation of closure flanges or new pipe sections.

END OF SECTION

REVISION OF SECTION 203 –EXCAVATION AND EMBANKMENT

Section 203 of the Standard Specifications is hereby revised for this project as follows:

Subsection 203.03 shall include the following:

Embankment Material (Complete In Place) (Special). Embankment Material (Complete In Place) (Special) shall be used to comprise the clay liner for the Boulder and White Rock Ditch. If no suitable material can be sourced onsite, clay material shall be imported to the project. Imported Embankment material shall be a clay material with a minimum of 60% by weight passing the #200 sieve and a plasticity index (PI) of no less than 24%. Imported material shall be compacted on a minimum of 12" depth of scarified moisture conditioned and compacted subgrade. Compaction requirement shall be 95% of the maximum dry density (ASTM D 968). Moisture requirement will be within 2% of the optimum moisture content. Tests may be performed by the owner; if a failed test is received the contractor shall be responsible for the cost of the test and any corrective actions necessary.

END OF SECTION

REVISION OF SECTION 206 -EXCAVATION AND BACKFILL FOR STRUCTURES, CULVERTS, PIPES AND RIPRAP

Section 206 of the Standard Specifications is hereby revised for this project as follows:

Subsection 206.07 shall include the following:

For Box Culverts, Wingwalls and Retaining Walls:

Structure Backfill (Class 1) will be measured and paid for in accordance with Standard Section 206. Structure Excavation will not be measured and paid for separately, but shall be included in the work.

For Storm and Sanitary Sewer Manholes and Inlets:

Structure Backfill (Flow-Fill) shall be used to backfill all manholes. The limits of flow-fill shall be the excavation limit of the manholes. The fill shall extend upward to the proposed finish subgrade. The flow-fill will not be measured and paid for separately, but shall be included in the work.

For Storm, Sanitary and Water Pipes:

Limits and materials for Structure Excavation and Structure Backfill for all storm, sanitary and water pipes shall be in accordance with the City of Boulder Utility Trench and Pipe Bedding details as shown on the plans. Structure Excavation, Structure Backfill (Class 1 or Flow-Fill) and Bedding (including granular bedding material up to 12 inches above the top of the pipe) required for all pipes will not be measured and paid for separately, but shall be included in the work.

For Riprap, Boulders, Grouted Boulders and Boulder Edge:

Structure Excavation, Structure Backfill, Bedding Material and Filter Material for riprap, boulders, grouted boulders and boulder edge will not be measured and paid for separately, but shall be included in the work.

END OF SECTION

REVISION OF SECTION 207 - TOPSOIL

Section 207 of the Standard Specifications is hereby revised for this project as follows:

Subsection 207.02 is hereby revised to include the following:

Topsoil (Special): Topsoil (special) shall consist of 90:10 mix (by volume) of athletic grade sand (screened to 2 mm minus) and fine shredded cedar mulch mixed 70:30 (by volume) with screened topsoil. Final mix proportions by volume shall be 63% sand, 7% mulch, and 30% sandy loam topsoil. Growing media shall be supplied by golf and sport solutions, LaSalle Colorado (contact: Eric Pollock, 303-961-0092) or approved equivalent.

Subsection 207.03 is hereby revised to include the following:

The top 6-inches minimum of topsoil and top 18-inch minimum of wetland topsoil including existing grass cover, roots, and shrubs, shall be stripped and stockpiled prior to beginning hauling, excavating, or fill operations. Topsoil shall be stripped a minimum of 5 feet beyond the working limits of areas to be excavated or filled. Topsoil shall also be stripped for construction staging areas and temporary stockpile areas. Topsoil shall be placed directly upon completed cut and fill slopes and all other graded areas whenever conditions and the progress of construction permit. Topsoil shall be replaced at a minimum thickness of 6-inches, unless shown otherwise. Topsoil shall be placed to cover riprap as shown on the Contract Drawings.

The stockpiled material will be protected from transport from stream flows or runoff by using erosion and sediment controls. If noxious weeds are found at a site before grading, areas to be disturbed shall be pre-treated with either an approved herbicide or mowing before grading.

Subsection 207.04 shall include the following:

The quantity to be paid for topsoil shall not be remeasured but will be the number of cubic yards designated in the contract. This is based on stripping the existing surface to a depth of 6-inches for upland areas and 18-inches for wetland areas for the areas within the construction limits and for excavation and embankment areas as shown on the Contract Drawings.

In Subsection 207.05, add the following:

Pay Item	Pay Unit
Stockpile Topsoil	Cubic Yard
Stockpile Wetland Topsoil	Cubic Yard
Topsoil (Special)	Cubic Yard

Payment for stockpile topsoil and stockpile wetland topsoil shall include but is not limited to stripping, stockpiling and replacement of topsoil to a minimum depth of 6-inches over the areas within the grading limits as shown on the Contract Drawings. Grasses and shrubs removed during clearing and grubbing may be incorporated into the topsoil mix. Payment shall be made at the contract unit prices for topsoil and shall include full compensation for all labor, equipment and materials to complete the work.

Payment for Topsoil (Special) shall include but is not limited to furnishing, transporting, mixing, stockpiling, and placement of topsoil to a minimum depth of 6-inches over the areas as shown on the Contract Drawings. Payment shall be made at the contract unit prices for topsoil and shall include full compensation for all labor, equipment and materials to complete the work.

END OF SECTION

REVISION OF SECTION 210 - RESET STRUCTURES

Section 210 of the Standard Specifications is hereby revised for this project as follows:

Subsection 210.01 shall include the following:

Removal and Reset of Miscellaneous items shall include the removal, storage and resetting of trash cans and picnic benches in the area of the dog park. Fixtures shall be replaced according to their current conditions. This may require concrete work.

This work shall also include Reset Traffic Signal Pole. This item will require the existing footing to be protected in place and reused for resetting the traffic pole.

END OF SECTION

ADDITION OF SECTION 211 - DEWATERING

Section 211 is added to the Standard Specifications as follows:

Subsection 211.01 shall include the following:

Dewatering shall be completed for the project in accordance with Section 107.25 Water Quality Control of the Standard Specifications. Additionally, the contractor shall be responsible for providing and maintaining water control through the project area to route surface runoff as well as subsurface water through the project area without causing adverse impacts to surrounding properties and properties downstream of the project area.

BASIS OF PAYMENT
Subsection 211.02 shall include the following:

No measurement will be made for water control and dewatering operations and the Dewatering pay item will be paid for as a lump sum item. The first monthly pay request shall pay five percent of the bid price for Dewatering recognizing that water control measures may be some of the first work items, unless the first pay request exceed five percent of the overall contract amount. No additional payments will be made until the contractor's total pay requests for the project as approved by the City exceed five percent completed on the project, then additional payments for this item will be made to match the percentage of work completed on the project.

END OF SECTION

REVISION OF SECTION 212 - SEEDING, FERTILIZING, SOIL CONDITIONER, AND SODDING

Section 212 of the Standard Specifications is hereby revised as follows:

Subsection 212.01 is hereby revised to include the following:

(b) *Submittals*. The following shall be submitted for the Work in this Section:

1. Test results showing mixture composition and analysis of soil preparation material
2. Delivery tickets on materials to verify quantities.
3. Seed mix listing LBS./Acre of each variety of seed
4. Seed mix listing the varieties in the bluegrass sod

Subsection 212.02 (a) is hereby revised to include the following:

Dryland Seed Mixture:

Common Name	Scientific Name	%
Fringed Sage	Artemisia frigida	5
Sideoats Grama	Bouteoua curtipendula	5
Blue Grama	Bouteloua gracilis	20
Buffalograss	Buchloe dactyloides	15
Rocky Mountain Beeplant	Cleome serrulata	4
Purple Prairie Clover	Dalea purpurea	2
Eastern Purple Coneflower	Echinacea purpurea	2
Thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	5
Slender wheatgrass	Elymus trachycaulus	5
Perennial Blanket Flower	Gaillardia artistata	2
Indian Blanket Flower	Gaillardia pulchella	5
Tanseyleaf Tansyaster	Machaeranthera tanacetifolia	5
Green Needlegrass	Nassella virdula	5
Western Wheatgrass	Pascopyrum smithii	10
Prairie Coneflower	Ratibida columniferea	5
Sand Dropseed	Sporobolus cryptandrus	5
		100

17-20 lbs. per acre

Riparian Seed Mixture:

Common Name	Scientific Name	%
Western Wheatgrass	Pascopyrum smithii	35
Fowl Mannagrass	Glyceria striata	35
Nutall's Alkaligrass	Puccinellia nuttalliana	2
Switchgrass	Panicum virgatum	24
Alkali Muhly	Muhlenbergia asperifolia	4
		100

8.5 lbs. per acre

Wetland Seed Mixture:

Common Name	Scientific Name	%
American sloughgrass	Beckmannia syzigachne	5
Sideoats grama	Bouteloua curtipendula	3
Bluejoint	Calamagrostis canadensis	9
Water Sedge	Carex aquatilis	9
Nebraska Sedge	Carex nebrascensis	9
Fox Sedge	Carex vulpinoidea	9
Rocky Mountain Beeplant	Cleome serrulata	3
Purple Prairie Clover	Dalea purpurea	2
Tufted Hairgrass	Deschampsia caespitosa	10
Eastern Purple Coneflower	Echinacea purpurea	2
Perennial Blanket Flower	Gaillardia artistata	3
Indian Blanket Flower	Gaillardia pulchella	4
Fowl Mannagrass	Glyceria striata	10
Mountain Rush	Juncus balticus	10
Fowl Bluegrass	Poa palustris	10
Prairie Coneflower	Ratibida columniferea	2
		100

26 lbs. per acre

Subsection 212.02 (b) 2. Shall be replaced with the following:

(b) Organics should be Class I compost. The organic material shall have an acidity in the range of pH 6 to 8, shall not exceed 5 mmhos/cm. soluble salt content utilizing TMECC 04.10-A, 1:5 slurry method mass basis, shall have a final non adjusted Carbon to Nitrogen ration of less than 12, shall have an Ammonia to Nitrate ratio of less than 4, and shall have a minimum organic content of 250 pounds/CY. Sand, gypsum or peat mosses are unacceptable materials. The mixture shall be free from clay subsoil, stones, lumps, plants and their roots, sticks, weed stolons and seeds, high salt content and other materials harmful to plant life.

Subsection 212.02 (c) shall be replaced with the following:

(c) Sod shall be a drought resistant Colorado grown bluegrass blend suitable for vigorous athletic field and general play use. The blend shall contain a minimum of three improved varieties.

Sod shall be a healthy, thick turf having undergone a program of regular fertilization, mowing and weed control; free of objectionable weeds; uniform in green color, leaf texture and density; healthy, vigorous, strongly implanted root system; inspected and found free of disease, nematodes, pests and pest larvae by the entomologist of the State Department of Agriculture. Each piece of sod shall be of a sandy-loam that will not break, crumble or tear during installation. The sod thickness shall be 1½" to 1¾", excluding top growth and thatch. The thatch shall not exceed ½" uncompressed. The sod shall be harvested no more than 24 hours before delivering to the sites. The minimum size for any piece of sod installed on the site shall be 18"x18"

Sand grown sod shall meet the requirements above, but shall be grown in a sandy medium.

Subsection 212.03 shall be replaced with the following:

No seeding shall take place when the site is wet or during freezing temperatures. Seeding shall take place immediately after the soil preparation has been installed and accepted. If seeding occurs after May 15th or before September 1st, the contractor shall, at no additional cost to the owner, reseed all disturbed areas after September 1st.

Subsection 212.06 (a) and (b) are hereby revised to include the following:

(a) Sticks, stones, debris, clods, greater than 2" shall be removed. All asphalt, concrete, or other construction debris shall be removed.

(b) Application rate for soil preparation material shall be 4 CY/1000 s.f. No fertilizer shall be applied to seeded areas.

Subsection 212.06 (c) shall be replaced with the following:

(c) All work specified herein shall be performed under the direct supervision of the Contractor's superintendent thoroughly familiar with the work of this section who shall be at the project site for the duration of the work of this section.

Any areas that have been prepared and approved for seeding and because of weather are not immediately seeded are subject to re-inspection and acceptance by the Owner's Representative. The Contractor shall notify the Owner's Representative of his intent to seed following delays

because of weather, allowing the Owner's Representative sufficient time to inspect and approve the prepared areas. Any areas that in the opinion of the Owner's Representative require re-grading or additional soil preparation because of wind and water erosion, or require additional tillage because of compaction, shall be done at the Contractor's expense.

Seeding shall not be undertaken until adjacent site improvements and pavements are substantially complete. No trucking or moving of equipment or materials will be permitted upon completed seeded areas.

Seed shall be drilled mechanically with a mechanical, power-drawn drill followed by packer wheels. Seed shall be applied at the specified rate.

Seeding will not be permitted when wind velocity is such as to prevent uniform seed distribution. No application shall be undertaken during inclement or the forecast of inclement weather. No application shall take place in the presence of free surface water or when the ground is frozen or un-tilled. Seed depth shall be 1/16"-1/4".

If seeding, raking in, and rolling operations are not performed in one (1) mechanical operation, the raking and rolling operations shall be performed separately and immediately after seeding operations.

If seed is broadcast, the seed shall be hand raked into the soil to the specified depth, and covered with erosion control mats and/or mulch as specified.

Slopes 4:1 or greater and hand-seeded areas: Double seeding rates.

Subsection 212.07 is hereby deleted and replaced by the following:

Soil Conditioning: Measurement will be made of the actual number of square feet of soil prepared and accepted at the locations shown on the Drawings or as directed by the Owner's Representative, and in accordance with the Drawings and Specifications. No separate measurement will be made for areas disturbed outside the limit of work. Areas disturbed outside the limit of work will be prepared at Owner's Representative discretion and at the contractor's own expense.

Seeding (Native), Seeding (Riparian), Seeding (Wetland): Measurement will be made of the actual number of square feet of seed installed and accepted at the locations within the limit of work as shown on the drawings or as directed the Owner's Representative, and in accordance with the specifications. No separate measurement will be made for areas disturbed outside the limit of work. These disturbed areas will be seeded or sodded at the Owner's Representative's discretion and at the contractor's own expense.

Sod, Sod (Sand Grown): Measurement will be made of the actual number of square feet of sod installed and accepted at the locations within the limit of work as shown on the drawings or as directed the Project Manager, and in accordance with the specifications. No separate measurement will be made for areas disturbed outside the limit of work. These disturbed areas will be seeded or sodded at the Project Manager's discretion and at the contractor's own expense.

Subsection 212.08 is hereby deleted and replaced by the following:

Soil Conditioning: Payment will be made at the unit price bid and shall include furnishing and installation of soil amendments including organic materials, discing, raking, spreading, fine grading and any other work required to complete the work in accordance with the Drawings and Specifications. All disturbed areas will be prepared prior to installation of seed.

Seeding (Native), Seeding (Riparian), Seeding (Wetland): Payment will be made at the unit price bid and shall include furnishing and installation of seed and mulch, watering and maintenance in accordance with the drawings and specifications.

Sod, Sod (Sand Grown): Payment will be made at the unit price bid and shall include furnishing and installing sod, fertilizer, watering, rolling, maintenance, and all other work necessary to provide a complete installation in accordance with the drawings and specifications.

PAY ITEM	**PAY UNIT**
Soil Conditioning	Acre
Seeding (Native)	Acre
Seeding (Riparian)	Acre
Seeding (Wetland)	Acre
Sod	Acre
Sod (Sand Grown)	Acre

END OF SECTION

REVISION OF SECTION 213 - MULCHING

Section 213 of the Standard Specifications is hereby revised as follows:

Subsection 213.03 is hereby revised to include the following:

(d) Wood mulch: shall be shredded wood shavings, 2" minimum to 4" maximum length, free of dirt, branches, or foreign material. In areas where mulch is to be installed adjacent to existing mulched areas, the new mulch shall match the existing mulch. Submit sample to Owner for approval.

(e) Metal Landscape Border

A. Comply with ASTM A 569, hot-rolled, standard flexible carbon steel rolled top landscape edging
B. Fabricated in sections with stake pockets stamped, punched, or welded to face of sections approximately thirty inches (30") apart to receive stakes.
C. Edger shall be 3/16" thick and 4" wide minimum
D. Use stakes specifically designed for use with selected edger
E. Stakes shall be 16" minimum length
F. Edger and stakes finish shall be electrostatic powder coat paint, color: green

Subsection 213.04 is hereby deleted and replaced by the following:

Landscape Edger: Measurement will be made of the actual number of linear feet of steel edger placed and accepted at the locations shown on the drawings or as directed by the Owner's Representative and in accordance with the specifications

Mulch (Decorative): Measurement will be made of the actual number of cubic feet of mulch placed and accepted at the locations shown on the drawings or as directed by the Owner's Representative and in accordance with the specifications.

Rock Mulch (Weed Free): Measurement will be made of the actual number of square feet of mulch placed and accepted at the locations shown on the drawings or as directed by the Owner's Representative and in accordance with the specifications.

Salvage and Reinstall Existing Rock Mulch: Measurement will be made of the actual number of square feet of mulch placed and accepted at the locations shown on the drawings or as directed by the Owner's Representative and in accordance with the specifications.

Subsection 213.05 is hereby deleted and replaced by the following:

Landscape Edger: Payment will be made at the unit price bid and shall include furnishing and installing all materials including steel edger and stakes, excavation, trenching, backfilling, removing and reinstalling as required to achieve the correct bed shape and size at the direction of the Owner's Representative, and any other items necessary to install the edger in accordance with the drawings and specifications.

Mulch (Decorative): Payment will be made at the unit price bid and shall include furnishing, transporting, and installing mulch as shown on the drawings and in accordance with the drawings and specifications.

Rock Mulch (Weed Free): Payment will be made at the unit price bid and shall include furnishing, transporting, and installing mulch as shown on the drawings and in accordance with the drawings and specifications.

Salvage and Reinstall Existing Rock Mulch: Payment will be made at the unit price bid and shall include salvaging, stockpiling, and reinstalling rock mulch, furnishing additional rock mulch to match the existing rock if necessary, subgrade preparation, and any other work and materials required to complete the installation as shown in the drawings and in accordance with the drawings and specifications.

PAY ITEM	**PAY UNIT**
Metal Landscape Border (3/16x4)	Linear Foot
Mulch (Decorative)	Cubic Foot
Rock Mulch (Weed Free)	Square Feet
Salvage and Reinstall Existing Rock Mulch	Square Feet

END OF SECTION

REVISION OF SECTION 214 - PLANTING

Section 214 of the Standard Specifications is hereby revised as follows:

Subsection 214.02 is hereby revised to include the following:

(b) Wetland Perennial Plants: Note that contractor will likely have to contract with a grower for the wetland plugs due to the quantity and size of some of the specified species. Some specified plants will require 1 full growing season or longer before they are ready for installation. The contractor is made aware of this lead time and shall plan for the preparation of wetland plants accordingly.

Fringe Wetland Species Mix

Common Name	Scientific Name	Size	Qty
Nebraska Sedge	Carex nebrascensis	10 Cu. In.	10,176
Common Threesquare Bulrush	Schioenoplectus pungens	10 Cu. In.	5,088
Common Spikerush	Eleocharis palustris	10 Cu. In.	5,088
Alkali Grass	Pucinelli nutans	10 Cu. In.	5,088
Sloughgrass	Bechmannia syzigachne	10 Cu. In.	5,088
Baltic Rush	Juncus balticus	10 Cu. In.	5,088
American mannagrass	Glyceria grandis	10 Cu. In.	2,496
Fowl mannagrass	Glyceria striata	10 Cu. In.	2,592
Scratchgrass	Muhlenbergia asperifolia	10 Cu. In.	5,088
Prairie Cordgrass	Spartina pectinata	10 Cu. In.	5,088
Torrey's Rush	Juncus torreyi	10 Cu. In.	5,088

Shallow Water Species Mix

Common Name	Scientific Name	Size	Qty
Panicled Bulrush	Scirpus microcarpus	10 Cu. In.	5,184
Softstem Bulrush	Schoenoplectus tabernaemontani	10 Cu. In.	5,184

Deep Water Species Mix

Common Name	Scientific Name	Size	Qty
Softstem Bulrush	Schoenoplectus tabernaemontani	40 Cu. In.	2,060
Common Tule	Schoenoplectus acutus	40 Cu. In.	2,060

(d) Soil Conditioner: shall adhere to the requirements of 212.02 (b). Fertilizer shall be slow release (15-30-15) and shall be applied per the manufacturer's recommendations.

Subsection 214.03(c) is hereby deleted and replaced by the following:

Trees: Stake proposed tree locations and obtain approval by the Owner's Representative prior to installing the trees. Excavate planting holes with sloped sides. Do not disturb soil at the bottom of the planting holes. Make excavations per the plans. In areas with buried riprap, remove riprap from the tree pit as required for installation of the plant. Trees shall be installed plumb and oriented for best appearance.

Shrubs: Fine grading shall be completed prior to planting in areas noted on the drawings. Layout potted plants in their proposed locations for approval by the Owner's Representative. Circular pits with vertical sides hard-trimmed shall be excavated for all shrubs. Diameter of pits for planting shall be per the plans, or as detailed on the drawings. In areas with buried riprap, remove riprap from the tree pit as required for installation of the plant. After pits have been dug, remove plants from their pots for installation. Shrubs shall be installed plumb.

Trees shall be planted upright and faced to give the best appearance or relationship to adjacent areas. No burlap shall be pulled out from under balls. Remove the bottom one third (1/3) of the wire basket before placing the tree in the hole. Remove all wire, surplus binding, and burlap from tree ball with adequate wire cutters after tree is placed and stabilized in plant pit. When the hole is nearly filled, the soil shall be puddled with water to eliminate air pockets as necessary and allow it to soak away. After the ground settles additional soil shall be filled in to the level of the finished grade.

Unless otherwise specified, all plants shall be planted in pits to such a depth that the finished grade level at the plant is two inches (2") higher than the original grade of the plant. They shall be planted upright and faced to give the best appearance or relationship to adjacent areas. When the hole is nearly filled, the soil shall be puddled with water to eliminate air pockets as necessary and allow it to soak away. After the ground settles additional soil shall be filled in to the level of the finished grade. Remove plants from containers and spread out roots carefully and place in hole.

Subsection 214.03(d) is hereby replaced with the following:

Prepared plant backfill shall consist of excavated existing site soil and soil amendment per 212.02 (b) 2. in the following proportions: 33% soil conditioner, 67% existing site soil. Hold mulch at least 3" away from the base of all plants. Mulch depth shall be per the planting details.

Subsection 214.03(f) is hereby deleted and replaced by the following:

Trees shall be supported immediately after planting. All trees shall be guyed as detailed. Wire

shall be passed through grommets in nylon straps to prevent direct contact with bark of the tree and placed around the trunk in a single loop. Wire shall be tightened and kept taut by twisting the strands together.

Subsection 214.03 (j) shall be added:

Wetland perennials: plugs shall be installed so that in groupings of not less than 100 of the same species grouped together. The intent is to create the appearance of natural, organically shaped groupings of wetland species, rather than a uniform grid of plants. Spacing for the plugs shall vary to create a natural appearance, but on average, plants will be spaced about 1' o.c. The intent is not to fill the entire wetland area with plugs. Some wetland areas will only be planted with wetland seed. Wetland plugs shall also be planted between boulders on non-grouted grade control structures. Coordinate with the Owner's Representative for layout of the wetlands plants.

Subsection 214.05 is hereby deleted and replaced by the following:

Plant (Tubeling) (10 cu. in.), Plant (Tubeling) (40 cu. in.), Deciduous Tree (2.5 Inch Caliper), Deciduous Tree (6 Foot), Deciduous Tree (8 Foot), Deciduous Shrub (Tubling), Deciduous Shrub (5 Gallon Container), Evergreen Tree (6 Foot) (Ball and Burlap), Evergreen Tree (8 Foot) (Ball and Burlap), Broadleaf Evergreen Shrub (5 Gallon Container), Ground Cover Vines (2.25 Inch Pots), Perennials (1 Gallon Container): Measurement will be made of the actual number of plants placed and accepted at the locations shown on the drawings or as directed by the Owner's Representative, and in accordance with the specifications.

Subsection 214.06 is hereby deleted and replaced by the following:

Plant (Tubeling) (10 cu. in.), Plant (Tubeling) (40 cu. in.), Deciduous Tree (2.5 Inch Caliper), Deciduous Tree (6 Foot), Deciduous Tree (8 Foot), Deciduous Shrub (Tubling), Deciduous Shrub (5 Gallon Container), Evergreen Tree (6 Foot) (Ball and Burlap), Evergreen Tree (8 Foot) (Ball and Burlap), Broadleaf Evergreen Shrub (5 Gallon Container), Ground Cover Vines (2.25 Inch Pots), Perennials (1 Gallon Container): Payment will be made at the unit price bid and shall include: furnishing and installation of all materials including plants, soil amendment, guying materials, fertilizer, excavation including stones, riprap, etc.; backfill, including hand placing rip rap as required; construction of dishes, staking; guying; wrapping; maintenance until substantial completion, and other items necessary to complete the work as shown on the drawings and in accordance with the specifications.

PAY ITEM	**PAY UNIT**
Plant (Tubeling) (10 cu. in.)	Each
Plant (Tubeling) (40 cu. in.)	Each
Deciduous Tree (2.5 Inch Caliper)	Each
Deciduous Tree (6 Foot)	Each
Deciduous Tree (8 Foot)	Each
Deciduous Shrub (Tubling)	Each
Deciduous Shrub (5 Gallon Container)	Each
Evergreen Tree (6 Foot) (Ball and Burlap)	Each
Evergreen Tree (8 Foot) (Ball and Burlap)	Each
Broadleaf Evergreen Shrub (5 Gallon Container)	Each
Ground Cover Vines (2.25 Inch Pots)	Each
Perennials (1 Gallon Container)	Each

END OF SECTION

REVISION OF SECTION 216 - SOIL RETENTION COVERING

Section 216 of the Standard Specifications is hereby revised for this project as follows:

Subsection 216.02 (a) is revised to include the following:

(a) *Erosion Control Blanket. Erosion Control Blanket shall be c*oir mat, which shall be KoirMat 700 coconut fiber erosion control matting (woven matting of coir yarn) manufactured by Nedia Enterprises, Inc. or approved equivalent.

Subsection 216.02 (c) is deleted and replaced with the following:

(b) Wood stakes shall be used to secure and anchor blankets as shown on the Contract Drawings. Lengths of wood stakes are indicated on the Contract Drawings for securing and anchoring Erosion Control Blanket and Soil Retention Blanket (straw-coconut).

Subsection 216.03 (b) is deleted and replaced with the following:

Areas to be covered with Erosion Control Blanket and Soil Retention Blanket (straw-coconut shall be properly prepared, seeded, and mulched before blankets are placed. Contour furrowing shall not be done in areas where blankets are to be placed. The soil shall be free of clods, rocks, wood, and other obstructions so that the blankets are in direct contact with soil. No gaps or voids shall exist under the blankets.

Blankets shall be installed starting at the upstream end and unrolled in the direction of the flow of water. Blankets shall be placed smoothly but loosely on the soil surface without stretching. Blankets shall be staked and anchored according to the details shown on the Contract Drawings. A minimum edge distance of 2-inches from the edge of blanket to the edge of stake shall be maintained.

See the Contract Drawings for installation details. Initial and terminal anchor trenches shall be used at the upstream and downstream ends of all installations. Longitudinal trenches shall be installed at the toe and top of slopes.

When blankets/mats need to be spliced at ends, place upstream blanket/mat over the downstream blanket/mat with an overlap of 12 inches and stake using 18-inch long wood stakes at one-foot transverse spacing.

Any areas disturbed during installation of the blankets shall be reseeded and mulched.

Subsection 216.05 shall include the following:

Pay Item	**Pay Unit**
Erosion Control Blanket	Square yard
Soil Retention Blanket (straw-coconut)	Square yard

The Erosion Control Blanket and Soil Retention Blanket (straw-coconut).shall be measured by the square yard of finished surface and no allowance will be made for overlap or trenching.

END OF SECTION

REVISION OF SECTION 304 - AGGREGATE BASE COURSE

Section 304 of the Standard Specifications is hereby revised for this project as follows:

Subsection 304.02 shall include the following:

Materials for the base course shall be Aggregate Base Course (Class 6) as shown in subsection 703.03

END OF SECTION

REVISION OF SECTION 401 - HOT MIX ASPHALT Compaction (PNEUMATIC TIRE ROLLERS)

Section 401of the Standard Specifications is hereby revised for this project as follows:

In subsection 401.17, first paragraph, delete the second sentence and replace with the following:

Both steel wheel and pneumatic tire rollers will be required on this project. If the Contractor has demonstrated that all of the manufacturer's recommendations were followed and the pneumatic tire roller is detrimental to the finished surface of the HMA, the Engineer, in cooperation with the Contractor and the Region Materials Engineer, may waive the pneumatic tire roller requirement.

END OF SECTION

REVISION OF SECTION 403 - HOT MIX ASPHALT

Section 403 of the Standard Specifications is hereby revised for this project as follows:

Subsection 403.02 shall include the following:

The design mix for hot mix asphalt shall conform to the following:

Table 403-1

Property	Test Method	Value For Grading					
				SX(75)	S(75)		Patching
Air Voids, percent at: N (design)	CPL 5115			3.5 – 4.5	3.5 – 4.5		3.5 – 4.5
Lab Compaction (Revolutions): N (design)	CPL 5115			75	75		75
Stability, minimum	CPL 5106			28	28		28
Aggregate Retained on the 4.75 mm (No. 4) Sieve for S, SX and SG, and on the 2.36mm (No. 8) Sieve for ST and SF with at least 2 Mechanically Induced fractured faces, % minimum*	CP 45			60	60		60
Accelerated Moisture Susceptibility Tensile Strength Ratio (Lottman), minimum	CPL 5109 Method B			80	80		80
Minimum Dry Split Tensile Strength, kPa (psi)	CPL 5109 Method B			205 (30)	205 (30)		205 (30)
Grade of Asphalt Cement, Top Layer				PG 64-22			PG 64-22
Grade of Asphalt Cement, Layers below Top					PG 64-22		PG 64-22
Voids in the Mineral Aggregate (VMA) % minimum	CP 48			See Table 403-2	See Table 403-2		See Table 403-2
Voids Filled with Asphalt (VFA), %	AI MS-2			65-80	65-80		65-80

Table 403-1

Property	Test Method	Value For Grading					
				SX(75)	S(75)		Patching
Dust to Asphalt Ratio				0.6 – 1.2	0.6 – 1.2		0.6 - 1.2
Fine Gradation	CP 50						
Coarse Gradation				0.8 – 1.6	0.8 – 1.6		0.8 – 1.6

Note: AI MS-2 = Asphalt Institute Manual Series 2

Note: Mixes with gradations having less than 40% passing the 4.75 mm (No. 4) sieve shall be approached with caution because of constructability problems.

Note: Gradations for mixes with a nominal maximum aggregate size of one-inch or larger are considered a coarse gradation if they pass below the maximum density line at the #4 screen.

Gradations for mixes with a nominal maximum aggregate size of 3/4” to 3/8” are considered a coarse gradation if they pass below the maximum density line at the #8 screen.

Gradations for mixes with a nominal maximum aggregate size of #4 or smaller are considered a coarse gradation if they pass below the maximum density line at the #16 screen.

*Fractured face requirements for SF may be waived by RME depending on project conditions.

All mix designs shall be run with a gyratory compaction angle of 1.25 degrees and properties must satisfy Table 403-1. Form 43 will establish construction targets for Asphalt Cement and all mix properties at Air Voids up to 1.0 percent below the mix design optimum. CDOT will establish the production asphalt cement and volumetric targets based on the Contractor's mix design and the relationships shown between the hot mix asphalt mixture volumetric properties and asphalt cement contents on the Form 429. CDOT may select a different AC content other than the one shown at optimum on the Contractor's mix design in order to establish the production targets as contained on the Form 43. Historically, Air Voids adjustments typically result in asphalt cement increases from 0.1 to 0.5 percent. Contractors bidding the project should anticipate this change and factor it into their unit price bid.

Table 403-2

	Minimum Voids in the Mineral Aggregate (VMA)			
Nominal Maximum Size*, mm (inches)	*****Design Air Voids ****			
	3.5%	**4.0%**	**4.5%**	**5.0%**
37.5 (1½)	11.6	11.7	11.8	N/A
25.0 (1)	12.6	12.7	12.8	
19.0 (¾)	13.6	13.7	13.8	
12.5 (½)	14.6	14.7	14.8	
9.5 (⅜)	15.6	15.7	15.8	
4.75 (No. 4)	16.6	16.7	16.8	16.9
	* The Nominal Maximum Size is defined as one sieve larger than the first sieve to retain more than 10%. ** Interpolate specified VMA values for design air voids between those listed. *** Extrapolate specified VMA values for production air voids beyond those listed.			

The Contractor shall prepare a quality control plan outlining the steps taken to minimize segregation of HMA. This plan shall be submitted to the Engineer and approved prior to beginning the paving operations. When the Engineer determines that segregation is unacceptable, the paving shall stop and the cause of segregation shall be corrected before paving operations will be allowed to resume.

Hot mix asphalt for patching shall conform to the gradation requirements for Hot Mix Asphalt (Grading S).

A minimum of 1 percent hydrated lime by weight of the combined aggregate shall be added to the aggregate for all hot mix asphalt. Acceptance samples shall be taken.

Delete subsection 403.05 and replace with the following:

403.05 The accepted quantities of hot mix asphalt will be paid for in accordance with subsection 401.22, at the contract unit price per ton for the bituminous mixture.

Payment will be made under:

Pay Item	**Pay Unit**
Hot Mix Asphalt (Grading SX) (75) (PG 64-22)	Ton
Hot Mix Asphalt (Grading S) (75) (PG 64-22)	Ton
Hot Mix Asphalt (Patching) (Asphalt)	Ton

Aggregate, asphalt recycling agent, asphalt cement, additives, hydrated lime, and all other work and materials necessary to complete each hot mix asphalt item will not be paid for separately, but shall be included in the unit price bid. When the pay item includes the PG binder grade, any change to the submitted mix design optimum asphalt cement content to establish production targets on the Form 43 will not be measured and paid for separately, but shall be included in the work. No additional compensation will be considered or paid for any additional asphalt cement, plant modifications and additional personnel required to produce the HMA as a result in a change to the mix design asphalt cement content.

Historically, typical asphalt cement increases reflected on the Form 43 are from 0.1 to 0.5 percent. However, the Contractor should anticipate the AC increases typical of his mixes. Contractors bidding the project should anticipate this change and factor it into their unit price bid.

When the pay item does not include the PG binder grade, asphalt cement will be measured and paid for in accordance with Section 411. Asphalt cement used in Hot Mix Asphalt (Patching) will not be measured and paid for separately, but shall be included in the work.

Excavation, preparation, and tack coat of areas to be patched will not be measured and paid for separately, but shall be included in the work.

END OF SECTION

REVISION TO SECTION 412 – CONCRETE PAVEMENT

Section 412 of the Standard Special Provisions is hereby revised for this project as follows:

Subsection 412.01 shall include the following:

This work consists of the construction Concrete Pavement associated with driveway curb ramp, roadway pans, driveways, and other miscellaneous drivable concrete surfaces.

Subsection 412.03 be deleted and replaced with:

Concrete shall be Class D and shall include 1.5 lbs/cy of fibrous reinforcement.

Subsection 412.24 shall include the following:

Pay Item	**Pay Unit**
Concrete Pavement (8 Inch) (Special)	Square Yard

Concrete Pavement (8 Inch) (Special): Payment will be made at the unit price bid and shall include: furnishing and installation of materials; fibrous reinforcing; formwork; subgrade preparation; finishing; joints; reinforcing bar, dowels, protective coatings; curing; sweeping; hot and cold weather protection, washing; cleanup and other items necessary to complete the work as shown on the drawings and in accordance with the specifications.

END OF SECTION

REVISION TO SECTION 504 – WIRE MESH FACING (TRELLIS)

Section 504 of the Standard Special Provisions is hereby revised for this project as follows:

Subsection 504.01 shall include the following:

All work associated with the Wire Mesh Facing (Trellis) pay item shall include supplying, welding and installing all wire mesh, steel plates, steel edging, fastening and mounting bolts, spacing hardware reinforcing steel required in accordance with the details shown in the plans and will not be measured and paid for separately, but shall be included in the work and pay item for Wire Mesh Facing.

Subsection 504.05 shall include the following:

Pay Item	**Pay Unit**
Wire Mesh Facing	Square Yard

END OF SECTION

REVISION TO SECTION 504 - FACING (SPECIAL)

1. GENERAL

1.01 SCOPE OF WORK

City of Boulder has contracted Chevo Studios to manufacture form liners, deliver them to site, store them on site and install form liners with coordination with contractor.

Contractor shall make accommodations during construction for Chevo personnel to install of custom form liners for Walls as specified in the construction documents and as specified herein. Duties of the contractor are specified below

Walls that will have a mural treatment include: Walls # 1, 7, 8, 14, 15, 16, 20, 21, 22, 24, 25, 26, 27, 30, and 31.

The attached image is a rendering of a typical mural elevation prepared by Chevo Studios. Each length of mural is unique. The imagery will vary but the process is consistent.

Wall 16 is an exception. Part of that wall is caisson wall with a poured façade. Chevo Studios and the Contractor will work together to determine the best method of achieving the mural on that wall. Design modifications may be necessary to accommodate the proposed process for the caisson wall and a separate submittal will be required once that process has been determined.

1.02 SUBMITTALS

After a discussion of the Contractor's preferred technique for realizing the caisson walls and their façade, Chevo Studios shall submit a final mural design for Wall 16, and shall revise or modify the mural as necessary to be acceptable to the City of Boulder.

2. PRODUCTS AND STORAGE

Chevo Studios will furnish a series of custom form liners which, when assembled, produce the murals submitted to and approved of by the City of Boulder. Each length of form liner fabricated by Chevo Studios will be comprised of a maximum of 1" MDF board. In selected areas, the liner will be made of multiple layers of MDF and textured plastic. The construction documents take into account the depth of the form liners and no adjustment to wall thickness will be necessary.

All form liner materials will be cut at a 45 degree angle to insure release during form removal. Final assembly of form liners will occur on site. Contractor will provide adequate space and access on site, within 100' of current work area for the Chevo storage trailer. Staging of the mural pieces will occur from this trailer.

Prior to construction, Chevo Studios will need verification from the Contractor of the forming system (including form ties), and patching materials. In general, patching is discouraged and proper vibration during the pour is critical to achieving a smooth finish without excessive air pockets. In addition to mechanical vibration, hammer pounding the face of the forms during the pour helps to attain the best finish.

The murals are an important feature of the project and high degree of positive collaboration between the general contractor and the mural team will be necessary to ensure an excellent finish.

3. SCHEDULE AND TIMING

Pre-construction: Within 30 days of award of contract, Contractor shall provide to Chevo Studios anticipated sequence and scheduling of wall pours. Chevo will work with the contractor to develop a final form liner installation schedule based on the Contractors preferred sequence. Chevo Studios will produce the form liners for the downstream sections in August. Chevo Studios will work with the contractor to determine sequence of form liner production for the upstream walls based on the contractors proposed schedule/sequence of pours for those walls.

Construction timing: The chart below outlines anticipated duration for installation of the form liners at each wall and provides total anticipated number of days required for installation.

Collaboration between the concrete crew and form liner crew is critical to maximize the workflow. Workdays listed below should not be seen as added days of production. It is required that the contractor and Chevo Studios work together to create simultaneous activities that allow for the overlap of installation of form liners while the next section on wall is being prepped. Additionally the contractor may, where appropriate, provide additional labor to assist in the installation of the liners under the direction of Chevo Studios if the opportunity exists to accelerate the schedule.

Duration of installation listed below assumes that the contractor will pour a single 60' section from cold joint to cold joint. Simultaneous pours of more than one 60' section with form liners may be coordinated with Chevo Studios provided there is adequate advance notice to prepare the required liners and provide additional personnel for installation.

Wall sections with form liners are grouped into three broad categories: Those under 5' above finished grade, those 5 to 8' above finished grade, and those more than 8' above finished grade. Assumptions for Chevo installation days on site:

Segments < 5' tall above grade - 2 days per 60' segment
Segments 5' - 8' tall above grade - 4 days per 60' segment
Segments > 8' above grade - 5 days per 60' segment

	Wall Length (FT)	# of segments with no artwork	# of segments less than 5' tall	# of segments taller than 5'-8' tall	# of segments taller than 8'	**Total number of segments with form liners**	**Total Chevo Studios installation days per wall**
Wall 1	326	1	5			**5**	**10**
Wall 7	413		7			**7**	**14**
Wall 8	266.05	1	1	3		**4**	**14**
Wall 14	700	1	1	9		**10**	**38**
Wall 15	255.75			3		**3**	**12**
Wall 16	179.68	1	1	1		**2**	**6**
Wall 20	84	1		1		**1**	**4**
Wall 21	119.5		2			**2**	**4**
Wall 22	586.5	1	2	8		**10**	**36**
Wall 24	87.63	1		1	1	**2**	**9**
Wall 25	51.76				1	**1**	**5**
Wall 26	136.6			2		**2**	**8**
Wall 27	250.9			1	3	**4**	**19**
Wall 30	159.47		2	1		**3**	**8**
Wall 31	182	2	1			**1**	**2**
	3798.84	**9**	22	31	5	**57**	**189**

On all sections of wall, the contractor will notify Chevo Studios 10 days in advance to reconfirm timing of installation based on any changes in schedule.

4. EXECUTION

The Contractor has primary responsibility for building and stripping the wall forms and liners.

When footers are complete, the Contractor will assemble the formwork for the face of the wall to receive form liner treatment and provide accurate layout for finished grade line and top of wall on the assembled forms. No rebar shall be in place in front of this interior surface prior to installation of the form liners (exceptions are the dowels that rise out of the footer).

Chevo Studios staff will install the form liners on the interior face of the prepared form. The form liners will be attached to the concrete forms using finish nails. The Contractor must provide a work area for installation that is clear of debris, equipment and tools, and in the case of walls over 8', the setup of scaffold where necessary. Representatives of the Contractor will be available during installation of the form liners to resolve any form related issues that inhibit installation of the form liners.

Upon installation of the form liners by Chevo Studios, the Contractor is responsible for spraying the wall and liners with form release and fitting the wall with rebar and erecting the remaining half of the wall forms. Contractor is also responsible for drilling through the form liners as necessary to place form ties. Care must be taken during installation of rebar and form ties to avoid damage to the form liners.

When all forms are assembled, the Contractor will pour the concrete and provide the necessary vibration to ensure a superior finished product. When the pour is complete, the Contractor is responsible for stripping the forms and disposal of the waste form liners.

The Contractor will inform Chevo Studios when the forms have been stripped and Chevo Studios will visit the site with a representative from the City of Boulder to assess the need for any patching or final finish. Contractor will be responsible for designated patching and finishing.

Contractor will be responsible for painting the walls per specifications.

5. SAMPLE

Contractor will work with Chevo Studios to create a sample wall 4' x 5' for review by the City of Boulder prior to the first wall pour with form liners. Contractor may coordinate with Chevo Studios to incorporate the sample onto the backside of an early wall pour, eliminating the need for a separate stand-alone sample.

END OF SECTION

REVISION OF SECTION 504 - CRIBBING

Section 504 of the Standard Specifications is hereby deleted in its entirety and replaced with the following:

Description

504.01 This work consists of the construction of dry stack stone walls in accordance with the drawings and these specifications.

Materials

504.02 Stone walls shall consist of the following components:

(a) *Stone.* The stone for the walls shall be salvaged from the existing stone walls on site. The stone shall be disassembled, cleaned of all concrete, mortar, grout, or other materials, and stored in a safe location. Contractor shall provide additional stone if required due to breakage or lack of material. Additional stone shall match the existing stone in every detail including type, color, size, cut edges, etc.

(b) *Base rock.* ¾" washed rock.

(c) *Colloidal Concrete:* 3/8" colloidal concrete as follows:

Cement Type:	1-2
Slump:	1"-2"
Air Content:	13%-16%
Unit Weight:	137.5 pcf
Yield:	27.2 cu. ft.
Water/Cement Ratio:	0.40
Permeability:	1.5 gpm/square foot
Compressive Strength:	28 day: 1,200 – 1,500 psi.

Construction Requirements

504.03 Construction requirements for the dry stack wall are as follows:

(a) Excavate and provide a firm, smooth, uniform subgrade for the wall. Compact subgrade to 95% maximum density.

(b) The base rock shall be installed at the uniform thickness shown on the plans and shall provide a level surface on which to construct the walls.

(c) Rock shall dry stacked. The placement of stones will require craftsmanship and care in making joints between stones tight as possible. In general, larger stones shall be placed on the bottom, and smaller stones on top. The placement of the stones shall result in a wall with tight butt joints. The wall shall have a batter of 12:1.

(d) The stones for the bench shall be set level and should match adjacent bench stones +/- 1/16".

(e) Colloidal concrete shall be placed behind the wall as shown on the drawings. Care should be taken to ensure that all stones for the wall have good contact with the concrete. Stone and concrete placement shall result in an installation where concrete is not visible from the face of the wall.

(f) Cap stones and bench stones shall rest on the colloidal concrete as shown on the drawings.

(g) Mock-up: The contractor shall construct a 10' long mock-up of the wall before proceeding with the entire wall construction. It is the contractors option to build the mock-up as part of the wall so it can be used as part of the project if accepted. The mock-up shall contain portions of wall and bench.

Method of Measurement

504.04 Masonry Landscape Wall (Dry Stack): Measurement will be made of the actual number of square feet of wall placed and accepted by the Owner's Representative, and in accordance with the drawings and specifications. Measurement shall be made of the face of the wall. No separate measurement will be made for the top of the cap, or the top of the bench.

Basis of Payment

504.05 Masonry Landscape Wall (Dry Stack): Payment will be made at the unit price bid and shall include: transporting, and installing the existing stones, furnishing, transporting, and installing all materials including: additional stone if required, base rock, and colloidal concrete; compaction, excavation, backfill, cutting, snapping, disposing of waste, hot and cold weather protection, subgrade preparation, cleanup, leveling, sweeping, washing, and other items necessary to complete the work as shown on the drawings and in accordance with the specifications.

PAY ITEM	**PAY UNIT**
Masonry Landscape Wall (Dry Stack)	Square Foot

END OF SECTION

REVISION OF SECTION 506 - RIPRAP, SOIL RIPRAP, RIPRAP (SPECIAL), GROUTED BOULDERS AND BOULDER WALLS

Section 506 of the Standard Specifications is hereby revised for this project as follows:

Subsection 506.01 shall be modified to include the following:

Riprap shall also be referred to as "Void-filled Riprap".
Riprap (36 Inch) shall also be referred to as "Boulder".
Grouted Riprap (36 Inch) (Special) shall also be referred to as "Grouted Boulders".
This work consists of the construction of boulder walls in accordance with these specifications and in conformity with the lines and grades shown on the plans or established and shall include all work and materials to construct the walls in accordance with the details in the plans. There are three different type of wall installations, and are listed as follows:

Boulder Wall A
Boulder Wall B
Boulder Wall C

Subsection 506.02 shall be modified to include the following:

Existing riprap removed during construction may be reused for "riprap" if it is free from deleterious materials and satisfies the specifications herein as determined by the Engineer.

Existing boulders removed during construction may be reused for "grouted boulders" if it is free from deleterious materials and satisfies the specifications herein as determined by the Engineer.

Riprap Materials shall meet the following requirements:

1. The riprap designation and total thickness of riprap shall be as shown on the DRAWINGS. The maximum stone size shall not be larger than the thickness of the riprap.
2. Neither width nor thickness of a single stone of riprap shall be less than one-third (1/3) of its length.
3. The specific gravity of the riprap shall be two and one-half (2.5) or greater.
4. Riprap specific gravity shall be according to the bulk-saturated, surface-dry basis, in accordance with AASHTO T85.
5. The bulk density for the riprap shall be 1.3 ton/cy or greater.
6. The riprap shall have a percentage loss of not more than forty percent (40%) after five hundred (500) revolutions when tested in accordance with AASHTO T96.
7. The riprap shall have a percentage loss of not more than ten percent (10%) after five (5) cycles when tested in accordance with AASHTO T104 for ledge rock using sodium sulfate.
8. The riprap shall have a percentage loss of not more than ten percent (10%) after twelve (12) cycles of freezing and thawing when tested in accordance with AASHTO T103 for ledge rock, procedure A.
9. Rock shall be free of calcite intrusions.
10. Gradation:
    a. Each load of riprap shall be reasonably well graded from the smallest to the largest size specified.
    b. Stones smaller than the two to ten percent (2 to 10%) size will not be permitted in an amount exceeding ten percent (10%) by weight of each

load.

c. Control of gradation shall be by visual inspection. However in the event ENGINEER determines the riprap to be unacceptable, ENGINEER shall pick two (2) random truckloads to be dumped and checked for gradation.

1) Mechanical equipment and labor needed to assist in checking gradation shall be provided by CONTRACTOR at no additional cost.

11. Color:

a. The color of the riprap shall be gray with gray/blue hues or other acceptable colors approved by ENGINEER prior to delivery to the PROJECT site.

b. Color shall be consistent on the entire PROJECT and shall match the color of rock to be used for all other portions of the WORK.

12. Broken concrete or asphalt pavement shall not be acceptable for use in the WORK.

13. Rounded riprap (river rock) is not acceptable, unless specifically designated on the DRAWINGS.

Soil Riprap shall meet the following requirements:

1. Rock requirements are to comply with riprap as specified in Article Materials.
2. The soil material shall be native or topsoil and mixed with sixty-five percent (65%) riprap and thirty five percent (35%) soil by volume.
3. Soil riprap shall consist of a uniform mixture of soil and riprap without voids.

Boulder Materials shall meet the following requirements:

1. Boulders used shall be the type designated on the DRAWINGS and shall conform to the following:

Boulder Classification	**Nominal Size (inches)**	**Range in Smallest Dimension of Individual Rock Boulders (inches)**	**Maximum Ratio of Largest to Smallest Rock Dimension of Individual Boulders**
B18	18	17 - 20	1.50
B24	24	22 - 26	1.50
B30	30	28 - 32	1.50
B36	36	34 - 38	1.50
B42	42	40 - 44	1.50
B48	48	45 - 51	1.50

2. The specific gravity of the boulders shall be two and one-half (2.5) or greater.

3. Boulder specific gravity shall be according to the bulk-saturated, surface-dry basis, in accordance with AASHTO T85.
4. The bulk density for the boulder shall be 1.3 ton/cy or greater.
5. The boulders shall have a percentage loss of not more than forty percent (40%) after five hundred (500) revolutions when tested in accordance with AASHTO T96.
6. The boulders shall have a percentage loss of not more than ten percent (10%) after five (5) cycles when tested in accordance with AASHTO T104 for ledge rock using sodium sulfate.
7. The boulders shall have a percentage loss of not more than ten percent (10%) after twelve (12) cycles of freezing and thawing when tested in accordance with AASHTO T103 for ledge rock, procedure A.
8. Rock shall be free of calcite intrusions.
9. Color:
    a. The color of the boulders shall be gray with gray/blue hues or other acceptable colors approved by ENGINEER prior to delivery to the PROJECT site.
    b. Color shall be consistent on the entire PROJECT and shall match the color of rock to be used for all other portions of the WORK.

Where "Void-Filled Riprap" is designated on the Contract Drawings, riprap shall be mixed with the materials and associated proportions listed in the Plans.

Subsection 506.03 shall be modified to include:

Soil Riprap: Where "soil riprap" is designated on the Contract Drawings, riprap voids are to be filled with native soil material. The riprap shall be pre-mixed with the native soil at the following proportions by volume: 70 percent riprap and 30 percent soil. The soil used for mixing shall be native topsoil, stripped from the channel banks and shall have a minimum fines content of 15 percent. The clean sandy soil in the channel bottom shall not be used for mixing with the riprap. The soil riprap shall be installed in a manner that results in a dense, interlocked layer of riprap with riprap voids filled completely with soil. Segregation of materials shall be avoided and in no case shall the combined material consist primarily of soil; the density and interlocking nature of riprap in the mixed material shall essentially be the same as if the riprap was placed without soil.

Void-filled Riprap: Where "void-filled riprap" is designated on the Contract Drawings, riprap shall be installed according to details and notes provided in the plans.

The Contractor shall install a test section of at least 60 square feet of void-filled riprap for the review and approval of the Engineer prior to installation of the remaining void filled-riprap.

Boulder Walls: Prior to placement of boulders, the Engineer shall be notified in order to approve the depth and limits of boulders.

Boulder Wall A shall include supplying and installing the woven geotextile fabric (Drainage Class 2), chink rock placed between voids when necessary, and squeegee in accordance with the detail. Boulder Wall B Shall include two rows of boulders, the woven geotextile fabric (Drainage Class 2), chink rock placed between voids when necessary, squeegee, and topsoil placement between the boulders in accordance with the detail. Boulder Wall C shall include supplying boulders and adjoining void-filled riprap.

Grouted Boulders: The following applies to the grouted boulder construction:

Where "grouted boulders" is designated on the Contract Drawings, grouted boulders shall be installed according to details and notes provided in the plans and the following specifications.

The subgrade to receive each boulder shall be excavated and any unstable material shall be removed. Approved material shall be placed and compacted in a maximum of 8-inch lifts to 95% of Maximum Standard Proctor Density (ASTM D698) and within 2 percent of optimum moisture to re-establish the subgrade of each boulder. Removal and replacement of unstable material shall only be completed at the direction of the Engineer.

The top of all boulders shall be as indicated on the Drawings. Finished grades and subgrades for boulders will be determined from the height of each boulder used.

Boulders shall be carefully picked and arranged so that adjacent rock surfaces match within 2 inches in top elevation and 2 inches along the vertical exposed face or channel side of rock (unless otherwise indicated in the drawings). Boulders shall be placed such that adjacent boulders "touch" each other and voids do not exceed 4 inches. It is the intent of construction to minimize voids and grout placed between boulders. Boulders shall be arranged in a step-like fashion and/or in rows to form "steps" as indicated on the Contract Drawings.

The grout depth shown on the Drawings applies to overall mass of grouted boulders and is intended to generally keep the top of grout well below the top of boulders; however, the depth of grout and/or size or placement of boulders shall be adjusted at the perimeters of the grouted boulders, and at the upstream and downstream ends of drop structures.

Prior to placing the grout, all debris, fines, smaller rock, and silt shall be removed from around or under the boulders. Boulder placement shall be approved by the Engineer prior to placing the grout.

Dewatering shall be implemented to ensure that the grout will not be placed in water and for a period of 24 hours after the grout has been placed.

Clean boulders by brushing and washing before grouting. Boulders receiving grout shall be kept wet when receiving grout. The concrete grout shall be placed by means of a low pressure (less than 10 psi) grout pump using a 3-inch diameter nozzle to ensure complete penetration of the grout into the boulder layer as shown on the drawings. A "pencil" vibrator shall be used to make sure all voids are filled between and under the boulders. The intent is to fill all voids from the subgrade level around the boulders to the depth indicated. In all cases, grout must penetrate to the subgrade of boulders.

The operator shall be able to stop the flow and will place grout in the voids and not on the surface of the rocks. Any spillage of grout on exposed boulder faces shall be cleaned and washed before the grout sets. The visual surfaces of the rocks shall be free of grout to provide a clean natural appearance. If washing does not clean off grout residue, then the Contractor shall wash off any grout residue with muratic acid and water, using a brush to scrub off the residue.

All grout between boulders shall be finished with a broom finish.

Batching and mixing requirements, time constraints, and hot and cold weather limitations for grout placement shall conform to specifications in Section 601. Grout shall not be placed when the air temperature is below 40 degrees F. Grout shall not be placed if the weather conditions are such

that the grout being placed cannot be completely protected before the advent of damaging weather (such as overnight below 35 degrees F, cold fronts, rainstorms, etc.).

All finished grout surfaces shall be cured immediately after placement by applying a clear membrane forming curing compound as specified in Section 601.13(b). In addition, the blanket method for curing as described in Subsection 601.13(d) shall be used in cold weather to maintain the grout surface at a temperature above 40 degrees F and in a moist condition during the first 7 days after placement. The minimum curing period shall be 7 days. Curing conditions and temperature will be monitored by the Engineer during the curing period.

Section 506.04 shall include the following:

Soil riprap will be measured by the cubic yard and includes both the rock (riprap) and topsoil. The costs shall incl

Boulders, void-filled riprap, and geotextile fabric associated with the boulder walls shall be paid for separately. Boulders and void-filled riprap shall be measured by the cubic yard.

The quantity to be paid for void filled riprap shall not be remeasured but will be the number of cubic yards designated in the contract and installed to the thickness shown on the contract plans and shall be paid for as Riprap. There will be no separate measurement unless there is an ordered change.

The quantity to be paid for grouted boulders shall not be remeasured but will be the number of cubic yards designated in the contract and installed to the thickness shown on the contract plans and shall be paid for as Grouted Riprap (36 Inch) (Special). There will be no separate measurement unless there is an ordered change.

Subsection 506.05 shall include the following:

Pay Item	Pay Unit
Grouted Riprap (36 Inch) (Special)	Cubic Yard
Riprap (6 Inch)	Cubic Yard
Riprap (12 Inch)	Cubic Yard
Riprap (18Inch)	Cubic Yard
Riprap (24 Inch)	Cubic Yard
Riprap (36 Inch)	Cubic Yard
Soil Riprap (12 Inch)	Cubic Yard

No Separate measurement or payment will be made for structure excavation. Costs for this shall be included in the work.

Payment for grouted riprap shall include but is not limited to excavation for riprap; subgrade preparation, furnishing and placing riprap and filling voids of riprap as specified; furnishing and placing planting pockets as specified, and disposal of excess excavated material as needed. Payment shall be made at the contract unit price for riprap and shall include full compensation for all labor, equipment, materials, transportation, and all other appurtenant items to complete the work.

Payment for riprap shall include but is not limited to excavation for riprap; subgrade preparation, furnishing and placing riprap including boulder filler material; and disposal of excess excavated material as needed. Payment shall be made at the contract unit price for riprap and shall include

full compensation for all labor, equipment, materials, transportation, and all other appurtenant items to complete the work.

Payment for soil riprap and void filled riprap shall include but is not limited to excavation for riprap and void filled material; subgrade preparation, furnishing and placing riprap and filling voids of riprap as specified; and disposal of excess excavated material as needed. Payment shall be made at the contract unit price for riprap and shall include full compensation for all labor, equipment, materials, transportation, and all other appurtenant items to complete the work.

END OF SECTION REVISION

REVISION OF SECTION 509 – STEEL STRUCTURES

Section 509 of the Standard Specifications shall also include the following:

509.32 Method of Measurement: There will be no measurement required for the complete fabrication and installation of the restrictor plate in accordance with the plans. This shall include all work, materials, labor and incidentals required for the complete installation including all fabrication, welding, hot-dip galvanizing, mounting bolts and hardware.

Basis of Payments

509.33 Payment will be made under:

Pay Item	**Pay Unit**
Restrictor Plate	Lump Sum

END OF SECTION REVISION

REVISION OF SECTION 514 – HAND RAIL and PEDESTRIAN RAILING (STEEL) (SPECIAL)

Section 514 of the Standard Specifications is hereby revised for this project as follows:

Subsection 514.01 shall include the following:

This work consists of furnishing and placing Hand Rail in accordance with these specifications and in conformity with the plan details. Hand Rail is also known as Headwall Railing.

This work consists of furnishing and placing Pedestrian Railing (Steel)(Special) in accordance with these specifications and in conformity with the plan details. Pedestrian Railing (Steel)(Special) is also known as Standard Railing and Spring Creek Railing.

Subsection 514.03 shall include the following:

Steel Pipe Rail shall be ASTM A-53 Grade B

All other steel shall be ASTM A-36

Subsection 514.07 shall include the following:

Hand Rail and Pedestrian Railing (Steel)(Special) will be measured by the linear foot from end to end of railing.

Subsection 514.08 shall include the following:

The accepted quantities of Pedestrian Railing (Steel)(Special) will be paid for at the contract unit price per linear foot.

Pay Item	Pay Unit
Hand Rail	Linear Foot
Pedestrian Railing (Steel)(Special)	Linear Foot

END OF SECTION

REVISION OF SECTION 601 - STRUCTURAL CONCRETE

Section 601 of the Standard Specifications is hereby revised to include the following:

Subsection 601.19 shall include the following:

All structural concrete shall include supplying and installing all reinforcing steel required in accordance with the details shown in the plans and will not be measured and paid for separately, but shall be included in the work and pay item for structural concrete. Concrete Class D (Special) shall include installing colored concrete in accordance with the plans. All Concrete Class D pay items shall include the provision and installation of all structural steel as shown in the plans and will not be paid for separately.

Subsection 601.20 shall include the following:

Pay Item	Pay Unit
Concrete Class D	Cubic Yard
Concrete Class D (Miscellaneous)	Cubic Yard
Concrete Class D (Box Culvert)	Cubic Yard
Concrete Class D (Wall)	Cubic Yard
Concrete Class D (Special)	Cubic Yard

END OF SECTION

REVISION OF SECTION 603 - CULVERTS AND SEWERS

Section 603 of the Standard Specifications is hereby revised to include the following:

Subsection 603.04 shall include the following:

Concrete toe walls shall be constructed at flared end sections in accordance with the plans.

Subsection 603.11 shall include the following:

The construction of the toe walls for the flared end sections shall be included as part of the end section pay item and will not be measured separately. This includes all exaction, formwork, concrete, reinforcing steel and backfill in accordance with the plans.

Subsection 603.12 is hereby revised to include the following:

The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule. Except as otherwise indicated on the plans or in the special provisions, all joints, elbows, concrete collars, Kor-N-Tee connectors, connecting bands, gasketed bells, other connecting devices, testing, flushing, structure excavation, bedding and structure backfill will not be paid for separately but shall be included in the work.

Payment will be made under:

Pay Item	Pay Unit
12 Inch Reinforced Concrete Pipe (Complete In Place)	Linear Foot
18 Inch Reinforced Concrete Pipe (Complete In Place)	Linear Foot
24 Inch Reinforced Concrete Pipe (Complete In Place)	Linear Foot
30 Inch Reinforced Concrete Pipe (Complete In Place)	Linear Foot
36 Inch Reinforced Concrete Pipe (Complete In Place)	Linear Foot
23 x 14 Inch Reinforced Concrete Pipe (Complete In Place)	Linear Foot
4 Inch Plastic Pipe	Linear Foot
6 Inch Plastic Pipe	Linear Foot
8 Inch Plastic Pipe	Linear Foot
10 Inch Plastic Pipe	Linear Foot
12 Inch Plastic Pipe	Linear Foot

END OF SECTION

REVISION OF SECTION 608 - SIDEWALKS AND BIKEWAYS

Section 608 of the Standard Specifications is hereby revised as follows:

Subsection 608.01 is hereby revised to include the following:

This work also includes the installation of stone pavers.

Subsection 608.02 is hereby revised to include the following:

The first sentence shall be deleted and replaced with Concrete for sidewalks, sidewalks (colored), bikeways, and curb ramps shall be Class D and shall include 1.5 lbs/cy of fibrous reinforcement.

Subsection 608.03 is hereby revised to include the following:

Materials for Stone Pavers:

(1) Stone Pavers: Stone pavers shall be salvaged pavers from the existing seating area. The pavers shall be cleaned of any concrete, mortar, or other materials that may be present. Should additional pavers be required due to breakage or due to lack of material, new stone pavers shall be supplied that match the salvaged stone in every detail including type of stone, color, thickness, etc.
(2) Base Course: ¾" washed rock
(3) Soil separator fabric: nonwoven geotextile composed of polypropylene fibers. Fabric shall be inert to biological degradation. Fabric shall meet the following specifications: 120 lbs minimum grab tensile strength per ASTM D4632, 50% grab tensile elongation per ASTM D4632, 50 lbs. minimum trapezoid tear strength per ASTM D4533, 1.7 sec permittivity per ASTM D4491, flow rate of 135 gal/min/square foot per ASTM D4491, and UV resistance of 70% strength retained at 500 hours per ASTM D4355.
(4) Sand Setting Bed: Well graded sand meeting ASTM C33
(5) Joint Sand: Polymeric sand, color tan
(6) Landscape Edger: plastic edger specifically designed for modular paving systems. Anchor per manufacturers recommendations.

Subsection 608.03 is hereby revised to include the following:

(b) Forms:
Metal forms shall not be used on curved portions of trail. Curved portions of trail shall be formed with wooden forms.

(d) Finishing:

1. All Flatwork: Trowel and edge as indicated on Drawings. After completion of troweling and before concrete has taken its initial set, tool all edges with edger having ¼" radius. Finish shall be a medium broom finish.

2. Quality of Finish: As bicyclists, rollerbladers, etc. will use this concrete, all surfaces must be smooth and uniform with no irregularities. Any irregularities must be corrected to the satisfaction of the Owner's Representative. If irregularities cannot be corrected satisfactorily, the concrete shall be replaced at the contractor's expanse. Removal and replacement of partial stones will not be accepted.

3. Rumble strip: The intent is for the rumble strip to have a rough surface. Rumble strip

shall have a heavy broom finish. Tooled joints shall be installed as shown on the plans.

(e) Joints: Replace with the following:

1. Spacing of Joints:
   A. Expansion Joints: Place expansion joint material prior to placing concrete at following locations:
      a. Between new concrete pavement and existing concrete pavement.
      b. As indicated on Drawings.
      c. As directed by Owner's Representative.
      d. Between vertical elements such as manholes, stairs, piers and the flatwork.

   B. Score Joints
      a. Space joints at intervals approximately equal to the width of the sidewalk or trail.

2. Joints for Concrete Trail Flatwork:
   Sawcut joints shall have a minimum depth of ¼ of total slab thickness and no greater than ¼" wide. The sawcutting must be timed properly. It should occur after the concrete has set up enough so that the saw will not dislodge any of the concrete aggregate and before the concrete experiences any shrinkage cracking. If either of these conditions occurs, the contractor will be responsible for removing and replacing the concrete at his own expense. If concrete requires replacement, the entire effected stone or stones shall be removed and replaced.

3. Joints for Rumble strip
   Install tooled joints as detailed on the drawings.

Subsection 608.04 is hereby deleted and replaced with the following:

Stone Pavers.
Contractor shall provide a 5'x5' mock-up of the paving. The accepted mock-up will establish the standard for the remainder of the work. If the mock-up is deemed unacceptable, it will be removed and re-installed at the contractor's expense. It is the contractor's option to construct this mock-up in the actual location of the paving, so it can remain in place if it is found to be of acceptable quality. Obtain Owner's Representative's acceptance of visual quality and character of the paving installation prior to proceeding with further construction.

Installation:

(1) Place and compact the base course at thickness shown on the plans. Add water to +/- 2% of optimum moisture content. Use mechanical roller for compaction. Compact to a uniform thickness with no high spots or low spots.
(2) Install edger per manufacturer's recommendations.
(3) Install soil separator fabric with 8" minimum overlap.
(4) Install sand setting bed to the uniform thickness shown on the drawings.
(5) Install pavers. Joints shall be as consistent as possible. Maximum width shall be ½". Final surface of pavers shall not deviate from adjacent stones or pavement by more than 1/16".

(6) All joints shall be filled with polymeric sand. Ensure that surface of pavers is completely dry prior to installation. Clean all excess sand from walkway and wet joint sand.

Subsection 608.05 is hereby amended by the following:

Concrete Sidewalk, Concrete Sidewalk (Colored): Measurement will be made of the actual number of square feet of concrete flatwork placed and accepted at the locations shown on the drawings or as directed by the Owner's Representative, and in accordance with the specifications.

Stone Pavers: Measurement will be made of the actual number of square feet of stone paver placed and accepted at the locations shown on the drawings or as directed by the Owner's Representative, and in accordance with the specifications.

Subsection 214.06 is hereby deleted and replaced by the following:

Concrete Sidewalk, Concrete Sidewalk (Colored): Payment will be made at the unit price bid and shall include: furnishing and installation of materials; fibrous reinforcing; formwork; subgrade preparation; finishing; joints; reinforcing bar, dowels, protective coatings; curing; sweeping; color additives, hot and cold weather protection, washing; cleanup and other items necessary to complete the work as shown on the drawings and in accordance with the specifications.

Concrete Curb Ramp: Payment will be made at the unit price bid and shall include: furnishing and installation of materials; fibrous reinforcing; formwork; subgrade preparation; finishing; joints; dowels, detectible warning pavers, protective coatings; curing; sweeping; color additives, hot and cold weather protection, washing; cleanup and other items necessary to complete the work as shown on the drawings and in accordance with the specifications.

Stone Pavers: Payment will be made at the unit price bid and shall include: salvaging, cleaning, storing, transporting, and installing the existing stone pavers, furnishing, transporting, and installing all materials including additional stone pavers if required, bedding material, soil separator fabric, bedding sand, joint sand, and edger; compaction; excavation; cutting, snapping, disposing of waste, subgrade preparation, leveling, sweeping, washing, cleanup, and other items necessary to complete the work as shown on the drawings and in accordance with the specifications.

PAY ITEM	**PAY UNIT**
Concrete Sidewalk	Square Yard
Concrete Curb Ramp	Square Yard
Concrete Sidewalk (Colored)	Square Yard
Stone Pavers	Square Foot

END OF SECTION

REVISION OF SECTION 609 – CURB AND GUTTER

Section 609 of the Standard Specifications is hereby revised as follows:

Subsection 609.01 is hereby revised to include the following:

Curb and Gutter Type 2 (Section I-B) Shall also be known as Spill Curb and/or Outfall/Median Curb.

Curb and Gutter Type 2 (Section II-B) Shall also be known as Curb and Gutter.

The Curb Section shall be per City of Boulder Standard Details.

END OF SECTION

REVISION OF SECTIONS 613 & 715 - LIGHTING

Sections 613 and 715 of the Standard Specifications are hereby revised for this project as follows:

SECTION 613 -LIGHTING

613.09 Lighting Control Center and Secondary Service Pedestals.

Photoelectric Cell – Provide a twist lock receptacle type photocell on a NEMA 3R enclosure with DPST relay inside the 3R enclosure, controlled by the photocell for on/off control, mount 3R enclosure on the side of the meter/power pedestal "MPP1" and route raceway out to the two luminaires at the railroad underpass for on/off control.

Cold Sequence Meter/Power Pedestal – Provide on all-in-one secondary service pedestal with meter, meter t-handle disconnect, a grounding rod system, a built-in maintenance duplex GFCI receptacle, service entrance rated, copper bus panel with main and branch breakers as indicated on the panel schedules and connections to the power supply.

Duplex GFCI Receptacle (With Back Box and Cover) – Provide a weatherproof GFCI receptacle complete with back box and cover mounted inside the irrigation controller cabinet (irrigation controller cabinet and all 24V and lower wiring shall be furnished and installed by the Irrigation Contractor) for means of disconnect to the irrigation controller. Contractor may be required to change GFCI receptacle out with a weatherproof toggle switch for means of disconnect at the direction of the Irrigation Contractor at no additional charge to the project.

BASIS OF PAYMENT

613.12 The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

Payment will be made under:

Pay Item	Pay Unit
Removal of Light Standard (Private)	Each
Reset TV Camera (Private)	Each
Reset Light Standard (Private)	Each
Reset Light Standard (by Xcel)	Each
Reset Wiring (re-establish owner power to private sign)	Each
½ Inch Electrical Conduit	Linear Foot
2 Inch Electrical Conduit (Bored)	Linear Foot
3 Inch Electrical Conduit (Bored)	Linear Foot
½ Inch Electrical Conduit (Plastic)	Linear Foot
1 Inch Electrical Conduit (Plastic)	Linear Foot
2 Inch Electrical Conduit (Plastic)	Linear Foot
3 Inch Electrical Conduit (Plastic)	Linear Foot
Wiring	Lump Sum
Type A luminaire (LED)	Each
Type B luminaire (LED)	Each
Photoelectric cell	Each

Cold Sequence meter/power pedestal	Each
Duplex GFCI Receptacle (with back box and cover)	Each

SECTION 715 - LIGHTING AND ELECTRICAL MATERIALS

715.03 Light Standards.

1) ***Type A luminaire.***

a) Surface mounted luminaire, nominal 13" x 6.6" deep marine grade cast aluminum housing with black baked enamel finish. Surface adapter for conduit entry without j-box.

b) UV-stabilized, high impact resistant, virgin injection molded pearlescent polycarbonate dome lens with die-cut, closed cell neoprene self-adhesive gasket.

c) One stainless steel Torx® with center pin fastener, supply driver.

d) Initial nominal absolute lumen output = 1355.

e) Replaceable ANSI 4000K LED array, 22 watt, high power factor 700mA integral driver, for 120-277v power. Estimated L70 life of 105,000 hours.

f) UL and CUL listed for Wet Location.

g) UL certified IP64 per IEC 60598.

h) Tested to the IESNA LM-79-08 standard.

i) Lifetime vandal warranty.

2) ***Type B luminaire.***

a) Surface mounted luminaire, nominal 26.5" long x 5" wide x 4" deep marine grade cast aluminum housing with black baked enamel finish.

b) UV-stabilized, high impact resistant, virgin injection molded pearlescent polycarbonate lens with die-cut, closed cell neoprene self-adhesive gasket.

c) Tamper resistant stainless steel Torx® with center pin fastener, supply driver.

d) Initial nominal absolute lumen output = 2263.

e) Replaceable ANSI 4000K LED array, 25 watt, high power factor 700mA integral driver, for 120-277v power. Estimated L70 life of 80,000 hours.

f) UL and CUL listed for Wet Location.

g) UL certified IP64 per IEC 60598.

h) Tested to the IESNA LM-79-08 standard.

i) Lifetime vandal warranty.

715.08 Secondary Service Pedestals and Lighting Control Centers

Photoelectric Cell – Shall include but not limited to the following:

1. 120V Photocell with twist lock receptacle base.
2. NEMA 3R enclosure
3. 120V, 20Amp, 2-pole, single throw, relay (controlled by photocell) mounted inside the 3R enclosure.
4. Twist lock receptacle mounted in the top of the 3R enclosure.

5. Tork #5403 or approved equal.

Cold Sequence Meter/Power Pedestal - Shall include but not limited to the following:

1. 200A meter housing with lever by-pass to Xcel Energy's Specifications
2. 200A T-handle meter disconnect with fuses to Xcel Energy's Specifications
3. 120/240V-1ph-3w, service entrance rated, copper bus, panel with main and branch breakers as indicated on the panel schedules.
4. Maintenance receptacle flush in panel dead front.
5. 5/8" x 8'-0" long, copper-clad driven ground rods with exothermic weld or approved underground lug connect conductor to ground rod. (2) ground rods required.
6. All-in-one, direct bury, NEMA 3R pedestal enclosure to house all equipment listed.
7. Milbank #U5949 or approved equal. Adjust model number to comply with number of poles required.
8. Contractor shall coordinate with xcel energy to assure that this pedestal is to Xcel Energy's specifications.

Duplex GFCI Receptacle (With Back Box and Cover) - Shall include but not limited to the following:

1. 20A, GFCI duplex receptacle or 20A, SPST toggle switch (at the Irrigation Contractors direction.)
2. 1-gang, FS type back box.
3. 1-gang, weatherproof cover plate.
4. Ground lug and wire in back box.
5. Mount receptacle inside the irrigation controller cabinet (or elsewhere at the direction of the Irrigation Contractor) for means of disconnect of the irrigation controller.
6. Coordinate with Irrigation Contractor for exact location prior to rough-in.

END OF SECTION

REVISION OF SECTION 615 - WATER CONTROL DEVICES

Section 615 of the Standard Specifications is hereby revised to include the following:

Subsection 615.01 shall include the following:

This work consists of constructing the Irrigation Diversion Structure (BWRD Turnout Structure) fixtures and attachments. This includes the installation the Turnout Structure pipe railing, trash rack, trash rack supports, gate opening level plate, 24-Inch Diameter Slide Gate, and (2) 5-foot wide by 4-foot high rectangular slide gates to be fabricated and installed in accordance with these specifications, details shown on the plans, to the lines and grades established, and to the manufacturer's recommendations. These gates shall be designed to cover the 24-inch round opening and the rectangular concrete box culvert openings to allow free outflow and prevent backflow for a minimum seating head of 20-feet.

Subsection 615.02 shall include the following:

Gate materials shall be per plans

Drawings for Approval
Drawings showing the dimensions and details required to locate and install the component assemblies shall be submitted for the engineer's approval prior to fabrication.

Subsection 615.03 shall include the following:

Installation of the gates, including the 24- Inch Slide Gate and (2) 5-foot wide by 4-foot high rectangular self-contained gates shall be installed in accordance with the manufacturers recommendations.

Subsection 615.05 shall include the following:

Pay Item	**Pay Unit**
Irrigation Diversion Structure	Lump Sum

Payment for Irrigation Diversion Structure shall be full compensation for all labor, equipment, materials and incidentals necessary to construct the fixtures and attachments associated with the BWRD Turnout Structure in accordance with the plans and specifications, including but not limited to pipe railing, trash rack, trash rack supports, gate opening level plate, 24-Inch Diameter Slide Gate, and (2) 5-foot wide by 4-foot high rectangular slide gates.

END OF SECTION

REVISION OF SECTION 619 - WATER LINES

Section 619 of the Standard Specifications is hereby revised to include the following:

Subsection 619.04 shall include the following:

All materials, labor, and incidentals associated with installing waterlines including joint restraints and thrust blocks shall be included in the work of installing the water lines and will not be measured and paid for separately.

END OF SECTION

REVISION OF SECTION 622 – BNSF CANOPY

Section 622 of the Standard Specifications is hereby revised to include the following:

Subsection 622.27 shall include the following:

The BNSF Canopy pay item shall include all materials, fabrication, field welds, foundations, labor, and incidentals associated with installing the BNSF Canopies adjacent to the BNSF railroad at the trail underpass complete in place in accordance with the plans.

Subsection 622.28 shall include the following:

Payment will be made under:

Pay Item	**Pay Unit**
BNSF Canopy	Lump Sum

END OF SECTION

REVISION TO SECTION 623 - IRRIGATION SYSTEM

Section 623 Irrigation System of the Standard Specification is

deleted and replaced with the following.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS: The General Contract Conditions, Drawings, and Division–1 Specification sections apply to Work of this section.

1.2 SUMMARY:

A. Work of this Section consists of installation of an underground irrigation system including the following:

1. Trenching, stockpiling excavation materials, refilling and compacting trenches.
2. Complete irrigation system including but not limited to piping, valves, fittings, heads and wiring, and final adjustments to insure complete coverage.
3. Water connections.
4. Replacement of unsatisfactory materials.
5. Cleanup, inspections, and approval.
6. Tests.

B. Related Work:

1. Examine all sections related to project work.

1.3 REFERENCES

A. Conform to requirements of reference information listed below except where more stringent requirements are shown or specified in Contract Documents.

1. American Society for Testing and Materials (ASTM) - Specifications and Test Methods specifically referenced in this Section.
2. Underwriters Laboratories (UL) - UL Wires and Cables.
3. National Sanitation Foundation (NSF) – Piping and backflow prevention.
4. American Water Works Association – Piping and backflow prevention.

1.4 QUALITY ASSURANCE

A. Irrigation Contractor Qualifications – Irrigation Contractor shall have had considerable experience and demonstrate ability in the installation of irrigation system(s) of specified type(s) in a neat, orderly and responsible manner in accordance with recognized standards of workmanship. To demonstrate ability and experience necessary for this Project, submit

if requested by Owners Representative, prior to contract award the following:

1. List of 3 projects completed in the last 2 years of similar complexity to this project. Description of projects shall include:
   a. Name of project.
   b. Location.
   c. Owner.
   d. Brief description of work and project budget.

2. Contractor to supply an Associated Landscape Contractors of Colorado (A.L.C.C.), Certified Irrigation Technician on site at all times irrigation installation is in progress.

B. Special Requirements.

1. Work involving substantial plumbing for installation of ductile iron or copper piping, backflow preventer(s), and related Work shall be executed by licensed and bonded plumber(s). Secure a permit at least 48 hours prior to start of installation.
2. Tolerances - Specified depths of mains and laterals and pitch of pipes are minimums. Settlement of trenches is cause for removal of finish grade treatment, refilling, compaction, and repair of finish grade treatment.
3. Coordination With Other Contractors - Protect, maintain, and coordinate work with work under other Sections.
4. Damage To Other Improvements - Contractor shall replace or repair damage to grading, soil preparation, seeding, sodding, or planting done under other Sections during Work associated with installation of irrigation system at no additional cost to the Owner.
5. Water Delivery Interruption – When working on an existing irrigation system, the Irrigation Contractor shall contact the Owners Representative and inform him 72 hours in advance of any water interruption that is required.
6. Work involving high voltage electrical wiring, grounding and related Work shall be executed by licensed and bonded electrician(s). Secure a permit at least 48 hours prior to start of installation.

C. Pre-Construction Conference:

1. Contractor shall schedule and conduct a conference to review in detail quality control and construction requirements for equipment and materials used to perform the Work. Conference shall be scheduled not less than 10 days prior to commencement of Work. All parties required to be in attendance shall be notified no later than 7 days prior to date of conference. Contractor shall notify qualified representatives of each party concerned with that portion of Work to attend conference, including but not limited to the Owners Representative, Contractor's Superintendent, and Installer.
2. Minutes of conference shall be recorded and distributed by Contractor to all parties in attendance within five (5) days of conference.

1.5 SUBMITTALS - Prepare and make submittals in accordance with conditions of the Contract.

A. Material List - Submit a complete materials list indicating manufacturer, model number and description of all materials and equipment to be used. Show appropriate dimensions and adequate detail to accurately portray intent of construction.

B. Record Drawings (As-Builts):

1. At onset of irrigation installation secure xerox copies of original irrigation design from Owner. At the end of every day, revise prints for Work accomplished that day in red ink. As-built drawings shall be brought up-to-date at the close of the working day every Friday by a qualified draftsperson. A print of record plan(s) shall be available at Project Site. Indicate zoning changes on weekly as-built drawings. Indicate non-pressure piping changes on as-builts. Upon completion of Project, prior to installation of water meters, secure digital copy ACAD 2010 of irrigation design from Owner and record asbuilt information. Deliver digital asbuilt drawing on disk and two 3 mill. mylar prints of same. Dimension, from two permanent points of reference (building corners, sidewalk, road intersections or permanent structures), location of following items:

   a. Point of connection.
   b. Routing of sprinkler pressure lines. Provide dimensions for each 100 L.F. (maximum) along each routing and for each change of direction.
   c. Sprinkler control valves.
   d. Quick coupling valves.
   e. Drain valves.
   f. Wire splice boxes.
   g. Control wire routing if not with pressure mainline.
   h. Gate valves.
   i. Sleeves.
   j. Flush valves.
   k. Other related equipment as directed.

2. Make dimensions accurately at the same scale used in the original drawings, or larger. Notes and dimension lettering must be legible.

3. The irrigation legend must be changed to accurately reflect the irrigation equipment installed, if such equipment is not the same as originally specified on the contract documents. This includes flow rates, effective spray diameter/radius and operating pressure of all sprinkler heads.

4. Owners Representative will not certify any pay request submitted by the Contractor if the as-built drawings are not current, and processing of pay request will not occur until as-builts are updated.

C. Operation Instructions – Submit three (3) written operating instructions including winterization procedures and start-up, with cut sheets of products, and coordinate scheduling/precipitation instructions with Owner's maintenance personnel.

1. Controller Charts:
   a. Do not prepare charts until record (as-built) drawings have been reviewed by Owners Representative.
   b. Provide one controller chart for each automatic controller installed.
      1) Chart shall be reproduction of record drawing. If photo reduction prints are required, keep reduction to maximum size possible to retain full legibility.
      2) Chart shall be xerox print of actual "as-built" system, showing area covered by that controller.
   c. Identify area of coverage of each remote control valve, using a distinctly different color drawing over entire pipe routing.
   d. Following review of charts by Owners Representative, they shall be hermetically sealed between two layers of (3) mil thick plastic sheet.
   e. Charts shall be completed and reviewed prior to final review of irrigation system.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, unload, store, and handle materials, packaging, bundling and products in dry, weatherproof condition in manner to prevent damage, breakage, deterioration, intrusion, ignition, and vandalism. Deliver in original unopened packaging containers prominently displaying manufacturer's name, volume, quantity, contents, instructions, and conformance to local, state, and federal law. Remove and replace cracked, broken, or contaminated items or elements prematurely exposed to moisture, inclement weather, snow, ice, temperature extremes, fire, or jobsite damage.

1. Handling of PVC Pipe - Exercise care in handling, loading and storing of PVC pipe. All PVC pipe shall be transported in a vehicle which allows length of pipe to lie flat so as not to subject it to undue bending or concentrated external loads. All sections of pipe that have been dented or damaged shall be discarded, and if installed, shall be replaced with new piping.

1.7 JOBSITE CONDITIONS:

A. Protection of Property:

1. Preserve and protect all trees, plants, monuments, structures, and paved areas from damage due to Work of this Section. In the event damage does occur, all damage to inanimate items shall be completely repaired or replaced to satisfaction of the Owner, and all injury to living plants shall be repaired or replaced by the Owner. All costs of such repairs shall be charged to and paid by Contractor.
2. Protect buildings, walks, walls, and other property from damage. Erect and

maintain barricades, warning signs and lights, and provide guards as necessary or required to protect all persons on the site. Damage caused to asphalt, concrete, or other building material surfaces shall be repaired or replaced at no cost to the Owner. Restore disturbed areas to original condition.

B. Existing Trees:

1. All trenching or other work under limb spread of any and all evergreens or low branching deciduous material shall be done by hand or by other methods so as to prevent damage to limbs or branches.
2. Where it is necessary to excavate adjacent to existing trees, use all possible care to avoid injury to trees and tree roots. Excavation in areas where 2-inch and larger roots occur shall be done by hand. Roots 2 inches or larger in diameter, except directly in the path of pipe of conduit, shall be tunneled under and shall be heavily wrapped with burlap to prevent scarring or excessive drying. Where a trenching machine is operated close to trees having roots smaller than 2 inches in diameter, wall of trench adjacent to tree shall be hand trimmed, making clean cuts through roots. Trenches adjacent to trees shall be closed within 24 hours, and when this is not possible, side of trench adjacent to tree shall be kept shaded with moistened burlap or canvas.

C. Protection and Repair of Underground Lines:

1. Request proper utility company to stake exact location (including depth) of all underground electric, gas, sewer, and telephone lines. Take whatever precautions are necessary to protect these underground lines from damage. If damage does occur, all damage shall be repaired by Utility Owner. All costs of such repairs shall be paid by Contractor unless other arrangements have been made.

2. Request Owner, in writing, to locate all private utilities (i.e., electrical service to outside lighting) before proceeding with excavation. If, after such request and necessary staking, private utilities which were not staked are encountered and damaged by Installer, they shall be repaired by the Owner at no cost to Installer. If Contractor damages staked or located private utilities, they shall be repaired by Utility Owner at Contractor's expense unless other arrangements have been made.

D. Replacement of Paving and Curbs - Where trenches and lines cross existing roadways, paths, curbing, etc., damage to these shall be kept to a minimum and shall be restored to original condition.

1.8 WARRANTY/GUARANTY: Manufacturer shall warrant materials against defects for a period of one year from date of Substantial Completion. Installer(s) shall guarantee workmanship for similar period.

A. Settling of backfilled trenches which may occur during guaranty period shall be repaired

at no expense to the Owner, including complete restoration of damaged property.

B. Expenses due to vandalism before substantial completion shall be borne by Contractor.

C. Owner will maintain irrigation system during warranty period, so as not to hamper proper operation of irrigation system.

D. The City of Boulder, Colorado reserves the right to make temporary repairs during the warranty period as necessary to keep systems in operating condition without voiding the contractor's warranty, nor relieving the contractor of his responsibilities.

E. The contractor shall make repairs and replacement promptly when notified.

1.9 MAINTENANCE:

A. Furnish the following maintenance items to Owner prior to Final Acceptance:

1. One 8 foot valve key for operation of gate valves and drain valves.
2. 2 keys for each automatic controller enclosure.
3. Provide 10 % of all irrigation heads and nozzles for future replacement.
4. Three keys and three hose swivels compatible with quick couplers installed.

B. Winterization – include cost in bid for winterizing complete system at conclusion of irrigation season (during which system received final acceptance) within 3 days notification by the Owner. System shall be voided of water using compressed air or similar method reviewed by Owners Representative. Reopen, operate and adjust system malfunctions accordingly during April of following season within 3 days of notification by Owner.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. General Piping:

1. Pressure Supply Lines (downstream of backflow prevention units) - Class 200 PVC BE (2").
2. Non-pressure Lines – 100lb, HDPE, SIDR-15, 1" minimum diameter.
3. PVC Sleeving - Class 200 PVC OR SIDR-11.5 HDPE for dir. bores.

B. Brass Pipe and Fittings:

1. Brass Pipe - 85% red brass, ANSI Schedule 40 screwed pipe.
2. Fittings - Medium brass, screwed 125 pound class.

C. Plastic Pipe and Fittings:

1. Identification Markings:
   a. Identify all pipe with following indelible markings:
   b. Manufacturer's name.
   c. Nominal pipe size.
   d. Schedule of class.
   e. Pressure rating.
   f. NSF (National Sanitation Foundation) seal of approval.
   g. Date of extrusion.

2. Bell End Pipe – Manufactured from virgin Polyvinyl Chloride compound in accordance with ASTM D2241 and ASTM D1784; cell classification 1254-B, Type 1, Grade 1.
   a. All fittings and service tees – Schedule 40 P.V.C. slip by slip and Schedule 80 P.V.C. M.I.P. and F.I.P. with steel reinforced service tees.

D. Quick Coupling Valves - Brass body with stabilizer wings and brass swing joint. Equip quick coupler with rubber cover. Key size and type as shown on Drawing.

E. Valve Boxes:

1. Isolation Valves, Quick Coupling Valves, Drain Valves, Wire Splices and Ground Rods - Carson Industries 10" round valve box with bolt down T-cover.
2. Master valve and drip valve assemblies – Carson Industries Super Jumbo 1730-18 with bolt down lid. Electric control valves for spray zones -Carson Industries Standard 1419-12B with bolt down lid.

F. Electrical Control Wiring:

1. Low Voltage:
   a. Electrical Control Wire - two wire path direct bury cable as specified on drawings.
   b. Electrical Common Wire – two wire path direct bury cable as specified on drawings.
   c. Wire Colors:
      1) By Owner.
      2) Data Wires – EV-SEN-CAB-PE39.

   d. Control Wire connections and splices shall be made with 3M DBY and

DBR direct bury splice connectors, or similar UL listed dry splice methods.

2. Controller – Rain Master Eagle I-Central two wire compatible controller with stainless steel flip top pedestal enclosure, Model No. EGP-TWi-PSB.

G. Electric Control Valves – Hunter ICV-G-FS-AS valves having manual flow adjustment and manual bleed assembly.

H. Sprinkler Heads – Provide fabricated riser units in accordance with details on Drawings - with riser nipples of same size as riser opening in sprinkler body.

1. Pop-Up Sprinkler Heads – Rain Bird 1800 SAM PRS series.
2. Rotary Sprinklers – Hunter PGP-Ultra with plastic risers.
3. Drip Irrigation for Shrub Beds – Rain Bird XBT-20.

I. Rain Sensor – Hunter Wireless Rain Click installed with all stainless steel band clamps.

PART 3 – EXECUTION

3.1 LANDSCAPE PLAN REVIEW AND COORDINATION - Contractor will be held responsible for coordination between landscape and irrigation system installation. Landscape material locations shown on the Landscape Plan shall take precedence over the irrigation system equipment locations. If irrigation equipment is installed in conflict with the landscape material locations shown on the landscape plan, the Contractor will be required to relocate the irrigation equipment, as necessary, at Contractor's expense.

3.2 STATIC PRESSURE VERIFICATION – Contractor shall field verify the static pressure at the project site, prior to commencing work or ordering irrigation materials, and submit findings, in writing, to Project Manager. If Contractor fails to verify static water pressure prior to commencing work or ordering irrigation materials, Contractor shall assume responsibility for all costs required to make system operational and the costs required to replace any damaged landscape material. Damage shall include all required material costs, design costs and plant replacement costs.

3.3 INSPECTION: - Examine areas and conditions under which Work of this Section is to be performed. Do not proceed with Work until unsatisfactory conditions have been corrected.

A. Grading operations, with the exception of final grading, shall be completed and approved by Project Manager before staking or installation of any irrigation system begins.

3.4 PREPARATION:

A. Staking shall occur as Follows:

1. Mark, with paint, routing of pressure supply line and flag heads for all new zones. Contact Owners Representative 48 hours in advance and request review of staking. Owners Representative will advise installer as to the amount of staking to be prepared. Owners Representative will review staking and direct changes if required. Review does not relieve installer from coverage problems due to improper placement of heads after staking.
2. If project has significant topography, free form planting beds, or other amenities which could require alteration of irrigation equipment layout as deemed necessary by Owners Representative, do not install irrigation equipment in these areas until Owners Representative has reviewed equipment staking.

B. Install sleeving under asphalt paving and concrete walks, prior to concreting and paving operations, to accommodate piping and wiring. Compact backfill around sleeves to 95% Standard Proctor Density within 2% of optimum moisture content in accordance with ASTM D698 under all pavement.

C. Trenching - Trench excavation shall follow, as much as possible, layout shown on Drawing. Dig trenches straight and support pipe continuously on bottom of trench. Trench bottom shall be clean and smooth with all rock and organic debris removed.

1. Clearances:
   a. Main pressure line - Make trenches of sufficient width (6 inches minimum) to properly assemble and position pipe in trench.
   b. Secondary Pipe - Trenches shall have a minimum width of 4 inches.
   c. Line Clearance - Provide not less than 6 inches of clearance between each line, and not less than 12 inches of clearance between lines of other trades.
2. Pipe and Wire Depth to finish grade:
   a. Pressure Supply Piping - 18 inches min. from top of pipe.
   b. PVC Sleeving – @ specified pipe or wire depth.
   c. Non-pressure Piping (rotor) – 12 inches min. from top of pipe.
   d. Non-pressure Piping (pop-up) – 12 inches min. from top of pipe.
   e. Control Wiring – Side of pressure mainline or 18 inches from top of wire bundle where installed separately from mainline trench(es).
3. Boring will be permitted only where pipe must pass under obstruction(s) which cannot be removed. In backfilling bore, final density of backfill shall match that of surrounding soil. It is acceptable to use sleeves of suitable diameter installed by directional boring, and pipe laid through sleeves. Observe same precautions as though pipe were installed in open trench.
4. Vibratory Plow – Not permitted for installation of piping on this project.

3.5 INSTALLATION - Locate other equipment as near as possible to locations designated. Deviations shall be reviewed by Owners Representative prior to installation.

A. PVC Piping - Snake pipe in trench as much as possible to allow for expansion and contraction. Do not install pipe when air temperature is below 40 degrees (F). Place manual drain valves at low points and dead ends of pressure supply piping to insure

complete drainage of system. When pipe laying is not in progress, or at end of each day, close pipe ends with tight plug or cap. Perform work in accordance with good practices prevailing in piping trades.

1. Solvent Weld PVC Pipe - Lay pipe and make all plastic to plastic joints in accordance with manufacturer's recommendations.
2. Gasketed End Pipes:
   a. None required.
   b. Thrust block sizing guide – see drawings.
3. Flexible Plastic (Polyethylene) Pipe – Lay pipe and assemble fittings following manufacturer's recommendations.

B. Control Wiring:

1. Low Voltage Wiring:
   a. Bury control wiring between controller and electric valves in pressure supply line trenches, strung as close as possible to main pipe lines with such wires to be consistently located below and to one side of pipe, or in separate trenches.
   b. Provide an expansion loop at every pressure pipe angle fitting, every electric control valve location (in valve box), and every 500 feet. Form 24" expansion loop by coiling two wire path cable in 12" diameter loops.
   c. Make all splices and E.C.V. connections using 3M DBY and DBR connectors or similar UL listed dry splice method.
   d. Install all control wire splices not occurring at control valve in a separate Carson Industries 10" round valve box with bolt down T-cover. Brand lid with WS in 1" high letters minimum.

2. High Voltage Wiring for Automatic Controller:
   a. Provide 120 volt power connection to automatic controller.
   b. All electric work shall conform to local codes, ordinances, and authorities having jurisdiction. All high voltage electrical work shall be performed by licensed electrician.

C. Electric Control Valves - Install as specified and detailed on the Drawings.

D. Quick Coupling Valves - Install as specified and detailed on the Drawings.

E. Drain Valves - Install as specified and detailed on the Drawings.

F. Gate Valves – Install as specified and detailed on the Drawings.

G. Valve Boxes - Install one valve box for each valve required. Install gravel after compaction of subgrade and prior to setting of valve box.

H. Sprinkler Heads - Install sprinkler heads where designated on Drawings or where staked. Set to finish grade as detailed. Spacing of heads shall not exceed the maximum indicated on Drawing unless re-staked as directed by Owners Representative. In no case shall the spacing exceed maximum recommended by manufacturer. Install heads on swing-joint risers. Adjust part circle heads for proper coverage. Adjust heads to correct height after sod is installed. Plant placement shall not interfere with intended sprinkler head coverage, piping, or other equipment. Owners Representative may request nozzle changes or adjustments without additional cost to the Owner.

I. Backfilling - Do not begin backfilling operations until required system tests have been completed. Backfilling shall not be done in freezing weather except with review by Owners Representative. Leave trenches slightly mounded to allow for settlement after backfilling is completed. Trenches shall be finish graded prior to walk-through of system by Project Manager.

1. Materials - Excavated material is generally considered satisfactory for backfill purposes. Backfill material shall be free of rubbish, vegetable matter, frozen materials, and stones larger than 1 inch in maximum dimension. Do not mix subsoil with topsoil. Material not suitable for backfill shall be hauled away. Contractor shall be responsible for providing suitable backfill if excavated material is unacceptable or not sufficient to meet backfill, compaction, and final grade requirements.
2. Do not leave trenches open for a period of more than 48 hours. Open excavations shall be protected in accordance with OSHA regulations.
3. Compact backfill to 90% standard proctor density, determined in accordance with ASTM D698 in landscape areas utilizing the following methods:
   a. Mainline Pipe: Mechanical tamping only in 9” maximum lifts.
   b. Secondary Pipe: Mechanical tamping or puddling in 12” maximum lifts.

J. Sleeving Under Paving:

1. Provide for a minimum cover of 18 inches between the top of the sleeve and the bottom of the aggregate base for all pressure and non-pressure piping installed under asphaltic concrete or concrete paving.
2. Sleeving located under areas where asphalt or concrete paving will be installed shall be bedded with sand (a layer 6" below pipe and 6" above pipe).
3. Compact backfill material in 6" lifts at 95% standard procter density determined in accordance with ASTM D698 under pavement using mechanical tamping devices.
4. Set in place, cap and pressure test all piping under paving, in presence of Owners Representative prior to backfilling and paving operations.
5. Sleeving under existing walks or pavement shall be done by directional boring. Where cutting or breaking of walks and/or concrete is necessary, it shall be done and replaced at no cost to the Town. Obtain permission to cut or break walks and/or concrete from Owners Representative.

3.6 FIELD QUALITY CONTROL:

A. Flushing - After piping, risers, and valves are in place and connected, but prior to installation of sprinkler heads, quick coupler assemblies, and hose valves, thoroughly flush piping system under full head of water pressure from dead end fittings. Maintain flushing for 5 minutes through furthermost valves. Cap risers after flushing.

B. Testing - Conduct tests in presence of Owners Representative. Arrange for presence of Owners Representative 48 hours in advance of testing. Supply force pump and all other test equipment.

1. After backfilling and installation of all control valves, fill pressure supply line with water, and pressurize to 120 PSI for a period of 2 hours.
2. Leakage, Pressure Loss - Test is acceptable if no loss of pressure is evident during the test period.
3. Leaks - Detect and repair leaks.
4. Retest system until test pressure can be maintained for duration of test.
5. Before final acceptance, pressure supply line shall remain under pressure for a period of 48 hours.

C. Walk-Through for Substantial Completion:

1. Arrange for Owners Representative presence 48 hours in advance of walk-through.
2. Entire system shall be completely installed and operational prior to scheduling of walk-through.
3. Operate each zone in its entirety for Owners Representative at time of walk-through and additionally, open all valve boxes if directed.
4. Generate a punch list of items to be corrected prior to Final Completion.
5. Furnish all materials and perform all work required to correct all inadequacies of coverage due to deviations from Contract Documents.

D. Walk-Through for Final Completion:

1. Arrange for Owners Representative presence 48 hours in advance of walk-through.
2. Show evidence to Owners Representative that the Owner has received all accessories, charts, record drawings, and equipment as required before Final Completion walk-through is scheduled.
3. Operate each zone, in its entirety for Owners Representative at time of walk-through to insure correction of all incomplete items.
4. Items deemed not acceptable by Owners Representative shall be reworked to complete satisfaction of Owners Representative.
5. If after request to Owners Representative for walk-through for Final Completion of irrigation system, Owners Representative finds items during walk-through which have not been properly adjusted, reworked, or replaced as indicated on punch list from previous walk-through, Contractor shall be charged for all subsequent walk-throughs. Funds will be withheld from final payment and/or

retainage to Contractor, in amount equal to additional time and expenses required by Owners Representative to conduct and document further walk-throughs as deemed necessary to insure compliance with Contract Documents.

3.7 ADJUSTING - Upon completion of installation, "fine-tune" entire system by regulating valves, adjusting patterns and break-up arms, and setting pressure reducing valves at proper and similar pressure to provide optimum and efficient coverage. Flush and adjust all sprinkler heads for optimum performance and to prevent overspray onto walks, roadways, and buildings as much as possible.

A. If it is determined that irrigation adjustments will provide proper coverage and improved water distribution as determined by Owners Representative, Contractor shall make such adjustments prior to Final Acceptance as directed, at no additional cost to the Owner. Adjustments may also include changes in nozzle sizes, degrees of arc, and control valve throttling.

B. All sprinkler heads shall be set perpendicular to finish grade unless otherwise designated.

C. Areas which do not conform to designated operation requirements due to unauthorized changes or poor installation practices shall be immediately corrected at no additional cost to the Owner.

3.8 CLEANING - Maintain continuous cleaning operation throughout duration of work. Dispose of, off-site at no additional cost to the Owner, all trash, excess soil or debris generated by installation of irrigation system.

4.0 METHOD OF MEASUREMENT –

All irrigation improvements will be measure by the actual number of components and linear feet of pipe and wire installed and accepted complete and in place, self-contained and fully operational.

4.1 BASIS OF PAYMENT –

The accepted quantities will be paid for at the contract unit price for the various items below that appear in the bid schedule.

Pay Item	**Pay Unit**
Irrigation water tap point of connection per notes and details on drawings	Each
Irrigation controller with power supply, grounding and rain sensor	Each
Service line 1.5” copper from meter through backflow assembly with stop and waste valve	Each
Backflow assembly with slab and enclosure	Each
Drain valve with service tee and valve box	Each
Isolation valve with service tee and valve box	Each

Quick coupler valve with swing joint and valve box	Each
Master valve with valve box and data cable	Each
Electric control valve for spray zones with valve box	Each
Electric control valve for drip zones with valve box	Each
PVC mainline pipe 2”	Linear foot
Polyethylene secondary pipe 1.5”	Linear foot
Polyethylene secondary pipe 1”	Linear foot
Two wire path cable	Linear foot
Sleeving CL-200 4” PVC open trench	Linear foot
Sleeving CL-200 4” HDPE directional bore	Linear foot
Sleeving CL-200 3” PVC open trench	Linear foot
Sleeving CL-200 3” HDPE directional bore	Linear foot
Pop-up spray head with nozzle and swing joint	Each
Gear drive spray head with nozzle and swing joint	Each
Drip emitter assembly with riser and flex pipe	Each
Drip zone flush valve with valve box	Each

END OF SECTION

REVISION TO SECTION 628 - BRIDGE GIRDER AND DECK UNIT

Section 628 is hereby added to the Standard Specifications for this project as follows:

DESCRIPTION

628.01 This work consists of the design, fabrication, and erection of a simple span prefabricated steel bridges. The bridge will be a prefabricated welded self-weathering steel truss pedestrian bridge with a concrete deck in accordance with the specifications and plan details.

Potential bridge suppliers are:

1. Continental Bridge
   8301 State Highway 29 N
   Alexandria, Minnesota 56308
   1-800-328-2047, FAX 320-852-7067

2. Steadfast Bridges
   4021 Gault Ave. South
   Fort Payne, Alabama 35967
   1-800-749-7515, FAX 256-845-9750

3. Excel Bridge Manufacturing Company
   12001 Shoemaker Avenue
   Santa Fe Springs, California 90670
   562-944-0701, FAX 562-944-4025

4. Big R Manufacturing LLC
   P.O. Box 1290
   Greeley, Colorado 80632-1290
   1-800-234-0734, FAX 1-970-356-962

5. Wheeler Lumber, LLC
   9330 James Avenue South
   Bloomington, Minnesota 55431-2317
   1-800-328-3986, FAX 952-929-2909

MATERIALS

628.02 Structural Steel. All structural steel shall be new (unused) material. The Contractor shall provide the Engineer with copies of all certified mill test reports for all structural steel and bolts. Floor beams, stringers, and members of each Half-through truss (upper and lower chords, diagonals, end posts and vertical posts) utilized in the bridges shall meet a longitudinal Charpy V-notch (CVN) value of 25 ft. lbs. at 40 degrees Fahrenheit. Testing shall be in accordance with AASHTO T 243 (ASTM A 673). The H frequency of heat testing shall be used. The Contractor shall provide the Engineer with certified copies of all CVN test reports. Upon request by CDOT the contractor shall make the certified copies of all CVN test reports available to the Staff Bridge Branch Fabrication Unit.

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All square and rectangular structural steel tubing shall conform to the requirements of ASTM A 847, Cold-Formed Welded and Seamless High Strength, Low Alloy Structural Tubing With Improved Atmospheric Corrosion Resistance.

All structural steel shapes and plates shall conform to the requirements of ASTM A 588, High-Strength Low-Alloy Structural Steel.

All anchor bolts and nuts shall conform to the requirements of ASTM F 1554 Grade 36, Carbon Steel Bolts and Studs, and shall be galvanized in accordance with the requirements of ASTM A 153. Each anchor bolt shall be provided with two nuts for jamming.

All structural steel field connections shall be bolted with high strength bolts. High strength bolts, including suitable nuts and plain hardened washers, shall conform to the requirements of ASTM A 325. Bolts shall be Type 3.

628.03 Decking Material. Pedestrian bridges for this project shall have Concrete Class D (Bridge) deck with average concrete thickness of seven inches. Concrete Class D (Bridge) and reinforcing steel shall be in full conformance with CDOT 2011 Standard Specifications for Road and Bridge Construction Section 601 "Structural Concrete" and Section 602 "Reinforcing Steel".

CONSTRUCTION REQUIREMENTS

628.04 Design. *LRFD Guide Specifications for Design of Pedestrian Bridges 2009* and the *AASHTO LRFD Bridge Design Specifications 2012 (6th Ed.) with 2013 Interims* shall govern the design.

The bridge manufacturer and contractor shall be responsible for providing sufficient gap between the abutment back wall and bridge superstructure to accommodate full range of the bridge thermal movements.

The superstructure of the pedestrian bridge shall consist of two parallel Half-through trusses, with at least one diagonal per panel. The trusses shall be the main load-carrying members of the bridge.

The members of each Half-through truss (upper and lower chords, diagonals, end posts, and vertical posts) shall be fabricated from square and rectangular structural steel tubing.

Floor beams and stringers shall be fabricated from structural steel shapes or square and rectangular structural steel tubing.

The maximum superstructure depth shall be 2'-0" measured from the top of the concrete deck to the bottom of the low cord.

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SECTION 628
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The structure shall conform to the clear span, clear width, and railing requirements shown on the plans. The railing shall be mounted to the inside of the bridge and shall be standard railing type as shown on the plans.

Each pedestrian bridge shall be designed for the following loads and loading conditions:

1. Dead load shall be as defined in Section 3.5 of the AASHTO LRFD Bridge Design Specifications.

2. Live load shall be taken for each member as the controlling case of an H-10 vehicle load (LL) or pedestrian load (PL) as defined in the AASHTO Guide Specifications. Distribution to the stringer and floor beams shall be in accordance with Section 4 of the AASHTO LRFD Bridge Design Specifications. Deflection and vibration limits as per the AASHTO Guide Specifications shall apply.

   Pedestrian live load shall be as defined by the AASHTO Guide Specifications, and used for Strength 1 Load Combination of the AASHTO LRFD Bridge Design Specifications, Section 3.

   Vehicle live load shall be as defined by the AASHTO Guide Specifications for a 20,000 pound (H-10) vehicle load, and used for Strength 1 Load Combination of the AASHTO LRFD Bridge Design Specifications, Section 3.

3. Wind load shall be as defined by the AASHTO Guide Specifications, and used in the Strength III Load Combination of the AASHTO LRFD Bridge Design Specifications, Section 3.

4. Distribution of wheel loads on concrete deck flooring shall be in accordance with Section 4 of the AASHTO LRFD Bridge Design Specifications.

Allowable loads in the structural steel members and weld metal shall be in accordance with Section 6 of the AASHTO LRFD Bridge Design Specifications.

Minimum thickness of structural steel shall be 3/16 of an inch.

½ inch diameter weep holes shall be drilled (flame cut holes will not be allowed) at all low points of all steel tubing members as oriented in the in-place, completed structure. In members that are level, or flat, a total of two weep holes shall be drilled, one at each end. Weep holes and their locations shall be shown on the Shop Drawings.

Allowable stresses for concrete decking shall be in accordance with Section 5 of the AASHTO LRFD Bridge Design Specifications.

All welded tubular connections shall be designed in accordance with Section 2, Parts A and D (Delete Subsection 2.36.6), of the Structural Welding Code-Steel ANSI/AWS/D1.1 (Latest Edition).

SECTION 628
BRIDGE GIRDER AND DECK UNIT

The Contractor shall install steel cover plates at the ends of the bridge as detailed on the plans. Steel cover plates shall conform to ASTM A588 or ASTM 242 grade 50 and shall be supplied by the bridge manufacturer. The cover plate shall be manufactured with beveled edges and shall be installed so that the top of the plate is flush with the finished grade elevation of the adjacent concrete deck and concrete approach trail.

Steel bearing plates, setting plates and teflon bonded to shim plates shall be designed and fabricated by the pedestrian bridge supplier and shall be in conformance with the requirements of section 512 of CDOT 2011 Standard Specifications for Road and Bridge Construction.

The Contractor shall submit seven sets of Design Calculations and Shop Fabrication Details (Shop Drawings) to the Engineer. Submittals shall be in accordance with Subsection 105.02. The Design Calculations and Shop Drawings shall contain the endorsement seal of the Professional Engineer registered in the State of Colorado responsible for the design.

628.05 Shop Fabrication. Welding and fabrication of weathering steel pedestrian bridges shall conform to the requirements of the Structural Welding Code-Steel ANSI/AWS D1.1 (Latest Edition) as amended by the following:

1. As required in Subsection 4.7.3, a welding procedure shall be established by qualification in accordance with the requirements of Subsection 3.3 for the ASTM A 847 material used on the bridge. The results of the Procedure Qualification shall be recorded on Form E-1 in Annex E of AWS D 1.1.
2. The Contractor shall submit a Quality Control Plan. The Plan shall include personnel qualifications, certifications, and a Written Practice in accordance with ASNT SNT-TC-1A.
3. The quality of all welds shall be in accordance with Section 6, Table 6.1. In Table 6.1, Undercut 7(B), the criteria for primary members shall apply to the bottom chord members.
4. All Complete Joint Penetration Groove Welds in butt joints in the bottom chord members shall be 100% Magnetic Particle tested in accordance with ASTM E 709. Acceptance shall be determined in accordance with Section 6.10 and Table 6.1, using Alternating Current. In addition, complete joint penetration groove butt welds welded from one side without backing of bottom chord members shall be examined by ultrasonic testing in accordance with Section 6.11.1.
5. Magnetic Particle Testing shall be performed on 100% of all attachment welds to the bottom chord, using Alternating Current, in accordance with Section 6.10 and Table 6.1.

6. All Procedure Qualification Records and Welder Qualification Test Records shall be current within three years of the date of beginning fabrication.
7. A copy of all Procedure Qualification Records, Welder Qualification Test Records, Quality Control Plan and all visual and nondestructive test reports shall be provided to the Engineer.

SECTION 628
BRIDGE GIRDER AND DECK UNIT

All weathering steel shall be blast cleaned, Steel Structures Painting Council Surface Preparation No. 6 (SSPC-SP6, Commercial Blast Cleaning), to remove mill scale and foreign material which would prohibit rusting to a uniform color.

All structural steel shall be powder coated black including bolts, washers, nuts and all necessary items required for installation of the bridge. Powder coating shall be applied in accordance with applicable ASTM standard.

628.06 Field Construction. The substructure shall be constructed in accordance with the details shown in the plans and the pedestrian bridge shop drawings. Before construction begins on the substructure, the Contractor shall determine the anchor bolt and bearing pad requirements and substructure dimensions needed to properly erect the structure which will be provided. The Engineer shall be provided with two copies of detail sheets delineating these requirements and any associated required changes to the proposed abutment geometry before work begins.

METHOD OF MEASUREMENT

628.07 Pedestrian bridge will be measured by the complete Bridge Girder and Deck Unit installed and accepted.

BASIS OF PAYMENT

628.08 The accepted quantity shall be paid for at the contract unit price for the pay unit listed below. Payment will be made under:

PAY ITEM	PAY UNIT
Bridge Girder and Deck Unit (85 Feet to 90 Feet)	EACH

Payment shall be full compensation for all work necessary to complete the item, which shall include design, fabrication, transportation to the bridge site, and erection. The substructure shall be measured and paid for separately, anchor bolts shall be included in Item 628. Payment will not be made for this item until all required reports, certifications, and forms have been submitted to the Engineer.

END OF SECTION

REVISION OF SECTION 630 - CONSTRUCTION TRAFFIC CONTROL PLAN (GENERAL)

Section 630 of the Standard Specifications is hereby revised for this project as follows:

Subsection 630.01 shall include the following:

The components of the Traffic Control Plan (TCP) for this project are included in the following documents:

1. The plans and these special provisions;
2. Subsection 104.04 and Section 630 of the Standard Specifications;
3. CDOT Standard Plans S-630-1 and S-630-2;
4. Schedule of Construction Traffic Control Devices;
5. *Manual on Uniform Traffic Control Devices (MUTCD) (2009 Edition)*; and
6. *Guide for Work Area Traffic Control*, American Traffic Safety Services Association (ATSSA).

Subsection 630.08 shall include the following:

The Contractor shall submit a detailed TCP including Method of Handling Traffic (MHT) for each different phase of construction to the Engineer for City approval at least two weeks prior to the start of any construction phase or prior to any changes in traffic control. The MHT shall include at a minimum the requirements listed under Section 630.09.

MHT shall also include the following: 1] temporary pavement markings; 2] work zone limits; 3] special construction activities if any; 4] traffic control during phasing changes (including provision for pedestrian and bicycle movements); 5] anticipated flagger location(s) and 5] coordination provisions for utility work.

Subsection 630.09 shall include the following:

Pedestrian movements shall be fully addressed in the Contractor's Traffic Control Plan (TCP) and Method of Handling Traffic (MHT). No plan will be approved that unreasonably impedes or restricts pedestrian movements. No devices required to implement the Contract requirements will be permitted to be installed on or above sidewalk surface areas unless otherwise approved by the City in the respective TCP or MHT.

Subsection 630.12 shall include the following:

<u>CONSTRUCTION REQUIREMENTS</u>

During construction of this project, traffic shall use the present traveled roadway at all times in all currently-provided directions unless otherwise directed or authorized by the Engineer. The Contractor shall provide full intersection movements for vehicular and pedestrian traffic at all times, unless otherwise authorized or directed by the Engineer.

Vehicular and pedestrian traffic shall be maintained on paved surfaces that remain stable through all weather conditions. Contractor shall be allowed alternate materials for short-term (one week or less) pedestrian only detours provided the proposed surface is stable and appropriate dust control measures are taken.

Contractor shall maintain access to all roadways, side streets, walkways, alleyways, driveways, and hike/bike paths at all times unless otherwise approved by the Engineer. Access to individual properties shall be maintained at all times unless otherwise approved by the Engineer. Contractor shall be required to coordinate full or partial closures of all private driveways with business owners along the construction area. Contractor shall develop an access maintenance plan in coordination with these owners, obtain their written approval, and submit same to the Engineer two weeks prior to the start of any work which impacts the signatory properties.

The Contractor shall not have construction equipment or materials in the lanes open to traffic at any time unless otherwise approved by the Engineer. All personal vehicle and construction equipment parking is prohibited where it conflicts with safety, access or the flow of traffic. Personal vehicles and construction equipment parking is prohibited in all private parking lots without the respective property owner's permission.

Contractor and subcontractors shall equip their construction vehicles with flashing amber lights. Flashing amber lights on vehicles and equipment shall be visible from all directions.

Contractor shall install construction traffic control devices in locations where they do not block or impede other existing traffic control devices; or sidewalks for pedestrians, disabled persons or bicyclists.

Excavations or holes shall be backfilled, fenced, or otherwise adequately protected when unattended. During non-construction periods (weekends, holidays, etc.), all work shall be adequately protected to provide for the safety of the public.

Traffic control devices used on this project shall be kept clean and in good working order at all times. The Engineer shall make the ultimate determination of "good working order."

Existing signs, traffic signals or other City-owned traffic control devices damaged due to the Contractor's operations shall be replaced in-kind or repaired by the Contractor at no additional cost to the project.

All advanced construction signing shall be installed prior to any construction activity and remain in place for all work periods. Road Work Ahead advance signs shall be reset if required to match the location of the work. Resetting construction signs during construction as required by the work is considered incidental to the project and will not be paid separately. Masking of existing or temporary signs as may be required by the work is considered incidental to the project and will not be paid for separately.

All flaggers used on this project shall be certified by a CDOT-approved flagger-certification program. The Contractor shall provide certificates of all flaggers used on the project 48 hours in advance of that flagger working on the project.

The Contractor shall submit the required MHTs, all appropriate Traffic Control Supervisor and Flagger documentation to the Engineer, and must receive approval prior to setting any traffic control device.

The Contractor shall maintain frequent communication with the Engineer regarding all aspects of the daily and weekly work schedule.

All construction traffic control devices including signs installed under this project shall be installed as depicted in the MUTCD and other supporting documentation referenced for this project within this Project Special Provision.

Construction signing shall be removed unless work is in progress or equipment has been left on the job site. All portable signs shall be removed at the end of each work day. Costs of removing, resetting or reinstalling construction traffic control devices shall be considered included in the work and will not be paid for separately.

Traffic control devices shall not be stored on the project site.

Contractor shall maintain continuous access through the project for pedestrians, bicycles and disabled persons. When the existing access route is disrupted by construction or construction-related activities, a temporary access shall be provided. All pedestrian access shall be delineated through the work area using proper channelizing devices.

All on-site Contractor personnel including superintendents are required to wear appropriate colored, reflective safety vests.

Contractor personnel shall not direct traffic through a signalized intersection at any time. See the Project Special Provision for Uniformed Traffic Control. When existing traffic signals require power-down, the Contractor shall coordinate all such work with the City of Boulder.

Vertical cuts or fills resulting from construction operations, including planning, adjacent to traffic lanes, shall be temporarily sloped at a 3:1 or flatter slope and delineated at 50 foot intervals immediately after grading or removal operations. Any variances from this requirement shall be approved by the Engineer.

PAVEMENT MARKINGS

The Contractor shall provide full compliance pavement markings at all times during the construction period. Contractor shall replace faded markings during individual phases as directed by the Engineer. Pavement markings which conflict with the TCP for individual phases shall be obliterated. Painting existing markings black shall not be deemed an acceptable means of obliteration.

WORK RESTRICTIONS

This project includes restrictions to work times and days that affect traffic during peak traffic times and days, holidays, holiday evenings, holiday weekends, and other circumstances as described in this Project Special Provision. Wherever other laws, ordinances, regulations or orders are more restrictive, they shall take precedence over these requirements.

The Contractor shall coordinate and cooperate fully with the City of Boulder, utility owners and other contractors; to assure adequate and proper traffic control is provided at all times. The Contractor shall coordinate and cooperate fully with any others providing traffic control for other operations to assure that work or traffic control devices do not interfere with the free flow of traffic except as allowed by the approved MHT.

The contractor shall schedule all work between 7:00 A.M. and 7:00 P.M Monday through Friday, and shall minimize noise of equipment and crews outside these hours. Disruption of 28th Street traffic (and side-streets) with lane closures shall be allowed as follows:

Southbound 28th Street – 9:00 am to 4:00 pm

Northbound 28th Street – 9:00 am to 4:00 pm

The hours noted above are the limits of time from "first cone to last cone" of the traffic control setup/takedown. Construction may be allowed on weekends or Holidays when approved by the Project Manager.

The Contractor shall make emergency repairs, and provide proper protection of the work and traveling public at all times.

Side street closures will not be allowed without the prior written approval of the Engineer.

Work performed and material placed during restricted work times will not be paid unless the completion of the work outside designated hours is pre-approved by the Engineer.

Periods of controller deactivation are only allowed between the hours of 9:00am to 2:00pm weekdays. All such periods shall be scheduled with the Engineer at least 72 hours in advance such that appropriate City personnel can be notified. Note that it is the Contractor's responsibility to schedule Uniformed Traffic Control and additional advance notice may be required to schedule that item.

END OF SECTION

FORCE ACCOUNT ITEMS

DESCRIPTION

This special provision contains the Department's estimate for force account items included in the Contract. The estimated amounts marked with an asterisk will be added to the total bid to determine the amount of the performance and payment bonds. Force Account work shall be performed as directed by the Engineer.

BASIS OF PAYMENT

Payment will be made in accordance with subsection 109.04. Payment will constitute full compensation for all work necessary to complete the item.

Force account work valued at $5,000 or less, that must be performed by a licensed journeyman in order to comply with federal, state, or local codes, may be paid for after receipt of an itemized statement endorsed by the Contractor.

Force Account Item	Quantity	Estimated Amount
F/A On the Job Trainee	2240 Hour	$ 6,720
F/A Railroad Flagging	F.A.	$ 48,000
F/A Signing	F.A.	$ 2,000

UTILITIES

The known utilities within the limits of this project are:

Entity	Contact	Phone	Mobile
CenturyLink	Kathy Dunbar	(303) 441-7113	
Comcast	Kevin Young	(303) 284-7541	(720) 281-8666
Level 3 Communications	Ken Hadrick	(303) 482-9826	
RTD Operations	Len Grant	(303) 299-5007	(720) 353-1299
Xcel Energy (Gas & Electric)	Bob Voegely	(303) 245-2395	(303) 946-5156

City Of Boulder

Bikeway/Medians Supervisor	Carey Sager	(303) 413-7115
Gravity Systems	Pieter Beyer	(303) 441-3293
Information Technology	Donald Ingle	(303) 441-4183
Utilities (Traffic Signals)	Joe Paulson	(303) 441-3289
Utilities (Water)	Steve Buckbee	(303) 441-3279
Sign/Markings Shop	Scott Baker	(303) 413-7122
Urban Forestry	Kathleen Alexander	(303) 441-3406
Water Supervisor	Josh Meek	(303) 413-7439

Boulder and White Rock Ditch	Mike Ballantine	(303) 359-8284
Boulder and White Rock Ditch	Dennis Gould	(720) 491-9725
Farmers Ditch	Boyd Sheets	(720) 220-4262

The work described in these plans and specifications will require coordination between the Contractor and the utility companies in accordance with subsection 105.11 in conducting their respective operations as necessary, so the utility work can be completed with minimum delay to all parties concerned.

The Contractor will be required to provide traffic control for any utility work expected to be coordinated with construction within the project construction limits, as directed by the Engineer. However, traffic control for utility work outside of typical project work hours shall be the responsibility of the utility owners.

UTILITIES

Utility companies, entities, or their agents that have utilities that are to be installed, adjusted, relocated, or removed by the Contractor may require their inspectors to approve and accept the work being accomplished. If the Contractor is approached by the utilities, the Contractor shall notify the utilities that they should coordinate their inspections with the Engineer. Any problems that arise are to be resolved through the Engineer.

The Contractor shall be responsible for protecting, supporting, and if necessary, shoring existing utilities while constructing the roadway and or channel improvements and associated work unless otherwise noted. The Contractor shall submit to the City of Boulder and the individual utility companies' plans of how the utility lines will be supported and protected during construction.

As stated in Section 105 of the Specifications, the Contractor shall consider in the bid proposal all of the permanent and temporary utility facilities in their present and relocated positions as shown in the Contract and as revealed by site investigation, in addition to new installations. Additional compensation will not be allowed for foreseeable coordination, inconvenience, or damage sustained due to interference from the utility facilities or the installation, removal or relocation operations as indicated in the Contract.

For this project, there will also not be delays granted or extensions of Contract time related to the coordination of the project with utility relocation work by others. The Contractor and Engineer shall meet with the utility owners as often as necessary (in the Contractor's opinion) to effectively coordinate and schedule required utility relocations or adjustments by the respective utility companies.

The work listed below shall be performed by the Contractor in accordance with the plans and specifications, and as directed by the Engineer. The Contractor shall keep the utility company(s) advised of any work being done to their facility, so that the utility company(s) can coordinate their inspections for final acceptance of the work with the Engineer. The Contractor shall provide written notice to each utility owner, with a copy to the Engineer, immediately prior to each utility work element expected to be coordinated with construction. The number of days prior notice is noted for each company.

FOR:

City of Boulder

In locations as detailed in the plans, the Contractor shall perform the following work:

- Adjust manholes to match proposed grade at the following locations: sanitary sewer manhole Sta. BWRD 14+22.80 LT, and sanitary sewer manhole Sta. BWRD 14+78.79 RT and Sta. 10+19.7 LT.
- Install sanitary sewer PVC (non-pressure pipe) pipe of various size, casing pipes of various size, concrete encasements, and manholes within the project limits as shown in the plans. The installation of these facilities will require removal of sanitary sewer manholes and sanitary sewer pipes of various size and material. See Sanitary Sewer Profiles.
- Remove sanitary sewer service for 3333 S. Iris Avenue
- Install new sanitary sewer service for 3333 S. Iris. This shall include manholes and casing, See Sanitary Sewer Profiles.
- Remove an existing fire hydrant and install a new fire hydrant at Sta. WC 71+52 LT

UTILITIES

- Remove existing water lines and replace / relocate with PVC (pressure pipe) pipe and appurtenances along the western edge of the Foothills Parkway embankment, Spring Creek Place, 34th Street, Bridger Trail, Kalmia Avenue, and Winding Trail Drive. See Water Line Plan & Profiles.
- Remove existing water lines and replace with epoxy lined steel pipe and appurtenances along Iris Avenue. See Water Line Plan & Profiles.
- Remove water meter and water service line for 3333 S. Iris Avenue.
- Install new water meter and water service line for 3333 S. Iris Avenue. Including waterline sleeve.
- Relocate water meters and irrigation works at Sta. WC 72+22.
- Provide irrigation taps, and irrigation systems throughout project. See Irrigation Plans.
- Remove existing storm sewer manholes, inlets, end sections, and pipe as shown on the plans.
- Install storm sewer manholes, inlets, end sections, culverts, and pipe as shown on the plans.
- Provide electrical conduit and sleeves for project lighting and irrigation controls. See Lighting Plans.
- Protect in place the existing utility lines not indicated for removal or relocation, including relocated utility lines.

This work is expected to be coordinated during construction. The Contractor shall provide the utility owner written notice five (5) days immediately prior to each required inspection.

Xcel Energy (Electric)

In locations as detailed in the plans, the Contractor shall perform the following work:

- Provide survey information for the elevation of proposed project improvements to assist Xcel in properly relocating facilities and avoid conflicts.
- Coordinate the removal and reset of the Winding Trail street light.
- Coordinate with Xcel on for the removal and installation of a new power pole south east of the intersection of 28th Street and Palo Parkway. This coordination shall require **60 days** prior notice.
- Coordinate all other removal and or relocation of Xcel facilities noted in the plans.
- Remove abandoned electric line encountered during the construction of project improvements.
- Provide traffic control and coordinate the relocation of existing electrical facilities by Xcel forces as required. Expose, protect and support, as required, any electrical lines located within the excavation limits of any proposed utilities or structures.
- Allow time for relocation of facilities.

This work is expected to be coordinated during construction. The required time shall be determined by the Contractor, Xcel and the Engineer.

Prior notice – unless otherwise noted 30 Days

UTILITIES

Xcel Energy (Gas)

In locations as required, the Contractor shall perform the following work:

- Provide survey information for the elevation of proposed project improvements to assist Xcel in properly relocating facilities and avoid conflicts.
- Coordinate all other removal and or relocation of Xcel facilities noted in the plans.
- Remove abandoned gas line encountered during the construction of project improvements.
- Provide traffic control and coordinate the relocation of existing gas facilities by Xcel forces as required. Expose, protect and support, as required, any gas lines located within the excavation limits of any proposed utilities or structures.
- Allow time for relocation of facilities.

This work is expected to be coordinated during construction. The required time shall be determined by the Contractor, Xcel, and the Engineer.

Prior notice – 30 Days

CenturyLink

In locations as detailed in the plans, the Contractor shall perform the following work:

- Provide survey information for the elevation of proposed project improvements to assist CenturyLink in properly relocating facilities and avoid conflicts.
- Coordinate with CenturyLink on for the relocation of the fiber optic line in Iris Avenue. This coordination shall require **90 days** prior notice.
- Coordinate all other removal and or relocation of CenturyLink facilities noted in the plans.
- Remove abandoned telephone and fiber optic lines encountered during the construction of project improvements.
- Provide traffic control and coordinate the relocation of facilities by CenturyLink forces as required. Expose, protect and support, as required, any CenturyLink lines located within the excavation limits of any proposed utilities or structures.
- Allow time for relocation of facilities.

This work is expected to be coordinated during construction. The required time shall be determined by the Contractor, CenturyLink, and the Engineer.

Prior notice – unless otherwise noted 30 Days

Level 3

In locations as detailed in the plans, the Contractor shall perform the following work:

- Provide survey information for the elevation of proposed project improvements to assist Level 3 in properly relocating facilities and avoid conflicts.
- Provide traffic control and coordinate with Level 3 for the lowering of the fiber optic line located within BNSF ROW running parallel to the east side of the tracks.

UTILITIES

This work is expected to be coordinated during construction. The required time shall be determined by the Contractor, Level 3, and the Engineer.

Prior notice – 60 Days

Comcast

In locations as detailed in the plans, the Contractor shall perform the following work:

- Provide survey information for the elevation of proposed project improvements to assist Comcast in properly relocating facilities and avoid conflicts.
- Coordinate with Comcast on for the relocation of the fiber optic line in located between Foothills Parkway and the BNSF railroad. This coordination shall require **120 days** prior notice.
- Coordinate all other removal and or relocation of Comcast facilities noted in the plans.
- Remove abandoned cable and fiber optic lines encountered during the construction of project improvements.
- Provide traffic control and coordinate the relocation of facilities by Comcast forces as required. Expose, protect and support, as required, any Comcast lines located within the excavation limits of any proposed utilities or structures.
- Allow time for relocation of facilities.

This work is expected to be coordinated during construction. The required time shall be determined by the Contractor, CenturyLink, and the Engineer.

Prior notice – unless otherwise noted 30 Days

BNSF Railroad

In locations as detailed in the plans, the Contractor shall perform the following work:

- The Contractor shall notify the owner before working near railroad. Railroad flagman will be required for work within 25' of track, paid for as a force account item.
- Allow time and space for BNSF to access the bridge work area and construct the BNSF bridge.

This work is expected to be coordinated during construction. The required time to complete this work is estimated to be 10 working days.

Prior notice – see special conditions

UTILITIES

RTD

As required, the Contractor shall perform the following work:

Coordinate the temporary relocation and/or combining of existing transit stops along 28th Street and Palo Parkway with the Contractors planned phasing of the work.

- Accommodate pedestrian access to all existing, temporary and proposed transit stops along the project limits throughout the duration of the project.

This work is expected to be coordinated during construction. The required time shall be determined by the Contractor and RTD.

Prior notice – 14 Days

Left Hand Water District

In locations as detailed in the plans, the Contractor shall perform the following work:

- Coordinate with Left Hand on the need for them to operate valves, shut down their waterline, remove, cap, and install thrust blocks.
- Provide traffic control and coordinate the removal of facilities by Left Hand forces as required. Expose, protect and support, as required, any Left Hand lines located within the excavation limits of any proposed utilities or structures.
- Allow time for removal of facilities.

This work is expected to be coordinated during construction. The required time shall be determined by the Contractor, Left Hand, and the Engineer.

Prior notice –2 Days

Boulder and White Rock Ditch

In locations as detailed in the plans, the Contractor shall perform the following work:

- Coordinate with Boulder and White Rock Ditch on timing of ditch relocation and construction of ditch improvements.
- See special conditions for other coordination requirements.

This work is expected to be coordinated during construction. The required time shall be determined by the Contractor, Boulder and White Rock Ditch, and the Engineer.

Prior notice – see special conditions.

UTILITIES

Farmers Ditch

In locations as detailed in the plans, the Contractor shall perform the following work:

- The Farmers Ditch outfalls into Wonderland Creek directly downstream of Bridger Trail along the south bank. The contractor shall notify the ditch company prior to any work in this area.

This work is expected to be coordinated during construction. The required time shall be determined by the Contractor, Farmers Ditch, and the Engineer.

Prior notice – 48 Hours

The utility work listed below will be performed by the utility owners or their agents. This list is provided for information only, and is not necessarily all inclusive. The project contractor is responsible to coordinate the required utility relocation work by others within the project limits in order to maintain control of the project schedule and minimize delays and inconveniences to all parties concerned:

City of Boulder

- Operate all valves for waterline construction and lowerings.
- Provide inspections as needed.

UTILITIES

Xcel Energy (Electric)

- Sta. WC 56+01 to WC 56+82 RT: Xcel Energy forces shall be responsible for the relocation of approximately 65 feet of existing buried electric line and one electrical pedestal / transformer box along the northern bank of Wonderland Creek, approximately 240 feet upstream of the Wonderland Creek crossing of Spring Creek Place. This relocation is to accommodate the proposed Wonderland Creek channel grading. The existing line and equipment shall be removed by Xcel Energy. Xcel Energy forces shall also be responsible for the relocation, reconnection, and/or extension of all existing electrical service lines to the new line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 5 working days to complete.
- Sta. WC 58+57 to WC 60+28 RT: Xcel Energy forces shall be responsible for the possible relocation of approximately 164 feet of existing buried electric line along the northern bank of Wonderland Creek, beginning approximately 260 feet east and 70 feet south of the intersection of Iris Avenue and 34th Street and ending approximately 380 feet east and 210 feet south of the intersection. Xcel Energy forces will confirm that their existing line can be or is adequately protected during the excavation and the construction

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  of the Wonderland Creek retaining wall #7 by the Contractor. If a conflict arises or is expected, Xcel Energy forces shall relocate the electric lines and coordinate exact locations of relocated facilities in the field during construction with the Contractor. Xcel Energy forces will work with the Contractor to protect or relocate these facilities as required. Xcel Energy forces shall also be responsible for the relocation, reconnection, and/or extension of all existing electrical service lines to the new line. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces during construction by the Contractor and take 5 working days to complete.
- Sta. WC 62+32 to WC 62+46 RT: Xcel Energy forces shall be responsible for the relocation of the power pole guy wire on the southeast corner of the intersection of Iris Avenue and 34th Street. The relocation is needed due to the construction of a storm sewer 6 inlet, the Iris box culvert, as well as retaining wall #8. Xcel Energy forces shall be responsible for the possible relocation of the power pole on the southeast corner of the intersection of Iris Avenue and 34th Street and approximately 60 feet of buried electric line running from the power pole to the north. The possible power pole relocation is needed due to the construction of the Iris box culvert and retaining wall #8. The possible buried electric line relocation is needed due to the construction of retaining wall #8, reconstruction of the Iris Avenue and 34th Street waterline, and storm sewer improvements. Xcel Energy forces will confirm that their existing power pole and electric line can be or is adequately protected during the excavation and the construction of project improvements by the Contractor. If a conflict arises or is expected, Xcel Energy forces shall relocate the power pole and electric line and coordinate exact locations of relocated facilities in the field during construction with the Contractor. Xcel Energy forces will work with the Contractor to protect or relocate these facilities as required. If a relocation is expected the Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy

forces during construction by the Contractor and take 5 working days to complete.

- Sta. WC 64+17 to WC 64+33 RT: Xcel Energy forces shall be responsible for the relocation of the power pole located on the north side of Iris Avenue, between 3333 and 3393 Iris Avenue. The relocation of the power pole includes approximately 65 feet of overhead electric line attached to this pole. The relocation of the pole and associated lines is needed due to the construction of Iris box culvert storm sewer improvements. The proposed relocation shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. Xcel Energy forces shall also be responsible for the relocation, reconnection, and/or extension of all existing electrical service lines to the new line. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 5 working days to complete.
- Sta. WC 210+64 to WC 212+75 LT: Xcel Energy forces shall be responsible for the possible relocation of approximately 221 feet of existing buried electric line located along the western bank of Wonderland Creek, downstream (south) of the Kalmia Avenue crossing of Wonderland Creek. The existing electric line originates from a power pole on Kalmia Avenue approximately 92 feet west of the Kalmia Avenue crossing of Wonderland Creek and continues south along Wonderland Creek before being redirected west to provide service to the Aspen Grove condominiums. The line appears to be in a joint trench with a Comcast cable TV line. The relocation is needed due to the construction of retaining wall #14 as well as storm sewer #20 improvements. Xcel Energy forces will confirm that their existing line can be or is adequately protected during the excavation and the construction of the Wonderland Creek retaining wall #14 by the Contractor. If a conflict arises or is expected, Xcel Energy forces shall relocate the electric line and coordinate the exact locations of relocated facilities in the field during construction with the Contractor. Xcel Energy forces will work with the Contractor to protect or relocate these facilities as required. Xcel Energy forces shall also be responsible for the relocation, reconnection, and/or extension of all existing electrical service lines to the new line. If a relocation is expected the Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces during construction by the Contractor and take 5 working days to complete.
- Sta. WC 212+69 to WC 212+82 RT: Xcel Energy forces shall be responsible for the possible relocation of approximately 16 feet of two existing buried electric lines located to the north Kalmia Avenue directly to the south of the Kalmia Avenue intersection with Island Drive. The relocation is intended to accommodate the proposed storm sewer system located at the Kalmia Avenue and Island Drive intersection. The existing electric line in this area will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. If this work is not completed before construction begins, it is expected to be

coordinated with construction and take 3 working days to complete.

- Sta. WC 220+31 to WC 220+45 RT & LT: Xcel Energy forces shall be responsible for the relocation of approximately 80 feet of existing buried electric line providing service to the proposed Wonderland Creek Townhome development. The relocation is needed due to the construction of a new section of Wonderland Creek channel in this area. The existing electric line will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. Xcel Energy forces shall be responsible for the relocation, reconnection, and/or extension of all existing electrical service lines to the new line. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 5 working days to complete.
- Sta. WC 220+31 to WC 220+45 RT & LT: Xcel Energy forces shall be responsible for the relocation of approximately 80 feet of existing buried electric line providing service to the Manor Care facility at 2800 Palo Parkway. The relocation is needed due to the construction of a new section of Wonderland Creek channel in this area. The existing electric line will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. Xcel Energy forces shall be responsible for the relocation, reconnection, and/or extension of all existing electrical service lines to the new line. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 5 working days to complete.
- Sta. WC 224+67 to WC 225+26 LT: Xcel Energy forces shall be responsible for the relocation of approximately 38 feet of existing buried electric line providing service to the Manor Care facility sign at 2800 Palo Parkway. The relocation is needed due to the construction of a new section of Wonderland Creek channel in this area and the relocation of the sign. The existing electric line will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. Xcel Energy forces shall be responsible for the relocation, reconnection, and/or extension of all existing electrical service lines to the new line. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 5 working days to complete.

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- Sta. WC 224+67 to WC 225+26 LT: Xcel Energy forces shall be responsible for the removal and relocation of the second power pole south of the intersection of 28th Street and Palo Parkway. The relocation is needed due to the construction of a new section of Wonderland Creek channel in this area and the construction of the outfall of the 28th Street Underpass, which includes retaining wall #24. The Contractor shall build the southern 50 linear feet of retaining wall #24 with the existing power pole in place. Following the construction of the southern half of the wall, Xcel Energy forces shall remove the existing power pole and install another power pole 35 feet south of the existing location. Following the installation of the new power pole the Contractor will construct the remainder of wall #24 and install the 28th Street Underpass. Xcel Energy forces will remove the existing power pole and supply the new power pole. Xcel Energy forces shall be responsible for the relocation, reconnection, and/or extension of all existing electrical lines to the new pole. It is anticipated that this work will be completed by Xcel Energy forces during construction by the Contractor. It is expected to be coordinated with construction and take 10 working days to complete. The contractor shall provide Xcel Energy with 60 days written notice prior to required construction.
- Sta. WC 226+44 to WC 226+82 RT & LT: Xcel Energy forces shall be responsible for the relocation of approximately 156 feet of existing buried electric line along the west side of 28th Street directly south of the intersection with Winding Trail Drive. The relocation is intended to accommodate the proposed 28th Street culvert and underpass, retaining wall #26, and storm sewer #25. The Contractor shall be responsible for the excavation to the subgrade elevation of the 28th Street culvert prior to the gas line relocation and lowering. The existing electric line will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. Xcel Energy forces shall be responsible for the relocation, reconnection, and/or extension of all existing electrical service lines to the new line. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 3 working days to complete.

UTILITIES

- Sta. WC 227+18 to WC 229+05 LT & Sta. WC 228+47 to WC 228+61 LT: Xcel Energy forces shall be responsible for the relocation of approximately 205 feet of existing buried electric line along the south bank of Wonderland Creek between Winding Trail Drive and 28th Street. As part of the relocation, an electrical transformer will need to be relocated by Xcel Energy forces. This relocation shall also include the relocation of approximately 63 feet of existing buried electric line connecting to the previously mentioned south bank line between the condominiums at 3785 Birchwood Drive and 3775 Birchwood Drive. These relocations are intended to accommodate the proposed Wonderland Creek channel grading, storm sewer 26, and concrete retaining walls #30, #31, and #32. Additional utility relocations are necessary in this area and possibilities for a joint trench exist at the option of Xcel Energy. The existing electric line along the southern bank will be abandoned in place once the new main is in service. The abandoned main shall be removed by the Contractor where it is in conflict with proposed work. Xcel Energy shall remove the existing transformer box. Xcel Energy forces shall also be responsible for the relocation, reconnection, and/or extension of all existing electric service lines to the new main line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.
- Sta. WC 229+93 to WC 230+05 RT & LT: Xcel Energy forces shall be responsible for the relocation of approximately 80 feet of existing buried electric line along the east side Winding Trail Drive across the existing Winding Trail Drive crossing of Wonderland Creek and extending to the southwest. The relocation is necessary due to the removal and replacement of the existing Wonderland Creek crossing. The existing electric line in Winding Trail Drive will be abandoned in place once the new main is in service. The abandoned main shall be removed by the Contractor where it is in conflict with proposed work. The proposed relocation shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces during construction by the Contractor. The work is expected to take 5 working days to complete.
- Sta. WC 229+63 LT: Xcel Energy forces shall be responsible for the removal and resetting of the street light located on the east side of Winding Trail Drive directly to the south of the Winding Trail Drive crossing of Wonderland Creek. The removal and resetting of the street light shall include all necessary electrical line modifications. The removal and resetting is necessary due to the removal and replacement of the existing Wonderland Creek crossing at Winding Trail Drive. The timing of the removal and resetting of the street light shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. It is anticipated that this work will be completed by Xcel Energy forces during construction by the Contractor. The work is expected to take 2 working days to complete.
- Xcel Energy shall provide electrical service connection to the various project lighting and irrigation controls. See Lighting Plans.
- Monitor work adjacent to existing facilities.

UTILITIES

Xcel Energy (Gas)

- Sta. WC 62+43 to WC 63+30 RT & LT: Xcel Energy forces shall be responsible for the relocation of approximately 216 feet of existing 2" and 3" gas main in and around the intersection of Iris Avenue and 34th Street to accommodate the proposed Iris box culvert, retaining wall #8, sanitary sewer line 3, and waterlines 3 and 3.1. The existing gas main and associated fixtures mounted to the downstream face of the 34th Street Wonderland Creek Culvert shall be removed by Xcel Energy. The existing gas main in Iris Avenue will be removed by Xcel forces once the new main is in service. Xcel Energy forces shall be responsible for the relocation, reconnection, and/or extension of all existing gas service lines to the new gas main. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.
- Sta. WC 65+08 to WC 65+32 RT & Sta. WC 65+31 to WC 66+14 RT: Xcel Energy forces shall be responsible for the relocation of approximately 95 feet of existing 3" gas main in Iris Avenue near the intersection with Bridger Trail to accommodate the proposed Bridger Trail box culvert. Work in this area shall also include the relocation of approximately 47 feet of gas service line to 3333 Iris Avenue. This service line is approximately 100 feet east of the intersection of Iris Avenue and Bridger Trail. The relocation of this service line will accommodate the proposed Iris box culvert and sanitary sewer line 1. The existing gas main in Iris Avenue will be removed by Xcel forces once the new main is in service. Xcel Energy forces shall be responsible for the relocation, reconnection, and/or extension of all existing gas service lines to the new gas main. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 10 working days to complete.
- Sta. WC 69+57 to WC 69+63 RT & LT: Xcel Energy forces shall be responsible for the relocation of approximately 93 feet of existing gas service line of unknown size running from Iris Avenue north to a private property between Bridger Trail and Chisholm Trail. This relocation is intended to accommodate the proposed concrete retaining wall #11 and Wonderland Creek channel grading. The existing gas service line will be removed by Xcel forces once the new main is in service. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid

  Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 5 working days to complete.

UTILITIES

- Sta. WC 212+66 to WC 212+98 RT & LT: Xcel Energy forces shall be responsible for the relocation of approximately 66 feet of existing 2" gas main in Kalmia Avenue near and under the existing Kalmia Avenue crossing of Wonderland Creek. The relocation is intended to accommodate the proposed Kalmia Avenue culvert and underpass. The Contractor shall be responsible for the removal of the existing Kalmia Avenue culvert prior to the gas line relocation and lowering. The abandoned main shall be removed by Xcel Energy where it is in conflict with proposed work. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces during the reconstruction of the Kalmia Avenue culverts. This work is expected to be coordinated with construction and take 2 working days to complete.
- Sta. WC 212+68 to WC 212+77 RT: Xcel Energy forces shall be responsible for the possible relocation of approximately 16 feet of existing 2" gas main to the north Kalmia Avenue directly to the south of the Kalmia Avenue intersection with Island Drive. The relocation is intended to accommodate the proposed storm sewer system located at the Kalmia Avenue and Island Drive intersection. The existing gas main in this area will be abandoned in place once the new main is in service. The abandoned main shall be removed by Xcel Energy where it is in conflict with proposed work. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 3 working days to complete.
- Sta. WC 226+32 to WC 226+59 RT & LT: Xcel Energy forces shall be responsible for the relocation of approximately 65 feet of existing 4" gas main along the west side of 28th Street directly south of the intersection with Winding Trail Drive. The relocation is intended to accommodate the proposed 28th Street culvert and underpass and retaining wall #26. The Contractor shall be responsible for the excavation to the subgrade elevation of the 28th Street culvert prior to the gas line relocation and lowering. The existing gas main in 28th Street will be abandoned in place once the new main is in service. The abandoned main shall be removed by Xcel Energy where it is in conflict with proposed work. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces during the construction of the 28th Street culverts. This work is expected to be coordinated with construction and take 3 working days to complete.

- Sta. WC 227+18 to WC 229+05 LT: Xcel Energy forces shall be responsible for the relocation of approximately 205 feet of existing1 ¼" gas main along the south bank of Wonderland Creek between Winding Trail Drive and 28th Street. The relocation is intended to accommodate the proposed Wonderland Creek channel grading, storm sewer 26, and concrete retaining walls #30, #31, and #32. Additional utility relocations are necessary in this area and possibilities for a joint trench exist at the option of Xcel Energy. The existing gas main along the southern bank will be abandoned in place once the new main is in service. The abandoned main shall be removed by the Contractor where it is in conflict with proposed work. Xcel Energy forces shall be responsible for the relocation, reconnection, and/or extension of all existing gas service lines to the new gas main. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.
- Sta. WC 226+33 to WC 229+61 RT & LT: Xcel Energy forces shall be responsible for the possible relocation of approximately 74 feet of existing 3" gas main along the east side Winding Trail Drive in the area of the existing Winding Trail Drive crossing of Wonderland Creek. The relocation is intended to accommodate the removal and replacement of Winding Trail Drive culvert over Wonderland Creek. The existing gas main in Winding Trail Drive will be abandoned in place once the new main is in service. The abandoned main shall be removed by Xcel Energy where it is in conflict with proposed work. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid Xcel Energy in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces during the construction of the Winding Trail Drive culverts. This work is expected to be coordinated with construction and take 3 working days to complete.
- Monitor work adjacent to existing facilities.

Century Link

- Sta. WC 56+01 to WC 56+82 RT: CenturyLink forces shall be responsible for the relocation of approximately 83 feet of existing buried telephone line and one telephone riser / pedestal along the northern bank of Wonderland Creek, approximately 240 feet upstream of the Wonderland Creek crossing of Spring Creek Place. This relocation is to accommodate the proposed Wonderland Creek channel grading. The existing line and equipment shall be removed by CenturyLink. CenturyLink forces shall also be responsible for the relocation, reconnection, and/or extension of all existing phone service lines to the new line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid CenturyLink in locating their facilities. It is anticipated that this work will be completed by CenturyLink forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.

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- Sta. WC 58+57 to WC 60+28 RT: CenturyLink forces shall be responsible for the possible relocation of approximately 205 feet of existing buried telephone line along the northern bank of Wonderland Creek, beginning approximately 260 feet east and 70 feet south of the intersection of Iris Avenue and 34th Street and ending approximately 380 feet east and 210 feet south of the intersection. CenturyLink forces will confirm that their existing line can be or is adequately protected during the excavation and the construction of the Wonderland Creek retaining wall #7 by the Contractor. If a conflict arises or is expected, CenturyLink forces shall relocate the telephone line and coordinate the exact

  location of relocated facilities in the field during construction with the Contractor. CenturyLink forces will work with the Contractor to protect or relocate these facilities as required. CenturyLink forces shall also be responsible for the relocation, reconnection, and/or extension of all existing telephone service lines to the new line. The Contractor shall provide survey information for proposed improvements to aid CenturyLink in locating their facilities. It is anticipated that this work will be completed by CenturyLink forces during construction by the Contractor and take 15 working days to complete.
- Sta. WC 61+13 to WC 61+30 RT & LT: CenturyLink forces shall be responsible for the relocation of approximately 64 feet of existing buried telephone line crossing Wonderland Creek approximately 140 feet downstream of the 34th Street crossing of Wonderland Creek. This relocation is to accommodate the proposed Wonderland Creek channel regarding and retaining all #8. The existing line shall be abandoned by CenturyLink once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. CenturyLink forces shall also be responsible for the relocation, reconnection, and/or extension of all existing phone service lines to the new line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid CenturyLink in locating their facilities. It is anticipated that this work will be completed by CenturyLink forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.
- Sta. WC 61+67 to WC 71+21 RT & LT & Sta. WC 64+17 to WC 64+33 RT & Sta. WC 65+99 RT & LT: CenturyLink forces shall be responsible for the relocation of approximately 710 feet of existing buried fiber optic ducts and lines in Iris Avenue from approximately 82 feet east of the Iris Avenue intersection with 34th Street and ending approximately 600 feet west of the intersection. This relocation will require adjustment of the manhole rim at the west end of the relocation. This quantity of relocation includes a fiber optic line which breaks off of the Iris Avenue Line and continues south along Bridger Trail. Approximately 11 feet of buried telephone line shall be relocated to the east of 3333 Iris Avenue. A telephone riser at this relocation will also require relocation. These relocations are intended to accommodate the proposed Iris box culvert storm sewer improvements as well as the construction of retaining walls #10 and #11.The existing fiber optic ducts and lines in Iris Avenue and Bridger Trail will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. CenturyLink forces shall also be responsible for the relocation, reconnection, and/or extension of all fiber optic service lines to the new Iris Avenue and Bridger Trail fiber optic line. The proposed relocations shall be

UTILITIES

coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid CenturyLink in locating their facilities. It is anticipated that this work will be completed by CenturyLink forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 30 working days to complete. Due to the complexity of the work and the level of effort required to relocate these facilities the Contractor shall provide CenturyLink with 90 days written notice prior to required construction.

- Sta. WC 68+81 to WC 70+92 LT : CenturyLink forces shall be responsible for the relocation of approximately 223 feet of existing buried telephone line along the northern edge of Iris Avenue beginning approximately 90 feet east of the Iris Avenue intersection with Chisholm Trail and continuing approximately 220 feet east to a telephone manhole. A telephone riser associated with this line will need to be relocated. The telephone manhole shall be adjusted to match final grades. This relocation is necessary due to the construction of retaining wall #11. The existing telephone line in this area will be abandoned in place once the new line is in service. The abandoned line be removed by the Contractor where it is in conflict with proposed work. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid CenturyLink in locating their facilities. It is anticipated that this work will be completed by CenturyLink forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.
- Sta. WC 205+12 to WC 205+27 LT: CenturyLink forces shall be responsible for the relocation of approximately 44 feet of existing buried telephone line and the associated telephone riser located directly to the southwest of the Fire Access Bridge across Wonderland Creek, approximately 750 feet downstream of the Wonderland Creek crossing of Kalmia Avenue. The relocation is intended to accommodate the proposed retaining wall #13. The existing telephone line in this area will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. CenturyLink forces shall also be responsible for the relocation, reconnection, and/or extension of all existing phone service lines to the new line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid CenturyLink in locating their facilities. It is anticipated that this work will be completed by CenturyLink forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.
- Sta. WC 209+12 to WC 209+39 RT & LT: CenturyLink forces shall be responsible for the relocation of approximately 100 feet of existing buried telephone line crossing the Wonderland Creek channel near the location of the existing low flow pedestrian crossing, approximately 345 feet downstream of the Wonderland Creek crossing of Kalmia Avenue. The relocation is intended to accommodate the proposed retaining wall #14 along the southern channel bank and a series of boulder retaining walls along the northern bank. The existing telephone line in this area will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. CenturyLink forces shall also be responsible for the

relocation, reconnection, and/or extension of all existing phone service lines to the new line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid CenturyLink in locating their facilities. It is anticipated that this work will be completed by CenturyLink forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.

- Sta. WC 226+33 to WC 226+79 RT & LT: CenturyLink forces shall be responsible for the relocation of approximately 135 feet of existing buried telephone line and two associate telephone risers located on the east side of 28th Street, to the southwest of the 28th Street and Winding Trail intersection. The relocation is needed to accommodate the proposed 28th Street underpass, retaining wall #26, and sidewalk improvements. The existing telephone line will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. CenturyLink forces shall remove the abandoned risers. If CenturyLink relocates the risers to the east side of the proposed sidewalk improvements the improvements shall be flush with the ground surface due to the close proximity to 28th Street. The Contractor shall remove the concrete retaining walls surrounding the existing risers. CenturyLink forces shall also be responsible for the relocation, reconnection, and/or extension of all existing telephone service lines to the new 28th Street line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid CenturyLink in locating their facilities. It is anticipated that this work will be completed by CenturyLink forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 10 working days to complete. Please note that the telephone risers in conflict are also in conflict with the City of Boulder's 28th Street Multi-use Path project. This Wonderland Creek project represents the final configuration of this area.
- Sta. WC 226+63 to WC 227+15 RT & LT: CenturyLink forces shall be responsible for the relocation of approximately 107 feet of existing buried telephone line crossing Wonderland Creek near the intersection of Winding Trail Drive and 28th Street. The telephone line appear to originate from the telephone riser along the western edge of 28th Street, approximately 100 feet south of the intersection and terminates at a telephone riser along the southern bank of Wonderland Creek near the Winding Trail Village condominiums. The relocation is intended to accommodate the proposed Wonderland Creek channel grading, the 28th Street underpass, as well as retaining walls #26 and #30. The existing telephone line crossing the channel will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. CenturyLink forces shall also be responsible for the relocation, reconnection, and/or extension of all existing telephone service lines to the new telephone line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid CenturyLink in locating their facilities. It is anticipated that this work will be completed by CenturyLink forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.

- Sta. WC 227+18 to WC 229+05 LT: CenturyLink forces shall be responsible for the relocation of approximately 206 feet of existing buried telephone line along the south bank of Wonderland Creek between Winding Trail Drive and 28th Street. The relocation is intended to accommodate the proposed Wonderland Creek channel grading, storm sewer 26, and concrete retaining walls #30, #31, and #32. Additional utility relocations are necessary in this area and possibilities for a joint trench exist at the option of CenturyLink. The existing telephone line along the southern bank will be abandoned in place once the new main is in service. The abandoned main shall be removed by the

  Contractor where it is in conflict with proposed work. CenturyLink forces shall be responsible for the relocation, reconnection, and/or extension of all existing telephone service lines to the new telephone line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed improvements to aid CenturyLink in locating their facilities. It is anticipated that this work will be completed by CenturyLink forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.
- Monitor work adjacent to existing facilities.

Level 3

Sta. BWRD 10+07 to 14+12 LT: **:** Level 3 forces shall be responsible for the relocation of approximately 109 feet of existing buried fiber optic line located along the eastern edge of the BNSF railroad line within the BNSF right of way approximately 350 feet south of the Foothills Parkway Bridge over the BNSF railroad. The relocation shall consist of a lowering of the existing fiber optic line. This relocation is to accommodate the proposed BNSF Bridge over the proposed Wonderland Creek channel. In addition, the relocation shall account for the construction of retaining wall #1 and the multi-use path canopy in the area of the proposed BNSF Bridge. The proposed relocation shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for the relevant area project improvements. It is anticipated that this work will be completed by Level 3 forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete. The Contractor shall provide Level 3 with 60 days written notice prior to required construction. The cost of this work is reimbursable through a reimbursement agreement with the City of Boulder separate from the project budget.

UTILITIES

Comcast

- Sta. BWRD 10+09 to 14+08 LT: Comcast forces shall be responsible for the relocation of approximately 134 feet of existing buried fiber optic line and one fiber optic pull box including the associated marker post. The line to be relocated originates at a pull box directly south east of Talisman Place, runs southeast under the BNSF Railroad bridge for the Boulder and White rock Ditch and continues south to a pull box located to the south of the entrance to the Foothills Parkway Wonderland Creek box culverts. The portion to be relocated is located on the east side of the BNSF railroad embankment to the southern pull box. This relocation is to accommodate the proposed Wonderland Creek channel grading, retaining wall #1, waterline #1 improvements, and storm sewer #1 modifications. The existing fiber optic lines will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete. Due to the complexity of the work and anticipated need for coordination with the BNSF Railroad to relocate these facilities, the Contractor shall provide Comcast with 90 days written notice prior to required construction.
- Sta. WC 58+16 to WC 59+29 LT: Comcast forces shall be responsible for the relocation of approximately 113 feet of existing buried cable line located along the southern bank of Wonderland Creek approximately 330 feet downstream of the 34th Street crossing of Wonderland Creek. This relocation is to accommodate the proposed Wonderland Creek channel grading and a boulder retaining wall. The existing line shall be abandoned by Comcast once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. Comcast forces shall also be responsible for the relocation, reconnection, and/or extension of all existing cable service lines to the new line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 3 working days to complete.
- Sta. WC 58+57 to WC 60+28 RT: Comcast forces shall be responsible for the possible relocation of approximately 205 feet of existing buried cable line along the northern bank of Wonderland Creek, beginning approximately 260 feet east and 70 feet south of the intersection of Iris Avenue and 34th Street and ending approximately 380 feet east and 210 feet south of the intersection. Comcast forces will confirm that their existing line can be or is adequately protected during the excavation and the construction of the Wonderland Creek retaining wall #7 by the Contractor. If a conflict arises or is expected, Comcast forces shall relocate the cable line and coordinate the exact location of relocated facilities in the field during construction with the Contractor. Comcast forces will work with the Contractor to protect or relocate these facilities as required. Comcast forces shall be responsible for the relocation, reconnection, and/or extension of all existing cable

service lines to the new line. If necessary the Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces during construction by the Contractor and take 5 working days to complete

- Sta. WC 62+32 to WC 62+46 RT: Comcast forces shall be responsible for the relocation of approximately 41 feet of existing buried cable line originating at the power pole located on the southeast corner of Iris Avenue and 34th Street and continuing south along the east side of 34th Street. The relocation is needed due to the construction of the Iris box culvert as well as retaining wall #8. It is possible that Xcel Energy will remove and reset this power pole due to the construction of these improvements. If the power pole is removed and reset Comcast forces shall be responsible for relocating the Arial lines attached to this pole as necessary. The existing buried cable line in this area will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. Comcast forces shall be responsible for the relocation, reconnection, and/or extension of all existing cable service lines to the new line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 3 working days to complete.
- Sta. WC 64+17 to WC 64+33 RT: Xcel Energy forces shall be responsible for the relocation of the power pole located on the north side of Iris Avenue between 3333 and 3393 Iris Avenue and approximately 65 feet of overhead electric line attached to this pole. Comcast forces shall be responsible for the relocation of approximately 65 feet of aerial cable line associated with this power pole. The relocation of the pole and lines is needed due to the construction of the Iris culvert storm sewer improvements. The proposed relocation shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. Comcast forces shall be responsible for the relocation, reconnection, and/or extension of all existing cable service lines to the new line. The Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 5 working days to complete.
- Sta. WC 65+64 to WC 66+58 RT: Comcast forces shall be responsible for the relocation of approximately 153 feet of existing buried fiber optic line originating at the power pole on the southeast corner if Iris Avenue and Bridger Trail, continuing north across Iris Avenue, heading west to a pull box, and then heading north along the western edge of the 3333 Iris Avenue property. This relocation is intended to accommodate the proposed Iris box culvert and Bridger Trail box culvert. The fiber optic pull box shall be relocated with the line. The existing fiber optic line will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. The relocated pull box shall be removed by Comcast forces. Comcast forces shall be responsible for the relocation, reconnection, and/or extension of all fiber optic service lines to the new fiber optic line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The

UTILITIES

Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 10 working days to complete.

- Sta. WC 68+04 RT & LT: Comcast forces shall be responsible for the relocation of approximately 83 feet of existing buried cable line running north from Iris Avenue to a private property between Bridger Trail and Chisholm Trail. This relocation is approximately 190 feet west of the Iris Avenue and Bridger Trail intersection. The relocation is intended to accommodate the proposed Wonderland Creek channel grading. The existing cable line in this area will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Xcel Energy forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 5 working days to complete.
- Sta. WC 210+64 to WC 212+75 LT: Comcast forces shall be responsible for the possible relocation of approximately 221 feet of existing buried cable line located along the western bank of Wonderland Creek, downstream (south) of the Kalmia Avenue crossing of Wonderland Creek. The existing cable line originates from a power pole on Kalmia Avenue approximately 92 feet west of the Kalmia Avenue crossing of Wonderland Creek and continues south along Wonderland Creek before being redirected west to provide service to the Aspen Grove condominiums. The line appears to be in a joint trench with an Xcel Energy electric line. The relocation is needed due to the construction of retaining wall #14 as well as storm sewer #20. Comcast forces will confirm that their existing line can be or is adequately protected during the excavation and the construction of the Wonderland Creek retaining wall #14 by the Contractor. If a conflict arises or is expected, Comcast forces shall relocate the cable line and coordinate the exact locations of relocated facilities in the field during construction with the Contractor. Comcast forces will work with the Contractor to protect or relocate these facilities as required. Comcast forces shall be responsible for the relocation, reconnection, and/or extension of all existing cable service lines to the new line. If necessary the Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces during construction by the Contractor and take 5 working days to complete.
- Sta. WC 212+53 to WC 212+62 RT: Comcast forces shall be responsible for the possible relocation of approximately 14 feet of existing buried cable line to the north of Kalmia Avenue, directly to the south of the Kalmia Avenue intersection with Island Drive. The relocation is intended to accommodate proposed storm sewer #21 located at the Kalmia Avenue and Island Drive intersection. Comcast forces will confirm that their existing line can be or is adequately protected during the excavation and the construction of the storm sewer by the Contractor. If a conflict arises or is expected, Comcast forces shall relocate the cable line and coordinate the exact locations of relocated facilities in the field during construction with the Contractor. Comcast forces will work with the Contractor to protect or relocate these facilities as required. Comcast forces shall be responsible for the

relocation, reconnection, and/or extension of all existing cable service lines to the new line. If necessary the Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces during construction by the Contractor and take 3 working days to complete.

- Sta. WC 226+25 to WC 226+51 RT & LT: Comcast forces shall be responsible for the relocation of approximately 65 feet of existing buried cable line and one cable riser located on the east side of 28th Street to the southwest of the 28th Street and Winding Trail intersection. The relocation is needed to accommodate the proposed 28th Street underpass, retaining wall #26, and sidewalk improvements. The existing cable line will be abandoned in place once the new line is in service. The abandoned line shall be removed by the Contractor where it is in conflict with proposed work. Comcast forces shall remove the abandoned riser. If Comcast relocates the riser to the east side of the proposed sidewalk improvements the improvements shall be flush with the ground surface due to the close proximity to 28th Street. Comcast forces shall be responsible for the relocation, reconnection, and/or extension of all existing cable service lines to the new 28th Street line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 5 working days to complete. Please note that the cable riser in conflict is also in conflict with the City of Boulder's 28th Street Multi-use Path project. The Wonderland Creek project represents the final configuration of this area.
- Sta. WC 227+18 to WC 229+05 LT & Sta. WC 228+35 to WC 228+37 LT: Comcast forces shall be responsible for the relocation of approximately 206 feet of existing buried cable line along the south bank of Wonderland Creek between Winding Trail Drive and 28th Street. The relocation is intended to accommodate the proposed Wonderland Creek channel grading, storm sewer 26, and concrete retaining walls #30, #31, and #32. This relocation shall also include the relocation of approximately 37 feet of existing buried cable line connecting to the previously mentioned south bank line between the condominiums at 3785 Birchwood Drive and 3775 Birchwood Drive. Additional utility relocations are necessary in this area and possibilities for a joint trench exist at the option of Comcast. The existing cable line along the southern bank and the line between the two condos will be abandoned in place once the new main is in service. The abandoned lines shall be removed by the Contractor where it is in conflict with proposed work. Comcast forces shall be responsible for the relocation, reconnection, and/or extension of all existing cable service lines to the new cable line. The proposed relocations shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces prior to construction by the Contractor. If this work is not completed before construction begins, it is expected to be coordinated with construction and take 15 working days to complete.

UTILITIES

- Sta. WC 229+02 to WC 229+36 RT & LT: Comcast forces shall be responsible for the relocation of approximately 120 feet of existing telephone beginning on the north side of 3785 Birchwood Drive continuing northwest to cross over Wonderland Creek at Winding Trail Drive and then continuing northeast along the northern bank of Wonderland Creek. The relocation is necessary due to the removal and replacement of the existing Wonderland Creek crossing and the construction of retaining wall #32. The existing telephone line in Winding Trail Drive will be abandoned in place once the new main is in service. The abandoned main shall be removed by the Contractor where it is in conflict with proposed work. The proposed relocation shall be coordinated with the Contractor to ensure all potential conflicts are eliminated. The Contractor shall provide survey information for proposed project improvements to aid Comcast in locating their facilities. It is anticipated that this work will be completed by Comcast forces during construction by the Contractor. The work is expected to take 5 working days to complete.
- Monitor work adjacent to existing facilities.

Left Hand Water District

- Sta. WC 213+00 RT & LT: A 1" waterline owned by Left Hand Water District runs along the north side of Kalmia Avenue in the area of the Wonderland Creek project. It is understood that this waterline no longer provides service to customers west of the project location and can be abandoned to the west of the intersection of Kalmia Avenue and Island Drive. Left Hand shall be responsible for operating valves, removing, capping, and installing thrust blocks for the waterline as necessary in the area of the proposed reconstruction of the Kalmia culverts for Wonderland Creek as well as at the intersection of Kalmia Avenue and Island Drive. The Contractor shall provide Left Hand Water District with 48 hours advance notice for any prior to the need for any cutting and capping of the waterline. Left Hand Water District shall provide staff to observe and perform the work and conduct shutoffs at its own cost.
- Monitor work adjacent to existing facilities.

GENERAL:

The Contractor shall comply with Article 1.5 of Title 9, CRS ("Excavation Requirements") when excavation or grading is planned in the area of underground utility facilities. The Contractor shall notify all affected utilities at least three (3) business days prior to commencing such operations. Contact the Utility Notification Center of Colorado (UNCC) to have locations of UNCC registered lines marked by its member companies. To contact UNCC the Contractor shall call 1-800-922-1987. All other underground facilities shall be located by contacting the respective company. Utility service laterals shall also be located prior to beginning excavating or grading.

The location of utility facilities as shown on the Plan and Profile and Utility Sheets in the plans, and herein described, were obtained from the best available information. It shall be the Contractor's responsibility to field-verify both the horizontal and vertical locations of all existing and proposed utilities prior to commencing construction and to notify the engineer of any discrepancy.

UTILITIES

All costs incidental to the foregoing requirements will not be paid for separately but shall be included in the work. Additional excavation required to correct conflicts with existing and/or proposed utilities, as directed by the engineer, will not be paid for separately but shall be included in the work.

COLORADO DEPARTMENT OF TRANSPORTATION **ANTI-COLLUSION AFFIDAVIT**	PROJECT NO. LOCATION

I hereby attest that I am the person responsible within my firm for the final decision as to the price(s) and amount of this bid or, if not, that I have written authorization, enclosed herewith, from that person to make the statements set out below on his or her behalf and on behalf of my firm.

I further attest that:

1. The price(s) and amount of this bid have been arrived at independently, without consultation, communication or agreement for the purpose or with the effect of restricting competition with any other firm or person who is a bidder or potential prime bidder.

2A. Neither the price(s) nor the amount of this bid have been disclosed to any other firm or person who is a bidder or potential prime bidder on this project, and will not be so disclosed prior to bid opening.

2B. Neither the prices nor the amount of the bid of any other firm or person who is a bidder or potential prime bidder on this project have been disclosed to me or my firm.

3A. No attempt has been made to solicit, cause or induce any firm or person who is a bidder or potential prime bidder to refrain from bidding on this project, or to submit a bid higher than the bid of this firm, or any intentionally high or non-competitive bid or other form of complementary bid.

3B. No agreement has been promised or solicited for any other firm or person who is a bidder or potential prime bidder on this project to submit an intentionally high, noncompetitive or other form of complementary bid on this project.

4. The bid of my firm is made in good faith and not pursuant to any consultation, communication, agreement or discussion with, or inducement or solicitation by or from any firm or person to submit any intentionally high, noncompetitive or other form of complementary bid.

5. My firm has not offered or entered into a subcontract or agreement regarding the purchase or sale of materials or services from any firm or person, or offered, promised or paid cash or anything of value to any firm or person, whether in connection with this or any other project, in consideration for an agreement or promise by any firm or person to refrain from bidding or to submit any intentionally high, noncompetitive or other form of complementary bid or agreeing or promising to do so on this project.

6. My firm has not accepted or been promised any subcontract or agreement regarding the sale of materials or services to any firm or person, and has not been promised or paid cash or anything of value by any firm or person, whether in connection with this or any other project, in consideration for my firm's submitting any intentionally high, noncompetitive or other form of complementary bid, or agreeing or promising to do so, on this project.

7. I have made a diligent inquiry of all members, officers, employees, and agents of my firm with responsibilities relating to the preparation, approval or submission of my firm's bid on this project and have been advised by each of them that he or she has not participated in any communication, consultation, discussion, agreement, collusion, or other conduct inconsistent with any of the statements and representations made in this affidavit.

8. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as a fraudulent concealment from the Colorado Department of Transportation, of the true facts relating to submission of bids for this contract.

I DECLARE UNDER PENALTY OF PERJURY IN THE SECOND DEGREE, AND ANY OTHER APPLICABLE STATE OR FEDERAL LAWS, THAT THE STATEMENTS MADE ON THIS DOCUMENT ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

Contractor's firm or company name	By	Date
	Title	
2nd contractor's firm or company name. (If joint venture.)	By	Date
	Title	

Sworn to before me this day of, 20

Notary Public	
My commission expires	
NOTE: This document must be signed in ink.	

COLORADO DEPARTMENT OF TRANSPORTATION

BIDDERS LIST

Project Name and Number	Project Code	Proposal Date	Contractor	Region

Subcontractors/Suppliers/Vendors: The bidder must list all firms seeking to participate on the contract. This information is used by the Colorado Department of Transportation (CDOT) to determine overall goals for the Disadvantaged Business Enterprise Program. Failure to submit this form may result in the proposal being rejected.

Firm Name	Email	Work Proposed (Select all that apply)	DBE (Y/N)	Selected (Y/N)

I certify that the information provided herein is true and correct to the best of my knowledge.

Name	Signature/Initials	Title	Date

Work Proposed Categories:

1. *Materials and Supplies*
2. *Flagging and Traffic Control*
3. *Trucking and Hauling*
4. *Precast Concrete, Foundations, and Footings*
5. *Concrete Paving, Flatwork and Repair*
6. *Lighting and Electrical*
7. *Signs, Signal Installation, and Guardrail*
8. *Fencing*
9. *Buildings and Vertical Structures*
10. *Utility, Water and Sewer Lines*
11. *Structural Steel and Steel Reinforcement*
12. *Riprap and Anchored Retaining Walls*
13. *Landscape and Erosion Control*
14. *Bridge and Bridge Deck Construction*
15. *Asphalt Paving*
16. *Road and Parking Lot Marking*
17. *Chip Seal, Crack Seal, Joint Seal and Crack Fill*
18. *Bridge Painting and Coating*
19. *Stairway and Ornamental Metal*
20. *Parking Lots and Commercial Sidewalks*
21. *Clearing, Demolition, Excavation and Earthwork*
22. *Engineering and Surveying Services*
23. *Public Relations and Involvement*
24. *Piles and Deep Foundations*
25. *Waste Management and Recycling*
26. *Site Clean Up*
27. *Mechanical and HVAC*
28. *Tunnel Construction*
29. *Profiling and Grinding*
30. *Environmental Health and Safety*

This form must be submitted by the proposal deadline. For CDOT projects, submit to cdot_hq_dbeforms@state.co.us.

COLORADO DEPARTMENT OF TRANSPORTATION

ANTICIPATED DBE PARTICIPATION PLAN

Bidder:		Project:	
Contact:		Project Code:	
Phone:		Date of Proposal:	
Email:		Contract Goal:	
Preferred Contact Method:		Region:	

DBE Commitments

DBE Firm Name	Work to Be Performed	Commitment Amount	Eligible Participation
		Total Eligible Participation	
		Total Bid Amount	
		Total Eligible Participation Percentage	

Bidder Signature

This section must be signed by an individual with the authority to bind the Bidder. By signing this form, as an authorized representative of the Bidder, you declare under penalty of perjury in the second degree and any other applicable state or federal laws that the statements made in this document are true and complete to the best your knowledge. Further, you attest that you have read the Standard Special Provision Disadvantaged Business Enterprise Requirements and understand the following:

CDOT shall not award a contract until it has been determined that the contract goal has been met or that you have otherwise demonstrated good cause. Once your proposal has been submitted, commitments may not be modified or terminated without the approval of CDOT. If selected as the lowest apparent bidder, you shall submit a Form 1415 for each commitment listed above. If you have not met the contract goal, you will also be required to submit documentation of all good faith efforts to meet the contract goal.

It is your responsibility to ensure that the selected DBEs are certified for the work to be performed and that their eligible participation has been properly counted. For additional information and instructions on calculating eligible participation, see the Standard Special Provision Disadvantaged Business Enterprise Requirements.

Name	Title	Signature	Date

This form must be submitted by the proposal deadline. For CDOT projects, submit to cdot_hq_dbeforms@state.co.us.

COLORADO DEPARTMENT OF TRANSPORTATION

CONTRACTORS PERFORMANCE CAPABILITY STATEMENT

Project #

1. List names of partnerships or joint ventures ☐ none

_____

_____

_____

2. List decreases in the contractors fiscal or workmanship qualifications compared to the last prequalification statement submitted to CDOT. (Attach additional sheets if necessary.)

a. Key personnel changes ☐ none

_____

_____

_____

b. Key equipment changes ☐ none

_____

_____

_____

c. Fiscal capability changes (legal actions, etc.) ☐ none

_____

_____

_____

d. Other changes that may effect the contractors ability to perform work. ☐ none

_____

_____

_____

_____

I DECLARE UNDER PENALTY OF PERJURY IN THE SECOND DEGREE, AND ANY OTHER APPLICABLE STATE OR FEDERAL LAWS, THAT THE STATEMENTS MADE ON THIS DOCUMENT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE

Contractor's firm or company name	By	Date
	Title	

2nd Contractor's firm or company name (if joint venture)	By	Date
	Title	

COLORADO DEPARTMENT OF TRANSPORTATION

ASSIGNMENT OF ANTITRUST CLAIMS

PROJECT NO.

Contractor and Colorado Department of Transportation (CDOT) recognize that in actual economic practice antitrust violations ultimately impact on CDOT. Therefore, for good cause and as consideration for executing this contract and for receiving payments hereunder:

1. Contractor hereby irrevocably assigns to CDOT any and all claims it may now have or which may hereafter accrue to it under federal or state antitrust laws in connection with the particular project, goods or services purchased or acquired by CDOT pursuant to this contract.

2. Contractor hereby expressly agrees:

   a. That, upon becoming aware that a third party has commenced a civil action asserting on Contractor's behalf an antitrust claim which has been assigned to CDOT hereunder, Contractor shall immediately advise in writing:
      (1) Such third party that the antitrust claim has been assigned to CDOT, and
      (2) CDOT that such civil action is pending and of the date on which, in accordance with subparagraph a. (1) above, Contractor notified such third party that the antitrust claim had been assigned to CDOT;
   b. To take no action which will in any way diminish the value of the claims or rights assigned or dedicated to CDOT hereunder; and
   c. Promptly to pay over to CDOT its proper share of any payment under an antitrust claim brought on Contractor's behalf by any third party and which claim has been assigned to CDOT hereunder.

3. Further, Contractor agrees that in the event it hires one or more subcontractors to perform any of its duties under the contract, Contractor shall require that each such subcontractor:

   a. Irrevocably assign to CDOT (as a third party beneficiary) any and all claims that such subcontractor may have or which may thereafter accrue to the subcontractor under federal or state antitrust laws in connection with any goods or services provided by the subcontractor in carrying out the subcontractor's obligations to Contractor;
   b. Upon becoming aware that a third party has commenced a civil action on the subcontractor's behalf asserting an antitrust claim which has been assigned to CDOT hereunder, shall immediately advise in writing:
      (1) Such third party that the antitrust claim has been assigned to CDOT, and
      (2) Contractor and CDOT that such civil action is pending and of the date on which, in accordance with subparagraph b. (1) above, the subcontractor notified such third party that the antitrust claim had been assigned to CDOT;
   c. Take no action which will in any way diminish the value of the claims or rights assigned or dedicated to CDOT hereunder; and
   d. Promptly pay over to CDOT its proper share of any payment under an antitrust claim brought on the subcontractor's behalf by any third party and which claim has been assigned or dedicated to CDOT pursuant hereto.

I, acting in my capacity as officer of a bidder (bidders if a joint venture) do agree to the above assignment of antitrust claims.

Contractor's firm or company name	By	Date
	Title	
2nd contractor's firm or company name. (If joint venture.)	By	Date
	Title	

COLORADO DEPARTMENT OF TRANSPORTATION

COMMITMENT CONFIRMATION

SECTION 1. This section must be completed by the Contractor.

Project:		Project Code:	
Bidder/Contractor:		Phone:	
Contact:		Email:	
DBE Firm Name:		DBE Phone:	
DBE Address:		DBE Email:	

Commitment Details

Category	Work to be Performed	DBE Work Code(s)	Commitment Amount	Eligible Participation
Construction				
Trucking				
Supplies				
Services				
		Total		

This section must be signed by an individual with the power to contractually bind the Bidder/Contractor. You declare under penalty of perjury in the second degree and any other applicable state or federal laws that the statements made in this document are complete, true and accurate to the best of your knowledge.

Bidder/Contractor Representative	Title	Signature	Date

SECTION 2. This section must be completed by the DBE. (Attach additional pages if necessary).

This document is not a contract with the Bidder/Contractor; it is an acknowledgement of the obligation that the Bidder/Contractor is making to CDOT. The amounts listed above may be less than the subcontractor or purchase order amount, but can never be more, and shall not reflect any mark up by the Bidder/Contractor. **All questions must be answered.**

Are you contracting directly with the Bidder/Contractor or with one of its subcontractors? If with a subcontractor, provide the firm name.	
Will you be purchasing supplies or materials or leasing or renting equipment from the Bidder/Contractor or its subcontractors? If so, explain.	
Do you intend to subcontract any portion of the work listed above? If yes, state to which firms, what work and the approximate amount. Include trucking subcontractors and owner-operators.	
Will you be providing trucking services on this project? If so, state how many of your own trucks and employees you will have on this project.	
Who within your firm will be supervising and responsible for your firm's work on this project?	
Will you be acting as a broker on this project? If so, state what you will be brokering and your approximate brokerage fee.	
Will you be acting as a supplier on this project? If so, please state what you will be supplying and whether you will manufacture the items.	

This section must be signed by an individual with the power to contractually bind the DBE. You declare under penalty of perjury in the second degree and any other applicable state or federal laws that the statements made in this document are complete, true and to the best of your knowledge. You attest that you are eligible to participate as a DBE on this contract for the work listed above and have the capacity to perform the work as stated.

DBE Representative	Title	Signature	Date

See the DBE Standard Special provision for additional information on completing and submitting this form.

Pre-award CDOT projects: Submit this form to the CDOT Civil Rights and Business Resource Center via fax to (303)757-9019. All originals must be sent to: CDOT Civil Rights and Business Resource Center, 4201 E. Arkansas Ave. Room 150, Denver, CO 80222.

Pre-award local agency projects: Submit this form to the local agency. All originals must be sent to: CDOT Civil Rights and Business Resource Center, 4201 E. Arkansas Ave. Room 150, Denver, CO 80222.

COLORADO DEPARTMENT OF TRANSPORTATION

GOOD FAITH EFFORT REPORT

Section 1. Contractor and Project Information

Bidder:		Project:	
Address:		Project Code:	
Contact Name:		Proposal Amount:	
Contact Phone:		Contract Goal Percentage:	
Contact Email:		Contract Goal Dollar Value:	

Section 2. Efforts to Achieve DBE Participation. Attach a narrative that answers the questions below and complete Page 2 (Subcontractor Quote Summary). Provide any supporting documentation which demonstrates your good faith efforts.

a. Describe your overall plan or approach to meeting the contract goal. Include how much and what work you intend to self-perform; how much and what work you intend to subcontract; what work areas were identified as subcontracting opportunities for DBEs; and the approximate number of DBEs per area.

b. Describe your efforts to obtain DBE participation (i.e. how you attempted to execute your plan or approach to meeting the contract goal). Include direct outreach (state the DBE solicited, date(s) and method of phone, email or fax); indirect outreach such as events, publications, and/or communication with minority and other organizations that you conducted to reach DBEs (state date(s), location and audience); other efforts you made to assist DBEs in competing for or obtaining contracts (accepting quotes from DBEs that may be higher than other subcontractors, modifications to contract scopes, unbundling, mentoring, etc.); and obstacles you encountered in assisting or contracting with DBEs. Cost alone shall not be a reason to reject a DBE and will be considered in the evaluation of Page 2.

c. If the eligible participation submitted on the Form 1414 was miscalculated, determined to be invalid, or otherwise did not meet the contract goal, provide your justification for such deficiencies and the remedies you have taken or intend to take to avoid the issue in the future. If you have obtained any additional commitments since submission of the bid, attach the Form 1415(s) and the reason why such commitments were not obtained prior to the proposal due date.

Section 3. Affidavit of Good Faith Efforts. The Bidder must show that it took all necessary and reasonable steps to achieve the DBE contract goal which by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if not fully successful. 49 CFR Part 26, Appendix A sets forth examples and guidance for good faith efforts. The contractor is not limited to the examples provided in 49 CFR Part 26, Appendix A and may provide any documentation that demonstrates good faith efforts to obtain DBE participation on this contract.

If, at any time, CDOT has reason to believe that any person or firm has willfully and knowingly provided incorrect information or made false statements, CDOT may initiate suspension or debarment proceedings against the person or firm under 49 CFR Part 29, take enforcement action under 49 CFR Part 31, Program Fraud and Civil Remedies, and/or refer the matter to the Department of Justice or Office of the Inspector General for criminal prosecution under 18 U.S.C. 1001, which prohibits false statements in Federal program.

By signing below, the Bidder hereby affirms that it has made good faith efforts and has documented all such efforts in this form and the attached supporting documentation.

I, _____, am the _____ of _____.

Representative Name Title Company

I have the authority to make this affidavit for and on behalf of my company. All information provided herein and attached as evidence of my company's good faith efforts is true and accurate to the best of my belief.

_____ _____

Signature Date

Notarization: Must be completed by a licensed notary.

County of _____ State of _____

Subscribed and sworn before me this _____ day of _____

Notary Signature _____

Notary Address _____

_____

SEAL

CDOT projects: Submit this form and all supporting documentation to the CDOT Civil Rights and Business Resource Center via fax to (303)757-9019. All originals must be sent to: CDOT Civil Rights and Business Resource Center, 4201 E. Arkansas Ave. Room 150, Denver, CO 80222.

Local agency projects: Submit this form and all supporting documentation to the local agency. All originals must be sent to: CDOT Civil Rights and Business Resource Center, 4201 E. Arkansas Ave. Room 150, Denver, CO 80222.

Subcontractor Quote Summary (Attach additional pages if necessary.)

Subcontractor	DBE (Y/N)	Work Type(s)	Quote Amount	Selected (Y/N)	Reason

CTL | THOMPSON INCORPORATED

GEOTECHNICAL INVESTIGATION
BNSF RAILWAY BRIDGE (BRIDGE ID 0476-31.85) AND WONDERLAND CREEK IMPROVEMENTS SOUTH OF TALISMAN COURT AND TALISMAN PLACE BOULDER, COLORADO

Prepared For:

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Attention: Jim Watt, P.E.

Project No. DN46,992-125

January 24, 2014
Revised February 5, 2014

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SCOPE

This report presents the results of our Geotechnical Investigation for the planned BNSF Railway Bridge (Bridge ID 0476-31.85) and Wonderland Creek improvements south Talisman Court and Talisman Place in Boulder, Colorado (Fig. 1). The purpose of our investigation was to evaluate subsurface conditions and provide geotechnical design and construction criteria for this portion of the project. The scope was described in our Service Agreement (DN 11-0125R2-CM2) dated October 30, 2013.

This report was prepared from data developed during field exploration, field and laboratory testing, engineering analysis, previous investigations and experience with similar conditions. It includes descriptions of subsoil and bedrock conditions and groundwater levels found in our exploratory borings and discussions on design and construction of the planned improvements as influenced by geotechnical considerations. The recommendations presented in this report are based upon construction as currently planned. We should be contacted to review our recommendations if plans change. A brief summary of our conclusions and recommendations follows with detailed design criteria are presented within the report.

SUMMARY OF CONCLUSIONS

1. Subsoils encountered in our borings generally consisted of nil to about 19.5 feet of fill and natural sandy clay underlain by weathered and comparatively unweathered claystone bedrock to the maximum depth explored of 35 feet. Testing indicates the near-surface soils and bedrock are generally non-expansive or low swelling. Comparatively unweathered bedrock was estimated between elevations 5261 to 5272 feet (Fig. 2).

2. Groundwater was found in 4 borings during drilling at depths of about 6 to 32 feet. When the holes were checked after drilling, water levels were measured in all borings at depths of 3.5 to 12.2 feet, or elevations 5272 to 5283 feet (Fig. 3). We anticipate excavations will penetrate groundwater and temporary construction dewatering and stabili-

zation of excavation bottoms may be necessary. These issues are discussed in the report. Groundwater may fluctuate seasonally and rise in response to seasonal fluctuations, landscape irrigation and water levels in the creek and ditch.

3. We believe the soils penetrated by our exploratory borings can generally be excavated with typical heavy-duty construction equipment. On-site soils are suitable for re-use in new fills provided they are substantially free of debris, vegetation/organics and other deleterious materials, moisture conditioned and compacted as discussed in **SITE DEVELOPMENT**.

4. The bridge abutment and pier foundations can be constructed using steel H-piles driven to refusal in bedrock. Footings can be used for wing walls provided the foundations are protected from scour and undermining during flood stage events. Abutments and wing walls should be designed to resist lateral earth pressures as discussed in the report.

5. Surface drainage should be designed, constructed, and maintained to provide rapid removal of surface water runoff away from structures. Water should not be allowed to pond adjacent to foundations or on flatwork.

SITE CONDITIONS

The reach of Wonderland Creek to be improved is located at the eastern end of Phase I between Spring Creek Place and Foothills Parkway (Highway 157) in Boulder, Colorado (Fig. 1). The Boulder and Whiterock Ditch (BWRD) flows northeast along the west side of the railway. The existing BNSF railway heads northeast through the site and crosses over the creek and ditch. Upstream flow from the creek exits a culvert under Spring Creek Place and enters an open channel, then heads below the railway and Foothills Highway by a culvert. We understand flow from the creek spills over into the Boulder and Whiterock Ditch just west of the railway. The new BNSF Railway Bridge is planned about 200 feet south of Talisman Court and Talisman Place. The existing and proposed site conditions are shown on Fig. 1.

This portion of Wonderland Creek is a southeasterly trending drainage and the BWRD heads northeast. The ground surface slopes down gently to the south-

east. Both the creek and channel appeared to be degraded and unstable, as evidenced by steep side slopes and down-cutting due to erosion. There is heavy bushes, trees and other vegetation along the banks. Some debris was also observed on the banks and around the channel.

PREVIOUS INVESTIGATION

Our firm performed a Geotechnical Investigation for the Wonderland Creek Improvements between 34th Street and the subject reach under our Project No. DN45,648-145 (report dated November 23, 2011). We drilled one boring during the previous study which was about 400 feet northwest from the planned BNSF Railway Bridge. We found sandy to very sandy clay and interlayered clay/sand, over weathered and comparatively unweathered claystone. Groundwater was found at a depth of about 5 feet below the ground surface. Pertinent data from the previous investigation were considered in preparation of this report.

PROPOSED CONSTRUCTION

Plans indicate the project will consist of improving Wonderland Creek, redirecting the BWRD to the west of the existing ditch, constructing a 100-year overflow spillway and a new railway bridge to accommodate the existing tracks. The new railway bridge will be a 76-foot long span over the new spillway. New trails will be constructed which tie the existing trails together on the west and east sides of the site, with trail crossings over the creek and ditch and a path below the railway bridge. The purpose of the project is to complete mitigation measures to contain the flood flow, separate Wonderland Creek flow from the Boulder and Whiterock Ditch and construct a multi-use trail. In addition, the project will aim to enhance surrounding wetlands and relieve some of the flooding observed in the downstream subdivisions. We assume driven H-piles or drilled piers bottomed in bedrock are preferred foundation types for the bridge. There will be intermediate piers and each must have a minimum capacity of 250 tons.

INVESTIGATION

We investigated subsurface conditions by drilling five exploratory borings at the approximate locations shown on Fig. 1. We attempted to drill as close to the planned bridge as possible. Boring locations were determined by a representative of our firm using plans provided and referencing site features and landmarks, and elevations were determined by level surveying relative to the temporary benchmarks shown on Fig. 1. The borings were drilled to depths of 25 to 35 feet using continuous-flight, solid-stem auger. TH-3 and TH-4 were drilled using 3-inch diameter auger and a limited-access drill rig and the remaining borings were drilled with 4-inch diameter auger and a truck-mounted drill rig. Samples were obtained at 5-foot intervals using a 2.5-inch diameter (O.D.) modified California barrel sampler driven by blows of a 140-pound hammer falling 30 inches. Our field representative was present to observe drilling operations, log the soil and bedrock encountered, and obtain samples for laboratory tests. Upon completion of drilling, hand-slotted PVC pipe was inserted in the holes to facilitate delayed water level measurements. Summary logs of the exploratory borings including results of field penetration resistance tests and a portion of laboratory test results are presented in Fig. 4.

Samples were returned to our laboratory where they were examined by our engineer and laboratory tests were assigned. Laboratory tests included dry density, moisture content, particle-size analysis (gradation, hydrometer and percent silt and clay-sized particles passing the No. 200 sieve), Atterberg limits, unconfined compression, swell-consolidation and water-soluble sulfate concentration. Swell-consolidation tests were performed by wetting the samples under approximate overburden pressures (the weight of the overlying soil). Laboratory test results are presented in Appendix A and summarized in Table A-I.

SUBSURFACE CONDITIONS

Strata encountered in our exploratory borings generally consisted of nil to about 7 feet of sand and clay fill and about 5 to 12.5 feet of natural sandy clay underlain by weathered and comparatively unweathered claystone bedrock to the maximum depth explored of 35 feet. Some pertinent engineering characteristics of the soil and bedrock are described below.

We found about 5 to 7 feet of fill at the ground surface in all borings except TH-5. The fill consisted of sandy to very sandy clay and clayey to very clayey sand. Some asphalt debris and organic material was observed in the 4-foot drive sample from TH-2. The fill was medium stiff to very stiff or loose to medium dense based on field penetration resistance test results. Two fill samples contained 33 and 38 percent silt and clay-sized particles.

Natural soils generally consisted of sandy to very sandy, silty clay and very clayey sand with some gravel. The clay was medium stiff to very stiff. Three samples contained 48 to 85 percent silt and clay-sized particles and one showed moderate plasticity with a liquid limit of 36 and plasticity index of 20. Two samples had unconfined compressive strengths of about 4,400 and 4,800 psf. A clay sample swelled 1.1 percent when wetted.

Claystone bedrock was found at the ground surface in TH-5 and at depths of about 4 to 19.5 feet in TH-1 through TH-4. Weathered layers were about 5 and 16 feet thick in TH-3 and TH-5, respectively. Comparatively unweathered bedrock was found between elevations 5261 and 5272 feet, as shown on Fig. 2. The bedrock was weathered to very hard. Three claystone samples swelled 0.2 to 4.3 percent when wetted. Two samples contained 97 and 99 percent silt and clay-sized particles and showed moderate to high plasticity with liquid limits of 40 and 61 and plasticity indices of 20 and 40, respectively. Three samples had unconfined compressive

strengths of about 10,700 to 15,200 psf. Permeability of the claystone is expected to be negligible.

Groundwater was encountered during drilling in all borings except TH-2 at depths of about 6 to 32 feet below the existing ground surface. When the holes were checked after drilling on January 21, 2014, water levels were measured in every boring at depths of 3.5 to 12.2 feet, or elevations 5273 to 5283 feet as shown on Fig. 3. Excavations will likely penetrate groundwater and temporary construction dewatering and stabilization of excavation bottoms may be necessary. Water levels may fluctuate seasonally and rise in response to precipitation, landscape irrigation and water levels in the creek and ditch.

SITE DEVELOPMENT

Excavations

We believe the soils penetrated by our exploratory borings can generally be excavated with typical heavy-duty construction equipment. We recommend the owner and the contractor become familiar with applicable local, state and federal safety regulations, including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Based on our investigation and OSHA standards, we anticipate the soils will classify as Type B or C soils. Based on OSHA regulations, maximum slope inclinations of 1:1 and 1.5:1 (horizontal:vertical) for Type B and C soils may be used for temporary excavations in dry conditions, respectively. Flatter slopes, possibly as flat as 6:1, will be necessary below groundwater or where seepage is present. Excavation slopes specified by OSHA are dependent upon soil types and groundwater conditions encountered. The contractor's "competent person" should identify the soils in the excavations and refer to OSHA standards to determine appropriate slopes. Stockpiles of soil and equipment should not be placed within a horizontal distance equal to one-half the excava-

tion depth, from the edge of the excavation. A registered professional engineer should design excavations greater than 20 feet deep.

Soft, wet soils are likely to be present in excavations. These soils may slough to slopes of about 6:1 or shallower. This could impact efficiency of the contractor's work. They should be prepared to deal with soft and/or wet soil conditions. The bottoms of excavations can be stabilized by crowding crushed rock into the excavation bottom such that when compactive effort is applied it does not deform more than about 1 to 2 inches. Acceptable rock materials include, but are not limited to No. 2 and No. 57 rock, or 1 to 3 inch recycled concrete. Crushed rock on a layer of woven geofabric or geosynthetic grid can also be used, and should reduce the amount of aggregate needed to achieve stable subgrade. Typically, a biaxially woven fabric such as Mirafi 600x (or equal) or geogrid (such as Tensar BX1100 or equal) topped with 8 to 12 inches of crushed rock will provide a stable working surface. If available, crushed recycled concrete is a good choice. The actual need for, and elements of subgrade stabilization should be determined at the time of construction. Bedding material can consist of ASTM C33 No. 57 or 67 Coarse Concrete Aggregate mixed 50/50 with No. 8 Sand-Gravel.

Fill and Backfill

On-site soils are suitable for re-use as new fill provided debris, vegetation/organics and other deleterious materials are substantially removed prior to placement. Soil particles larger than 3 inches and cobbles larger than 6 inches should be broken down or removed prior to fill placement. Very moist or saturated soils should not be used as fill. If imported fill material is required, it should ideally be similar to on-site materials. A sample of import material should be submitted to our office for approval prior to placement.

Prior to fill placement debris, vegetation/organics and deleterious matter should be substantially removed from areas to receive fill. Areas to receive fill should

be scarified to a depth of 8 inches prior to fill placement and moisture conditioned according to the specifications below. Fill should be placed in thin (8 inches or less) loose lifts, moisture conditioned to within 2 percent of optimum moisture content and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698). Placement and compaction of fill and backfill should be observed and tested by a representative of our firm during construction.

Our experience indicates fill and backfill can settle, even if properly compacted to the criteria provided above. Factors that influence the amount of settlement are depth of fill, soil type, degree of compaction, and time. The length of time for the compression to occur can be a few weeks to several years. The degree of compression of fill under its own weight will likely range from low for granular soils (1 percent or less), moderate for clay/sand mixtures (1 to 2 percent) to high for claystone and highly plastic clay fills (greater than 2 percent). Any improvements placed over backfill should be designed to accommodate movement.

Permanent slopes should be stable at inclinations of 3:1 (horizontal to vertical). Shallower slopes can decrease erosion from run-off and sheet-flow. If increased resistance to erosion is desired, the soils can be stabilized with an additive such as portland cement. The detrimental properties can include difficulty of re-vegetation, chemical leaching and high cost. Should the owner wish to consider chemical stabilization of a portion of the fill soils, we should perform tests to determine the most appropriate additive and amount. As an alternative, seeding and re-vegetation can also be used to reduce erosion.

Dewatering

We anticipate excavations will penetrate groundwater and temporary construction dewatering systems may be needed. Current groundwater levels are expected to be at the lower end of seasonal variations and levels could be higher than our measurements. Groundwater levels may fluctuate seasonally and rise in

response to precipitation, landscape irrigation and water levels in the creek and ditch, both of which were dry during our investigation.

Several methods can be considered to temporarily dewater excavations. Well points or cased wells outside the excavation are alternatives commonly used to lower groundwater levels. Excavations that extend only a foot or two into groundwater can often be dewatered using sumps about 3 feet below grade, where the water is pumped down through the soils before being discharged.

The City and County of Boulder and/or The Colorado Department of Public Health and Environment may require dewatering permits. Our experience indicates periodic environmental testing is usually required with these permits, with reporting. Permitting requirements may also influence the construction schedule. We recommend researching these requirements and permit processing times well before dewatering begins.

FOUNDATIONS

To avoid problems with scour undermining foundations, and to allow high-unit structural loading with little deflection, we recommend the bridge be constructed on steel H-piles driven to refusal in the bedrock. Drilled piers bottomed in bedrock can also be used but would likely be more difficult to install. Design and construction criteria for driven piles are presented below. Additional design and installation criteria presented in the “Standard Specifications for Road and Bridge Construction” of the Colorado Department of Transportation (CDOT) should also be followed.

Design criteria are presented in terms of allowable working stress for driven piles because they will refuse in hard bedrock and their capacity will be determined based on the structural capacity of the pile. These criteria include un-quantified safety factors that have proven adequate in practice over the past 40 years or so.

Recent full-scale load tests conducted by and for CDOT imply factors of safety are not more conservative than normally required for adequate performance.

Driven Steel H-Piles

1. All piles should be driven to “practical refusal” into the bedrock. Practical refusal is defined as penetration of 1-inch or less for the final ten blows with a hammer that has the minimum manufacturer’s rated energy for the chosen pile size. Other pile and hammer combinations are possible. To reduce the risk of damaging piles during driving, the rated hammer energy divided by the cross-sectional area of the steel pile should not be greater than 2,500 foot-pounds per square inch.

2. A Pile Driving Analyzer (PDA) should be used during installation of each pile to establish driving criteria that will prevent pile damage.

3. We recommend using HP piles with a hardened driving shoe. If practical refusal is encountered above the rock surface, jetting or auguring should be used to advance the pile to the top of the bedrock. After jetting or auguring, the piles should be driven to practical refusal in the bedrock.

4. For piles driven to refusal in the bedrock, the compression load capacity will be controlled by the structural capacity of the pile. We recommend using an allowable stress of 9 kips per square inch (ksi) times the steel cross-sectional area of the pile to estimate the pile compression load capacity. Larger or smaller piles may be appropriate for the loading conditions.

5. The tension design load for piles can be estimated assuming a skin friction of 1,000 psf for the portion of piles in overburden soils.

6. All piles selected and provided by the contractor should be capable of withstanding the stresses induced by shipping, handling and mobilization. Reinforcement of the tip of the piles is recommended to reduce the risk of damage to the pile.

7. It is estimated the piles will penetrate from 1 to 9 feet into the bedrock depending upon the weathering conditions of the bedrock surface. This will result in pile lengths of about 20 to 30 feet below current grade. Refer to Fig. 2 for an estimate of the elevation of the comparatively unweathered bedrock.

8. Installation of driven piles should be observed by a representative of our firm to verify driving resistance, penetration, hammer performance and subsurface conditions. We recommend pile driving records be kept for all piles installed.

Pile Foundation Lateral-Load Analysis

Deep foundations will be designed to resist lateral loads applied to the structure through wind, trains, seismic, and lateral earth pressures. Several methods are available to analyze laterally loaded piles. The computer program LPILE developed by Reese can be used to calculate deflections for the various H-Piles and loading conditions anticipated by the structural engineer. Moment versus depth curves are developed from these analyses. If you desire, we can assist with these analysis after the structural engineer has developed representative loading criteria. Recommended soils/bedrock criteria for use with the LPILE program are as follows:

SOIL INPUT DATA FOR "LPILE"

	Clay	Bedrock
Density (pci)	0.069	0.072
Cohesion, C (psi)	15	55
Friction Angle, φ (Degrees)	0	0
ε_{50} (in/in)	0.006	0.004
Ks (pci)	800	1,000
Kc (pci)	300	2,000

The ε_{50} represents the strain corresponding to 50 percent of the maximum principal stress difference. K is the modulus of subgrade reaction used by the program to generate the slope of initial portion of the "P-Y Curves". The bedrock can be modeled as a stiff clay without free water in “LPILE”.

Closely Spaced Pile Reduction Factors

For axial loading, a minimum spacing of 3 diameters is recommended. At one diameter (piless touching) the skin friction load reduction factor for both piles would be 0.7. End bearing values would not be reduced. Interpolation can be used between 1 and 3 diameters.

Piers in-line with the direction of lateral loads should have a minimum spacing of 6 diameters (center-to-center) based upon the larger pile. If a closer spacing is required, the modulus of subgrade reaction for initial and trailing piers should be reduced. At a spacing of 3 diameters, the effective modulus of subgrade reaction of the lead pier can be estimated by multiplying the given modulus by 0.6; for trailing piles in a line at 3 diameter spacing, the factor is 0.4. Linear interpolation can be used for spacing between 3 and 6 diameters.

Reductions to the modulus of subgrade reaction can be accomplished in LPILE by inputting the appropriate modification factors for p-y curves. Reducing the modulus of subgrade reaction in trailing piles will result in greater computed deflections on these piles. In groups, the pile cap will force deflections of all piles to be equal. Load-defection graphs can be generated for each pile using the appropriate p-multiplier values. The sum of the piles lateral load resistance at selected deflections can be used to develop a total lateral load versus deflection graph for the system of piles.

For lateral loads perpendicular to the line of piles a minimum spacing of 3 diameters can be used with no capacity reduction. At one diameter (piles touching) the piers can be analyzed as one unit. Interpolation can be used for intermediate conditions.

Abutment Lateral Loads

For integral abutments, thermal movement (expansion and contraction) of the bridge deck or super-structure will deflect abutments and result in lateral earth pressures behind the abutment walls that vary between passive and active condition. We believe the passive lateral earth pressure should be used in design. The lateral earth pressure is dependent upon the soil type, compaction and slope of backfill, the geometry and friction between the wall and backfill, and the magnitude and direction of the wall deflections. If compacted on-site sandy clay is used as backfill, we recommend a friction angle of 30 degrees be used to calculate the appropriate lateral earth pressures in the design of the abutments. If CDOT Class 1 Structural Backfill is used as backfill, we recommend a friction angle of 34 degrees be used. For the lateral earth pressure calculation, “AASHTO Standard Specifications for Highway Bridges” may be referred. We recommend a bulk density of 130 pcf be assumed for the backfill behind the abutments. We can assist with calculations provided the details of the abutment geometry and backfill material are defined.

Wing Walls

Wing walls are likely on either side of each abutment. We recommend the wing walls be designed and constructed separate from the abutments and to be sufficiently flexible so “active” earth pressure conditions can be used in design. Generally, a cantilever type retaining wall with slip joints between the wall and abutment will meet these requirements.

Wing walls can be founded with spread footings constructed on the natural soils or compacted fill similar to the on-site soils, designed for a maximum allowable soil pressure of 3,000 psf. If soft or loose soils are encountered beneath the foundation, the foundation soils should be sub-excavated at least 2.5 feet deep and 2 feet laterally, and replaced with sand and gravel compacted to at least 95 percent of modified Proctor maximum dry density (AASHTO T 180, ASTM D 1557) and mois-

ture conditioned to within 2 percent of optimum moisture content. Flowable fill can also be used. A friction factor between concrete foundation and the foundation soils of 0.5 can be assumed to estimate sliding resistance. If a foundation key is required, the key can be designed using a design “passive” earth pressure calculated using 300 pcf equivalent fluid weight. We do not recommend the wing walls be designed using passive earth pressures from soils in front of the walls. The soils in front of the walls may be sloping away from the wall and could be eroded or scoured by the creek in the future.

The wing walls will be constructed in the slopes. The grades of the backfill behind the wing walls are anticipated to slope upwards. The lateral earth pressures are dependent on the type of backfill, the slope of the backfill, and other surcharge loads. The table below presents “active” equivalent fluid densities for on-site backfill at various slope ratios. These recommended values do not include allowances for the surcharge loads such as hydrostatic pressure, train loads, and loads from any adjacent structure or construction equipment. The backfill behind the walls should be compacted to at least 95 percent of modified Proctor maximum dry density (AASHTO T 180, ASTM D 1557).

RECOMMENDED DESIGN LATERAL EARTH PRESSURE FOR WING WALLS

BACKFILL SLOPE Granular Fill (Horizontal:Vertical)	EQUIVALENT FLUID DENSITY (pcf)
2:1	60
3:1	50
6:1	45
Level	40

The design lateral earth pressures presented above do not include a hydrostatic pressure. We recommend the retaining walls be designed for hydrostatic pressure or a wall drain system be installed behind walls to reduce the risk of devel-

oping hydrostatic pressures. A typical retaining wall drain is presented on Fig. 5. The drain should consist of a free-draining gravel layer and weep holes or slotted pipe to drain water from behind the walls. Miradrain or a similar manufactured drain can be used.

CONCRETE

Concrete in contact with soil can be subject to sulfate attack. We measured negligible water-soluble sulfate concentrations in two samples from this site. Sulfate concentrations less than 0.1 percent indicate Class 0 exposure to sulfate attack for concrete in contact with the subsoils, according to the American Concrete Institute (ACI) *Guide To Durable Concrete (ACI 201.2R-01)*. For this level of sulfate concentration, ACI indicates any type of cement can be used for concrete in contact with the subsoils. In our experience, superficial damage may occur to the exposed surfaces of highly permeable concrete, even though sulfate levels are relatively low. To control this risk and to resist freeze-thaw deterioration, the water-to-cementitious material ratio should not exceed 0.50 for concrete in contact with soils that are likely to stay moist due to surface drainage or high water tables. Concrete should have a total air content of 6 percent ± 1.5 percent.

DESIGN CONSULTATION AND CONSTRUCTION OBSERVATIONS

This report has been prepared for the exclusive use of Muller Engineering Company and the BNSF Railway for the purpose of providing geotechnical design and construction criteria for the portion of the project included. The information, conclusions, and recommendations presented herein are based upon the considerations of many factors including, but not limited to, the type of structure proposed, the geologic setting, and the subsurface conditions encountered. The conclusions and recommendations contained in the report are not valid for use by others. Standards of practice evolve in the area of geotechnical engineering. The recommendations provided are appropriate for about three years. If the proposed improvements are

not constructed within about three years or the proposed construction changes, we should be contacted to determine if we should update this report.

CTL | Thompson, Inc. should be retained to provide general review of the design construction plans prior to construction. Our firm should also provide geotechnical and materials observations and testing during construction. The purpose is to observe the construction with respect to the geotechnical design concepts, specifications or recommendations, and to facilitate design changes in areas where the subsurface conditions differ from those anticipated prior to start of construction. Excavations as well as placement and compaction of fill and backfill should be observed and tested. Installation of foundations and improvements should be observed. When construction schedules and quantities are defined, we can work with the owner's representatives to develop an appropriate scope of services and budget for construction monitoring.

GEOTECHNICAL RISK

The concept of risk is an important aspect with any geotechnical evaluation primarily because the methods used to develop geotechnical recommendations do not comprise an exact science. We never have complete knowledge of subsurface conditions. Our analysis must be tempered with engineering judgment and experience. Therefore, the recommendations presented in any geotechnical evaluation should not be considered risk-free. Our recommendations represent our judgment of those measures that are necessary to increase the chances that the structure will perform satisfactorily. It is critical that all recommendations in this report are followed.

LIMITATIONS

Our borings were spaced to obtain a reasonable evaluation of subsurface conditions. The borings are representative of soils encountered only at the exact

boring locations. Variations in the subsoil conditions not indicated by our borings are always possible. A representative of CTL | Thompson, Inc. should observe excavations, fill and backfill placement, installation of foundations and other improvements.

We believe this investigation was conducted with that level of skill and care normally used by geotechnical engineers practicing in this area at this time. No warranty, express or implied, is made. If we can be of further service in discussing the contents of this report or in the analysis of the influence of the subsoil conditions on design of the structures, please call.

CTL | THOMPSON, INC.

Christopher N. Bouchet, E.I.T.
Staff Engineer

Reviewed by:

David A. Glater, P.E., C.P.G.
Principal Geological Engineer

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CTL | THOMPSON, INC.

Christopher N. Bouchet, E.I.T.
Staff Engineer

Reviewed by:

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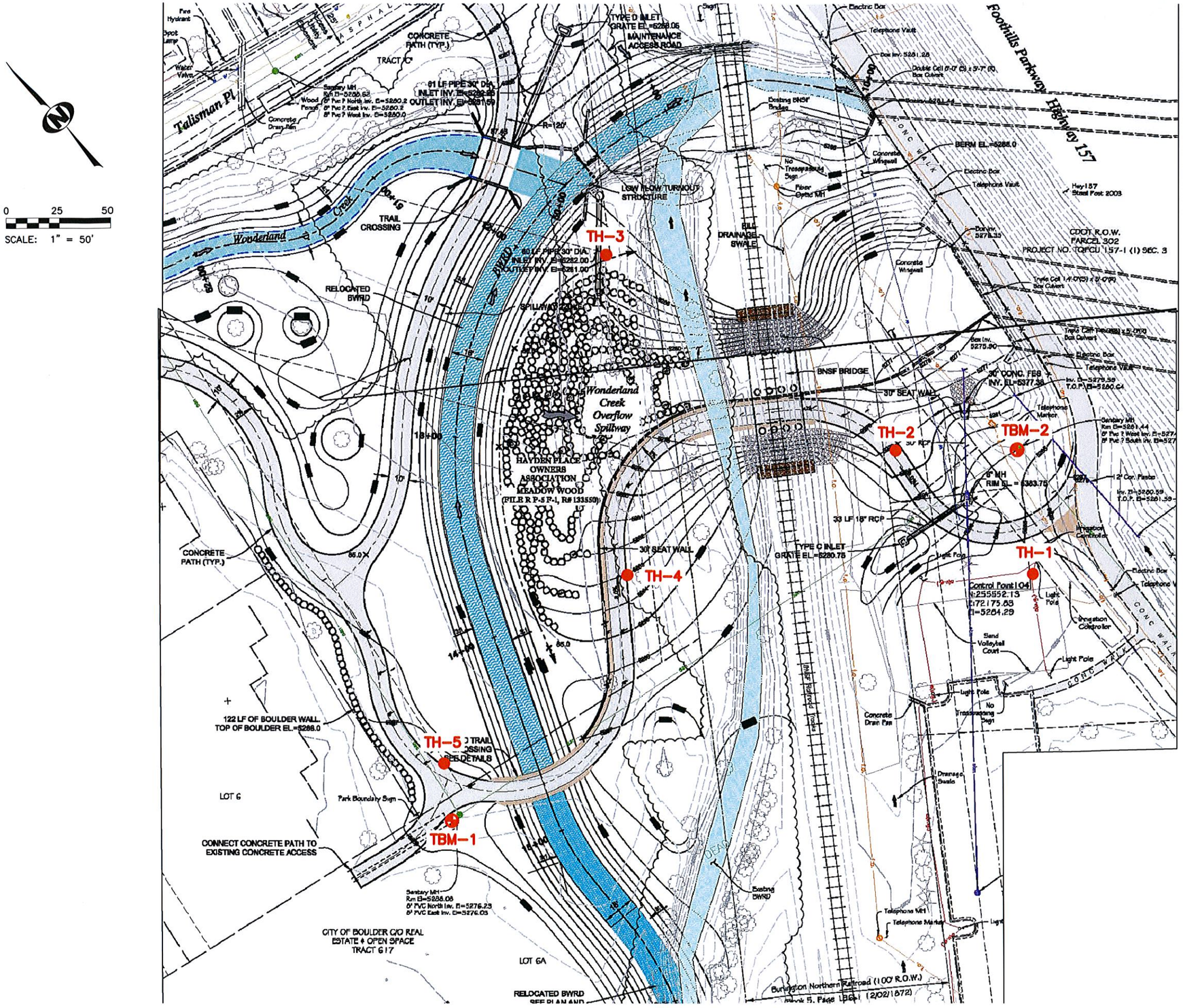
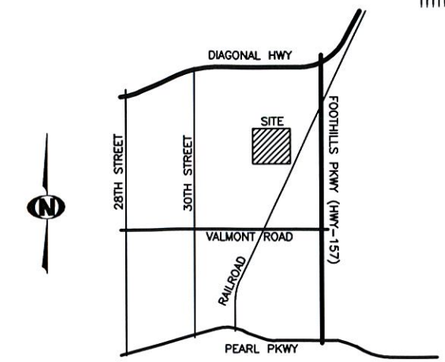
(3 copies)

Via e-mail: jwatt@mullereng.com





VICINITY MAP
NOT TO SCALE

LEGEND:

- **TH–1** APPROXIMATE LOCATION OF EXPLORATORY BORING
- **TBM–1** TEMPORARY BENCHMARK 1: SANITARY SEWER MANHOLE RIM (PLAN ELEV.=5288.1')
- **TBM–2** TEMPORARY BENCHMARK 2: SANITARY SEWER MANHOLE RIM (PLAN ELEV.=5281.4')

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BNSF RAILROAD BRIDGE (BRIDGE ID 0476-31.85) OVER WONDERLAND CREEK
Project No. DN46,992-125

Locations of Exploratory Borings

Fig. 1

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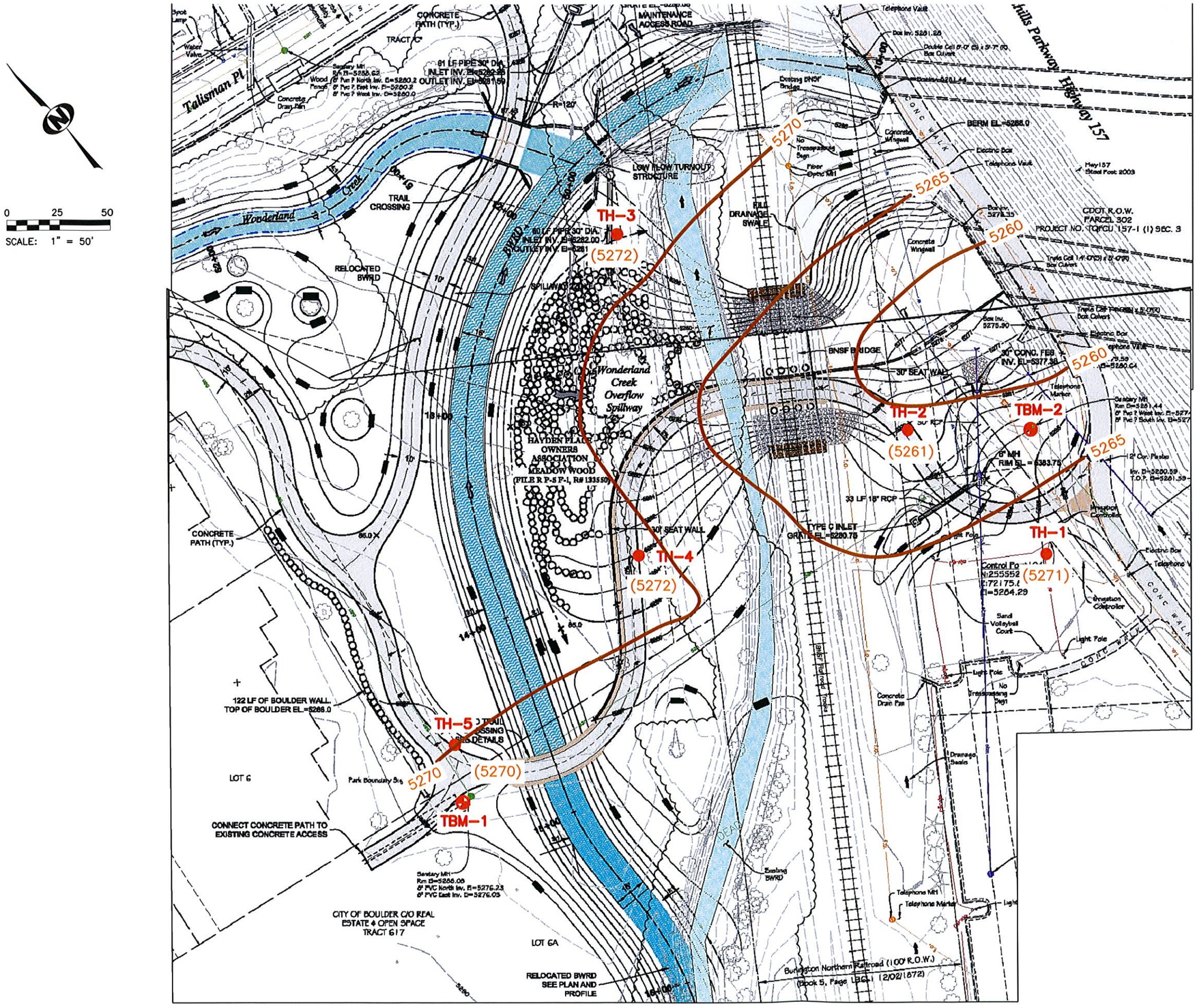

LEGEND:

TH-1	APPROXIMATE LOCATION OF EXPLORATORY BORING
TBM-1	TEMPORARY BENCHMARK 1: SANITARY SEWER MANHOLE RIM (PLAN ELEV.=5288.1')
TBM-2	TEMPORARY BENCHMARK 2: SANITARY SEWER MANHOLE RIM (PLAN ELEV.=5281.4')
(5267)	INDICATES ESTIMATED ELEVATION OF COMPARATIVELY UNWEATHERED BEDROCK AT BORING LOCATION (FEET)
5260	INDICATES ESTIMATED ELEVATION CONTOUR OF COMPARATIVELY UNWEATHERED BEDROCK (FEET)

NOTE:

THIS ESTIMATE WAS BASED UPON A SUBJECTIVE ANALYSIS OF DRILL HOLE DATA AND MAY NOT REFLECT LOCAL VARIATIONS.

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Project No. DN46,992-125

Estimated Elevation of Unweathered Bedrock

Fig. 2

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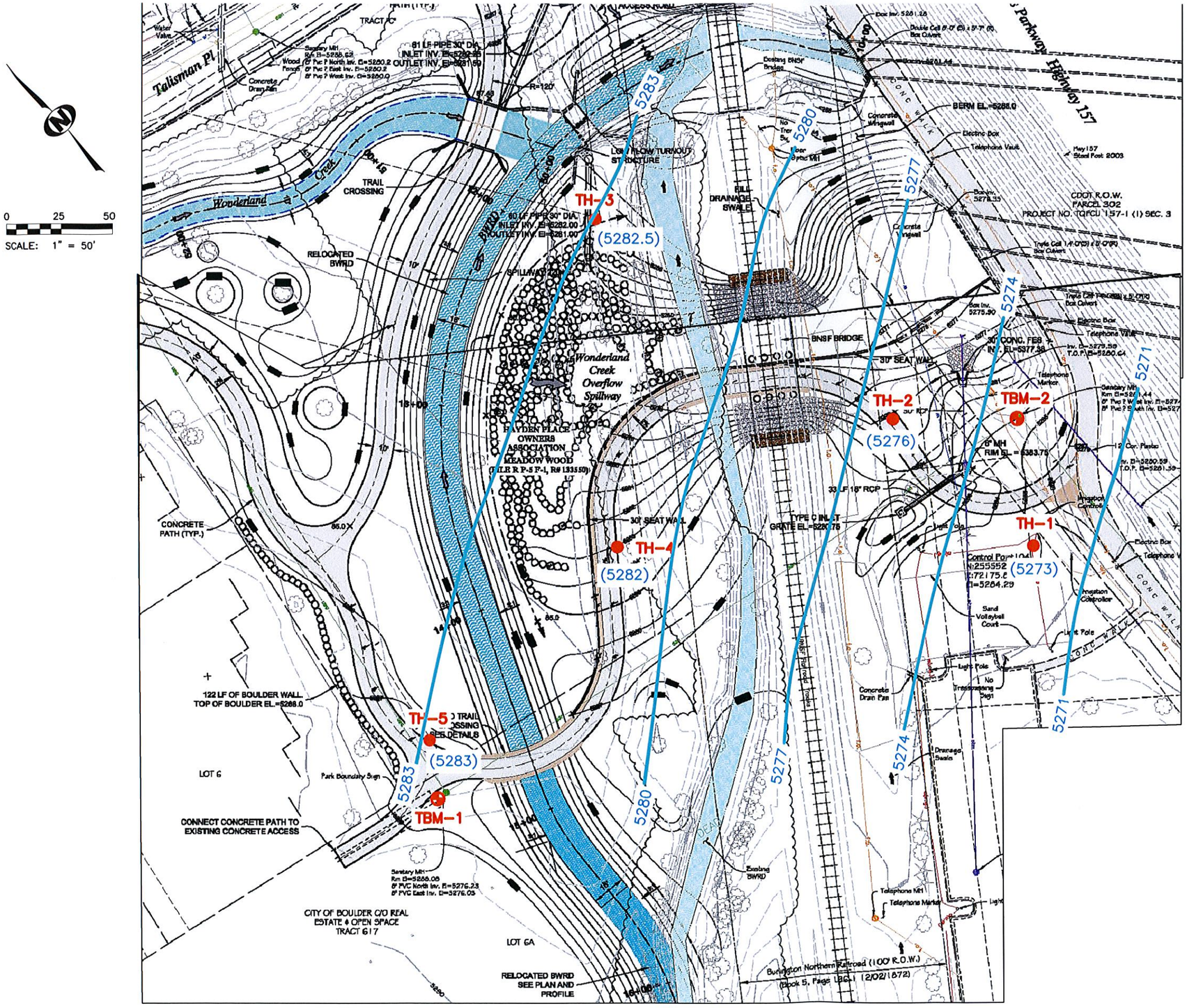

LEGEND:

TH-1 ●	APPROXIMATE LOCATION OF EXPLORATORY BORING
TBM-1 ⊕	TEMPORARY BENCHMARK 1: SANITARY SEWER MANHOLE RIM (PLAN ELEV.=5288.1')
TBM-2 ⊕	TEMPORARY BENCHMARK 2: SANITARY SEWER MANHOLE RIM (PLAN ELEV.=5281.4')
(5272.7)	INDICATES ESTIMATED GROUNDWATER ELEVATION AT BORING LOCATION (FEET)
5280	INDICATES ESTIMATED GROUNDWATER ELEVATION CONTOUR (FEET)

NOTE: THIS ESTIMATE WAS BASED UPON A SUBJECTIVE ANALYSIS OF DRILL HOLE DATA AND MAY NOT REFLECT LOCAL VARIATIONS AND SEASONAL FLUCTUATIONS.

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BNSF RAILROAD BRIDGE (BRIDGE ID 0476-31.85) OVER WONDERLAND CREEK
Project No. DN46,992-125

Estimated Groundwater Elevation

Fig. 3

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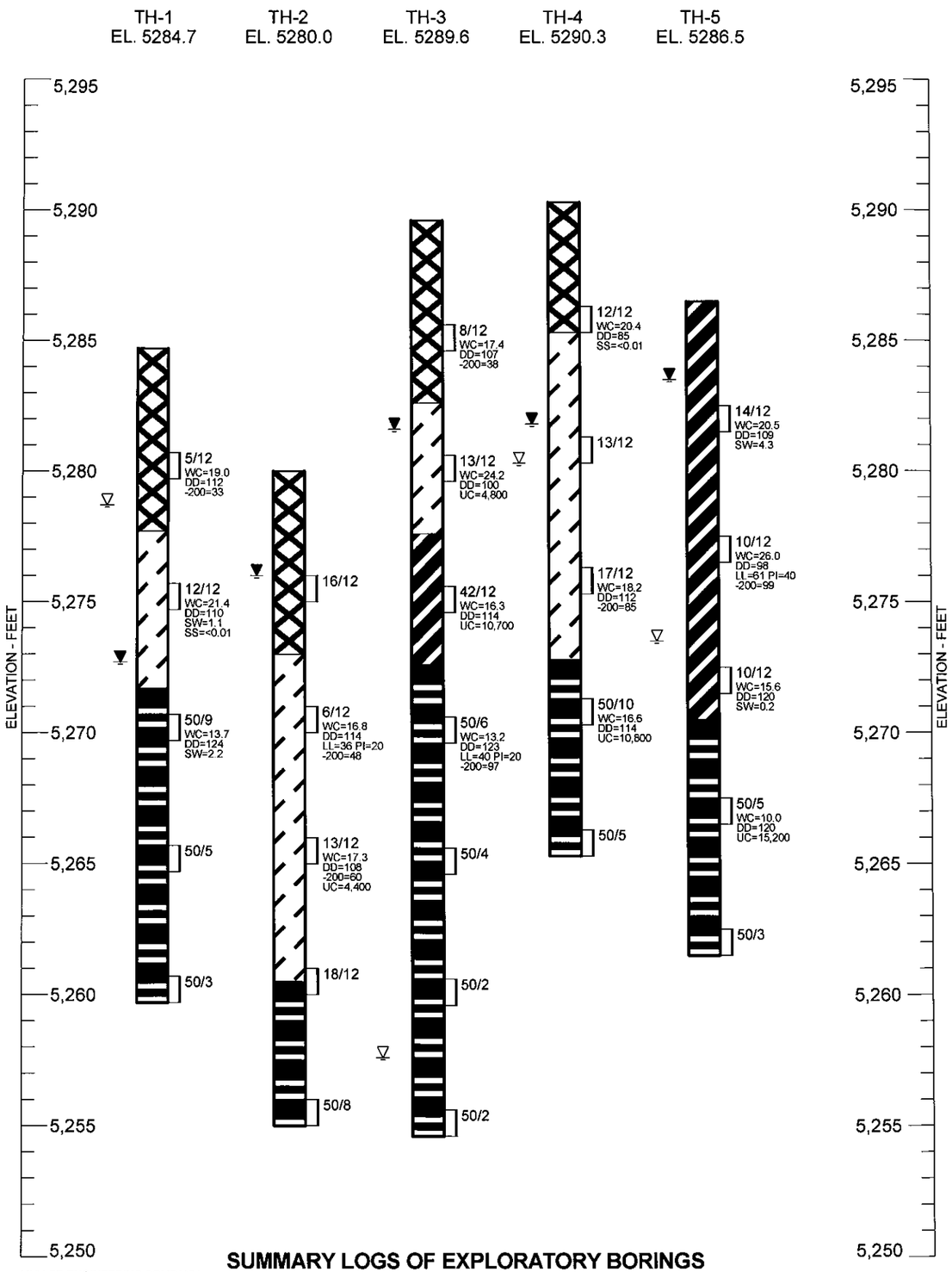

SUMMARY LOGS OF EXPLORATORY BORINGS

MULLER ENGINEERING COMPANY
BNSF RAILROAD BRIDGE (BRIDGE ID 0476-31.85) OVER WONDERLAND CREEK
PROJECT NO. DN46,992-125

LEGEND:

- FILL, CLAY, SANDY TO VERY SANDY OR SAND, CLAYEY TO VERY CLAYEY, SILTY, ASPHALT DEBRIS IN TH-2, MEDIUM STIFF TO VERY STIFF OR LOOSE TO MEDIUM DENSE, MOIST TO VERY MOIST, DARK BROWN, BROWN, RUST, TAN, GRAY, BLACK.
- CLAY, SANDY TO VERY SANDY, SOME VERY CLAYEY SAND, SILTY, SLIGHTLY GRAVELLY, MEDIUM STIFF TO VERY STIFF, MOIST TO VERY MOIST, BROWN, TAN, RUST, GRAY (CL, SC).
- WEATHERED CLAYSTONE, SILTY AT TIMES, MOIST TO VERY MOIST, RED, BROWN, RUST, TAN, GRAY, OLIVE.
- BEDROCK, CLAYSTONE, SOME SILTSTONE AND SANDSTONE, HARD TO VERY HARD, SLIGHTLY MOIST TO MOIST, GRAY, BROWN, TAN, OLIVE, WHITE.
- DRIVE SAMPLE. THE SYMBOL 5/12 INDICATES 5 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.
- WATER LEVEL MEASURED AT TIME OF DRILLING.
- WATER LEVEL MEASURED AFTER DRILLING ON JANUARY 21, 2014.

NOTES:

1. THE BORINGS WERE DRILLED ON DECEMBER 13, 18 AND 19, 2013 USING 3 OR 4-INCH DIAMETER, CONTINUOUS-FLIGHT, SOLID-STEM AUGER AND A LIMITED-ACCESS OR TRUCK-MOUNTED DRILL RIG.
2. BORING LOCATIONS WERE DETERMINED BY OUR FIELD REPRESENTATIVE USING PLANS AND REFERENCING SITE FEATURES AND LANDMARKS. ELEVATIONS WERE DETERMINED BY LEVEL SURVEYING RELATIVE TO THE TEMPORARY BENCHMARKS SHOWN ON FIG. 1.
3. WC - INDICATES MOISTURE CONTENT (%).
   DD - INDICATES DRY DENSITY (pcf).
   SW - INDICATES SWELL WHEN WETTED UNDER APPLIED PRESSURE (%).
   LL - INDICATES LIQUID LIMIT.
   PI - INDICATES PLASTICITY INDEX.
   -200 - INDICATES PASSING NO. 200 SIEVE (%).
   SS - INDICATES WATER-SOLUBLE SULFATE CONCENTRATION (%).
   UC - INDICATES UNCONFINED COMPRESSIVE STRENGTH (psf).
4. THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS AND CONCLUSIONS CONTAINED IN THIS REPORT.

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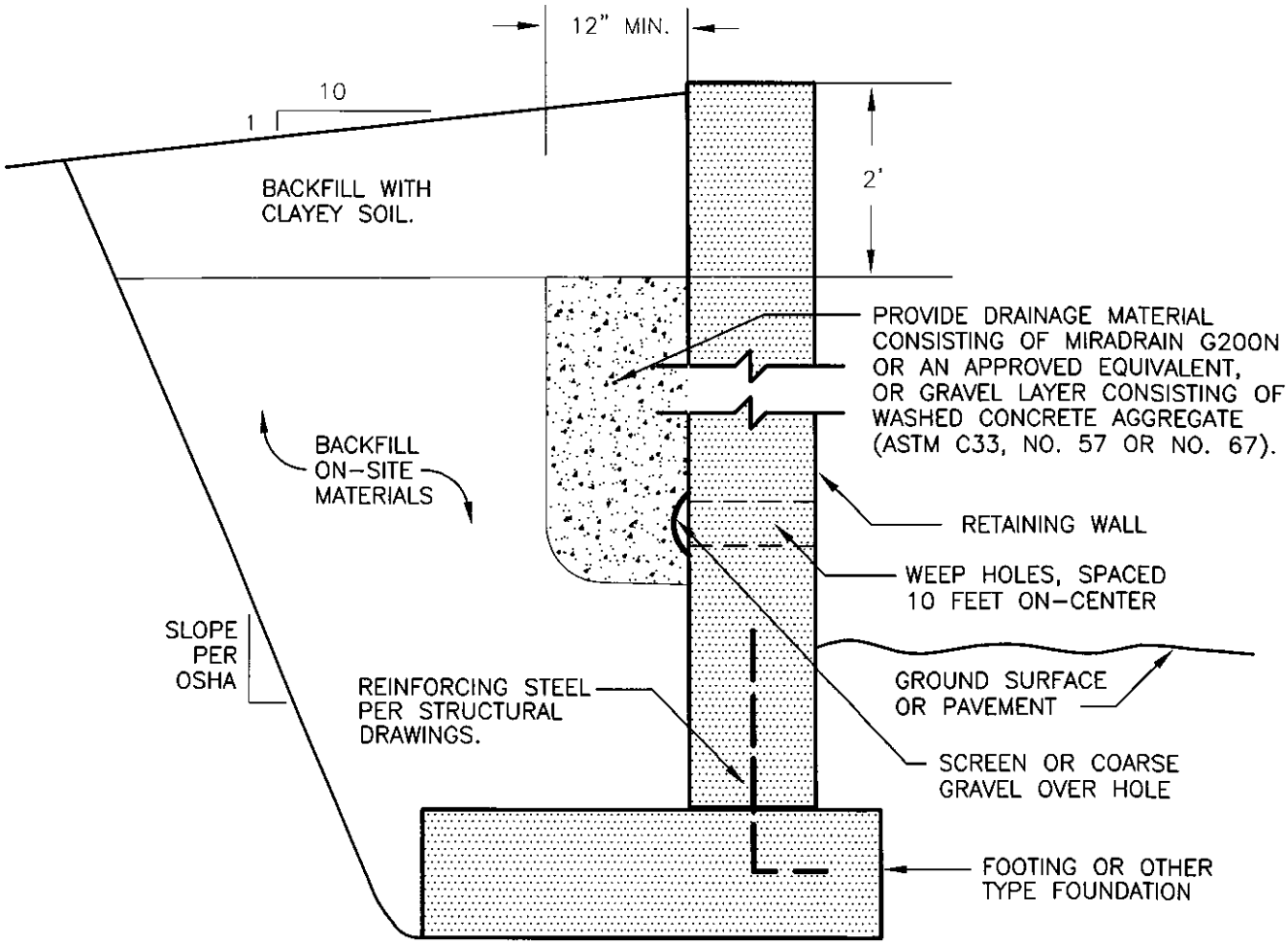
35-RETAINING-WALL_02



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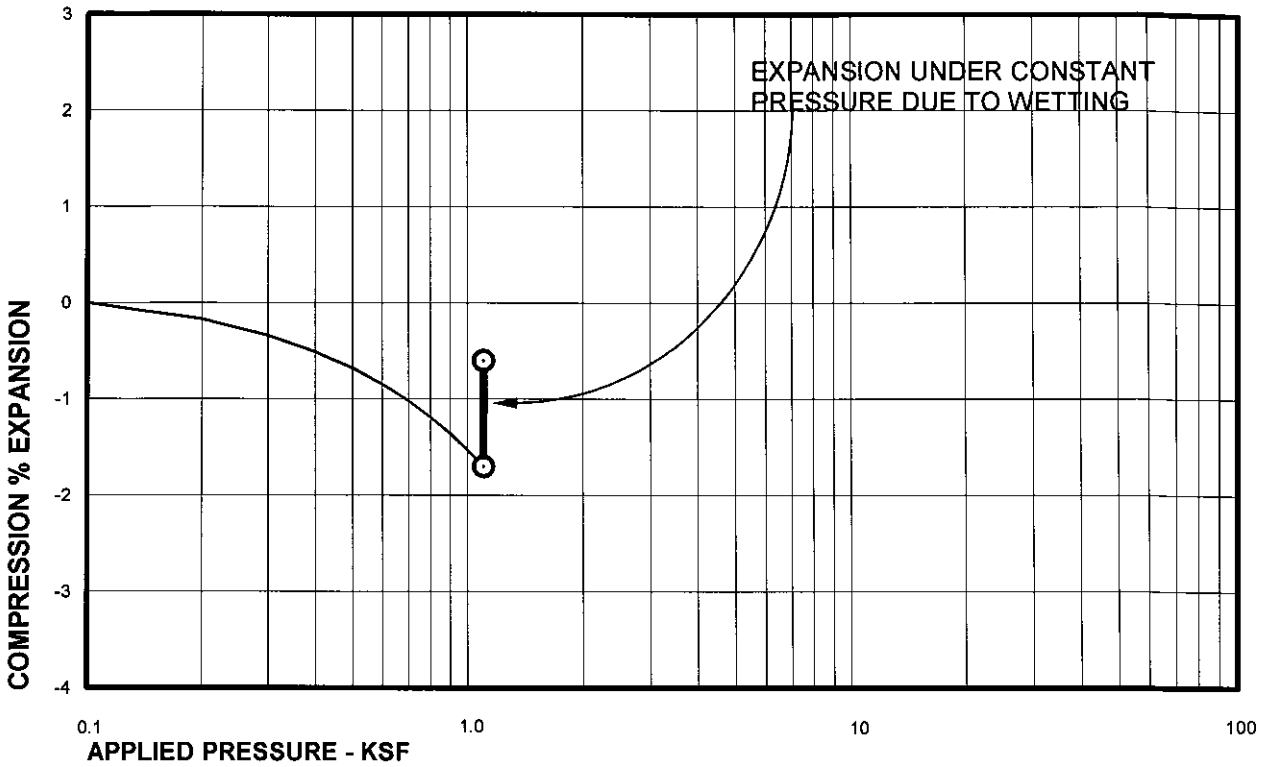
BNSF RAILROAD BRIDGE (BRIDGE ID 0476-31.85) OVER WONDERLAND CREEK
Project No. DN46,992-125

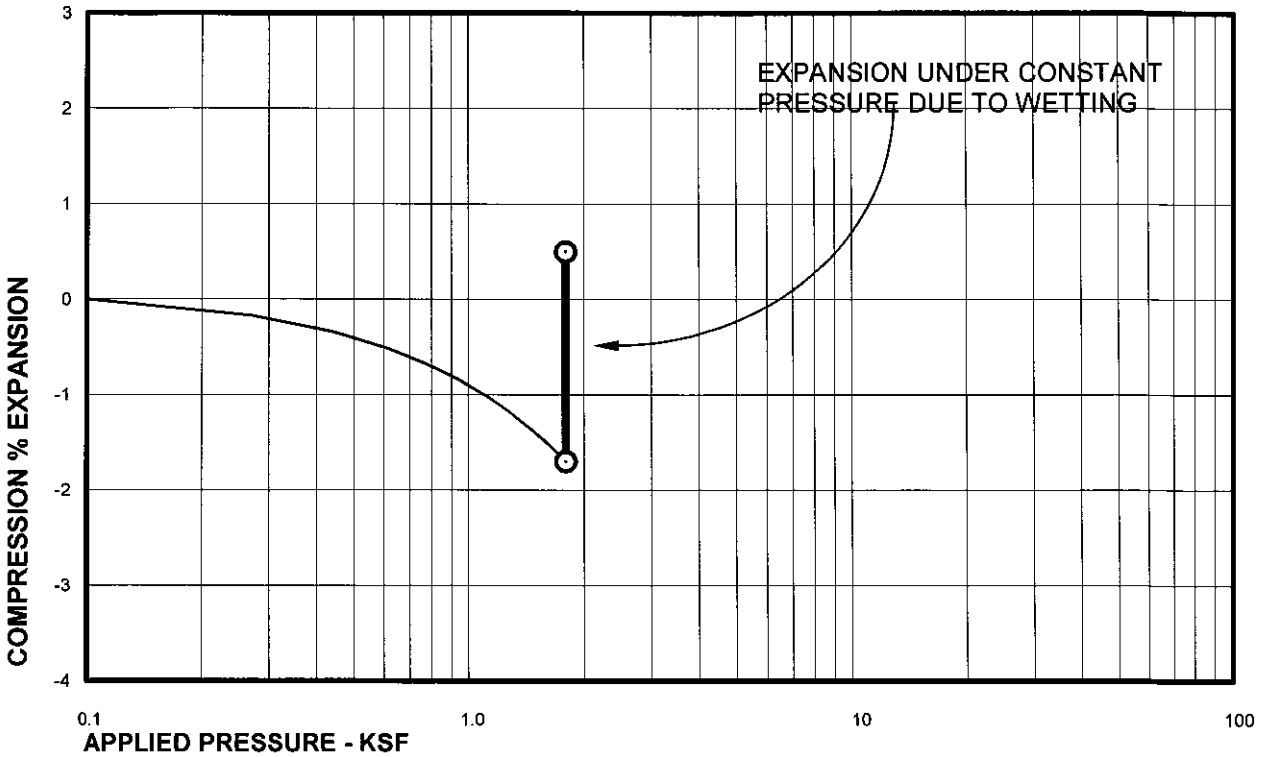
Typical Earth Retaining Wall Drain

Fig. 5

APPENDIX A
LABORATORY TEST RESULTS



Sample of CLAY, SANDY (CL) DRY UNIT WEIGHT= 110 PCF
From TH-1 AT 9 FEET MOISTURE CONTENT= 21.4 %



Sample of CLAYSTONE DRY UNIT WEIGHT= 124 PCF
From TH-1 AT 14 FEET MOISTURE CONTENT= 13.7 %

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BNSF RAILROAD BRIDGE (BRIDGE ID 0476-31.85) OVER WONDERLAND CREEK
PROJECT NO. DN46,992-125
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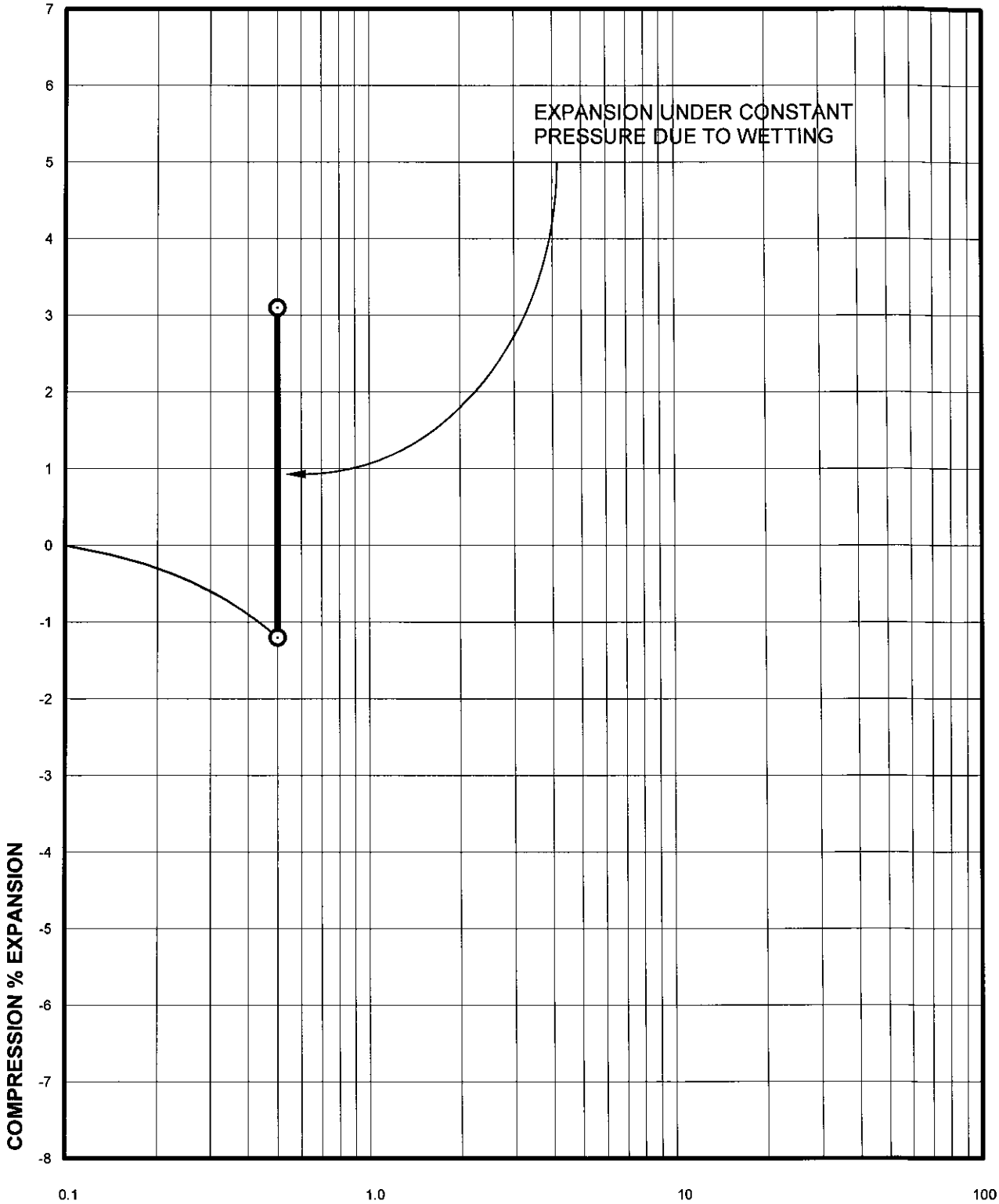
Swell Consolidation Test Results

FIG. A-1



Sample of WEATHERED CLAYSTONE

From TH-5 AT 4 FEET

DRY UNIT WEIGHT= 109 PCF

MOISTURE CONTENT= 20.5 %

Swell Consolidation Test Results

FIG. A-2

MULLER ENGINEERING COMPANY
BNSF RAILROAD BRIDGE (BRIDGE ID 0476-31.85) OVER WONDERLAND CREEK
PROJECT NO. DN46,992-125
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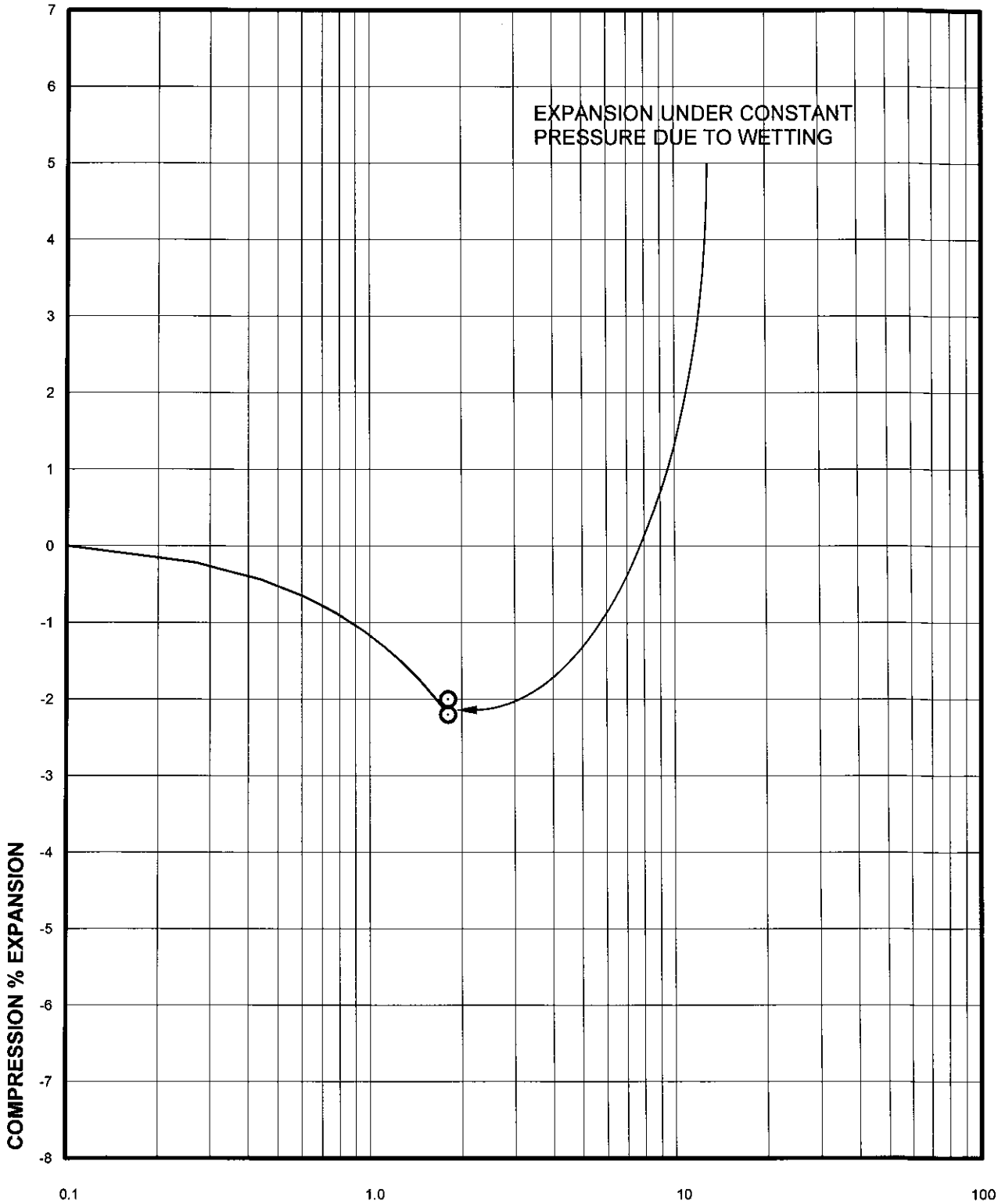

Sample of WEATHERED CLAYSTONE

From TH-5 AT 14 FEET

DRY UNIT WEIGHT= 120 PCF

MOISTURE CONTENT= 15.6 %

Swell Consolidation Test Results

FIG. A-3

MULLER ENGINEERING COMPANY
BNSF RAILROAD BRIDGE (BRIDGE ID 0476-31.85) OVER WONDERLAND CREEK
PROJECT NO. DN46,992-125
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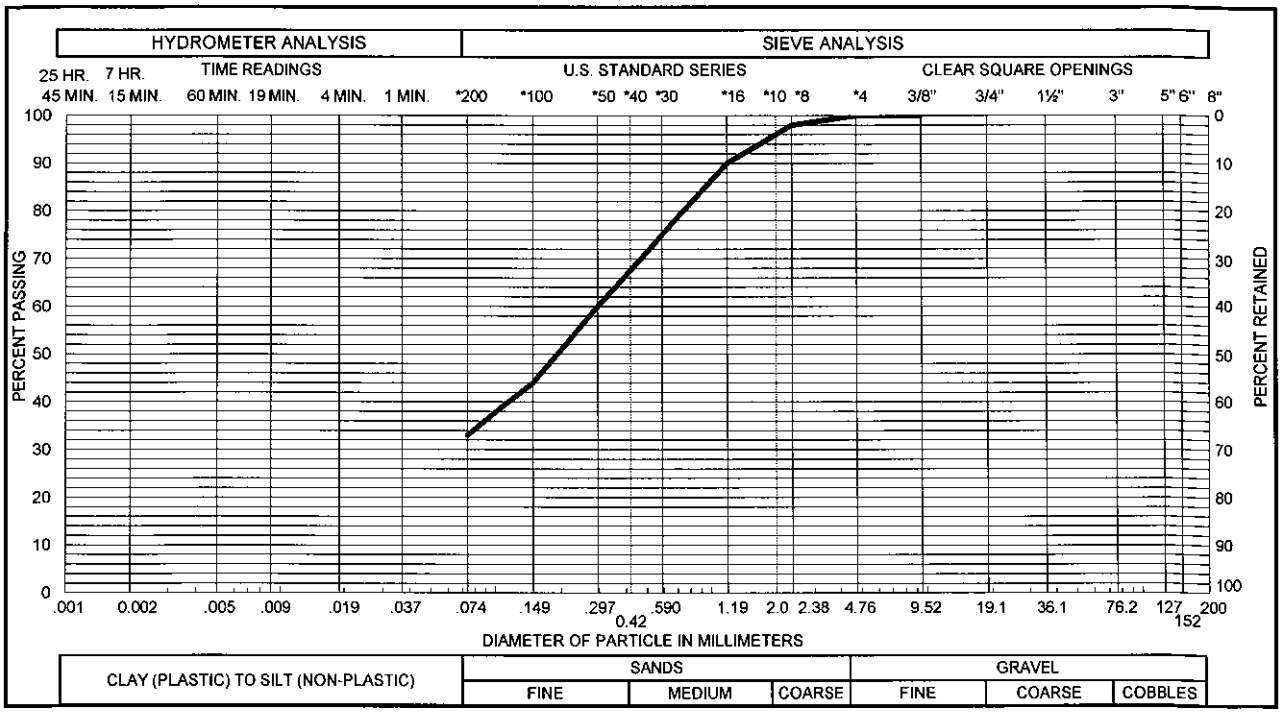
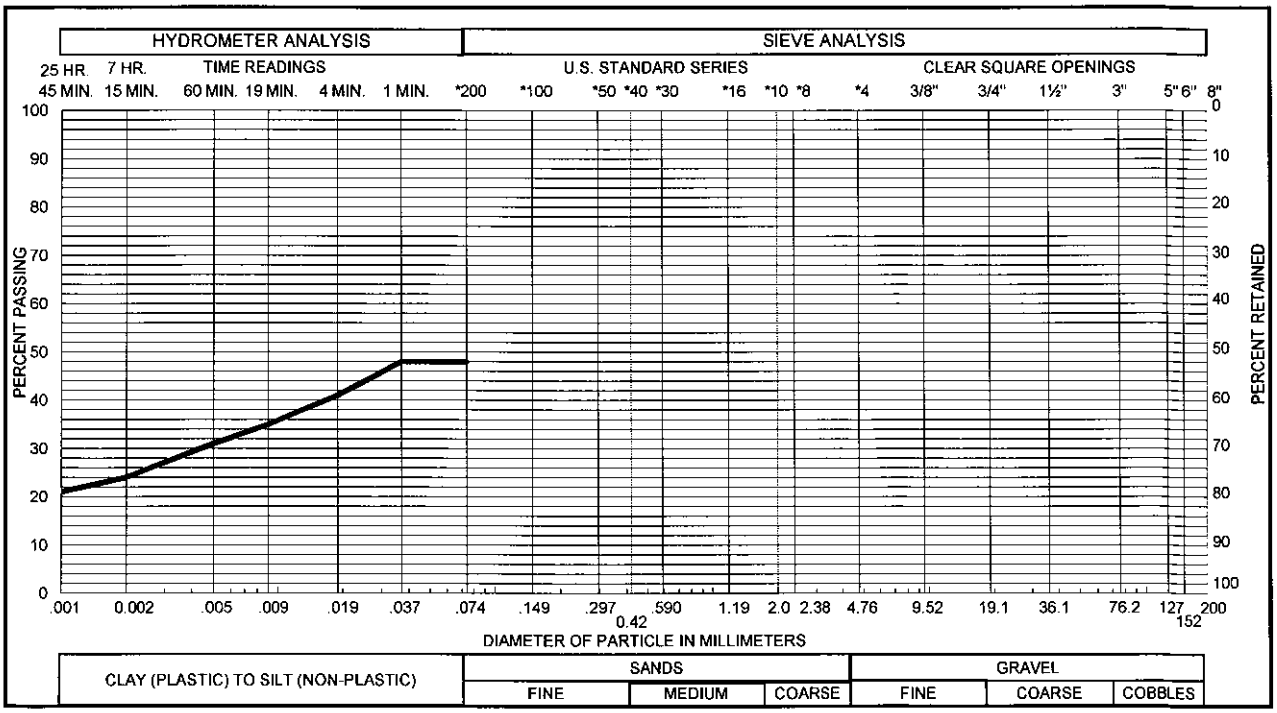


Sample of FILL, SAND, CLAYEY (SC)
From TH - 1 AT 4 FEET

GRAVEL 0 % SAND 67 %
SILT & CLAY 33 % LIQUID LIMIT
PLASTICITY INDEX



Sample of SAND, CLAYEY (SC)
From TH - 2 AT 9 FEET

GRAVEL 0 % SAND 52 %
SILT & CLAY 48 % LIQUID LIMIT 36
PLASTICITY INDEX 20

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PROJECT NO. DN46,992-125
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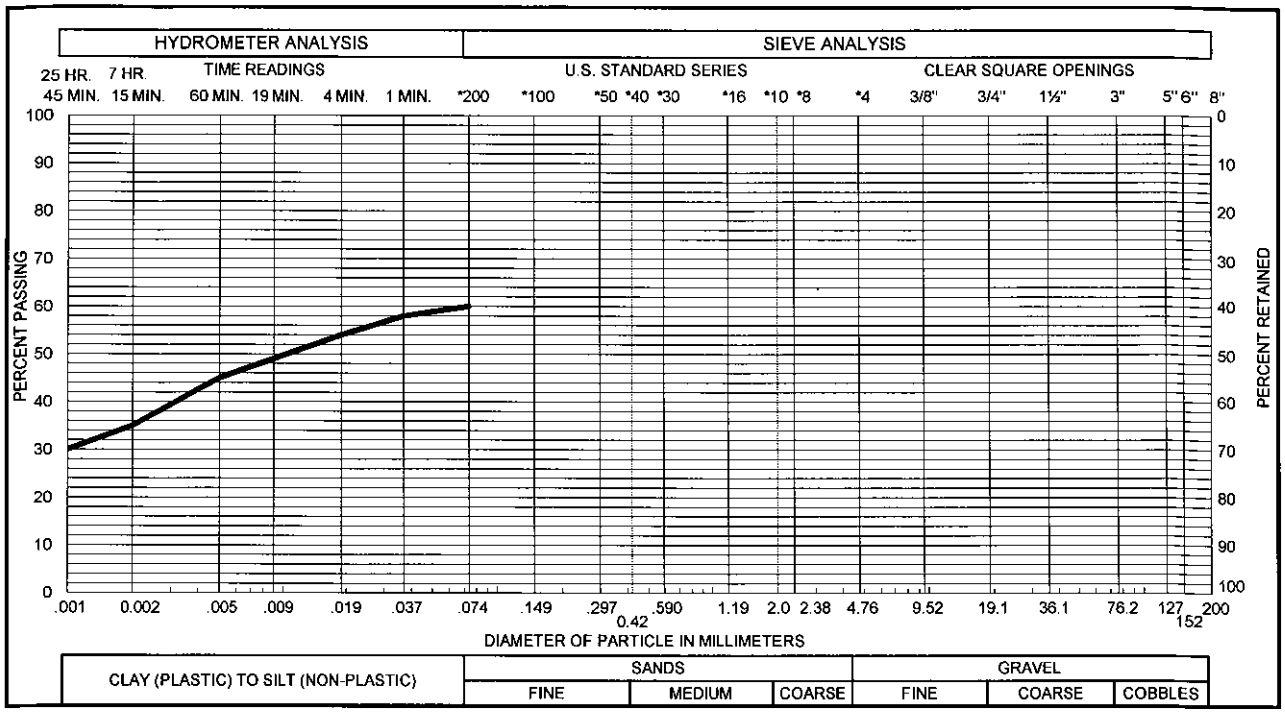
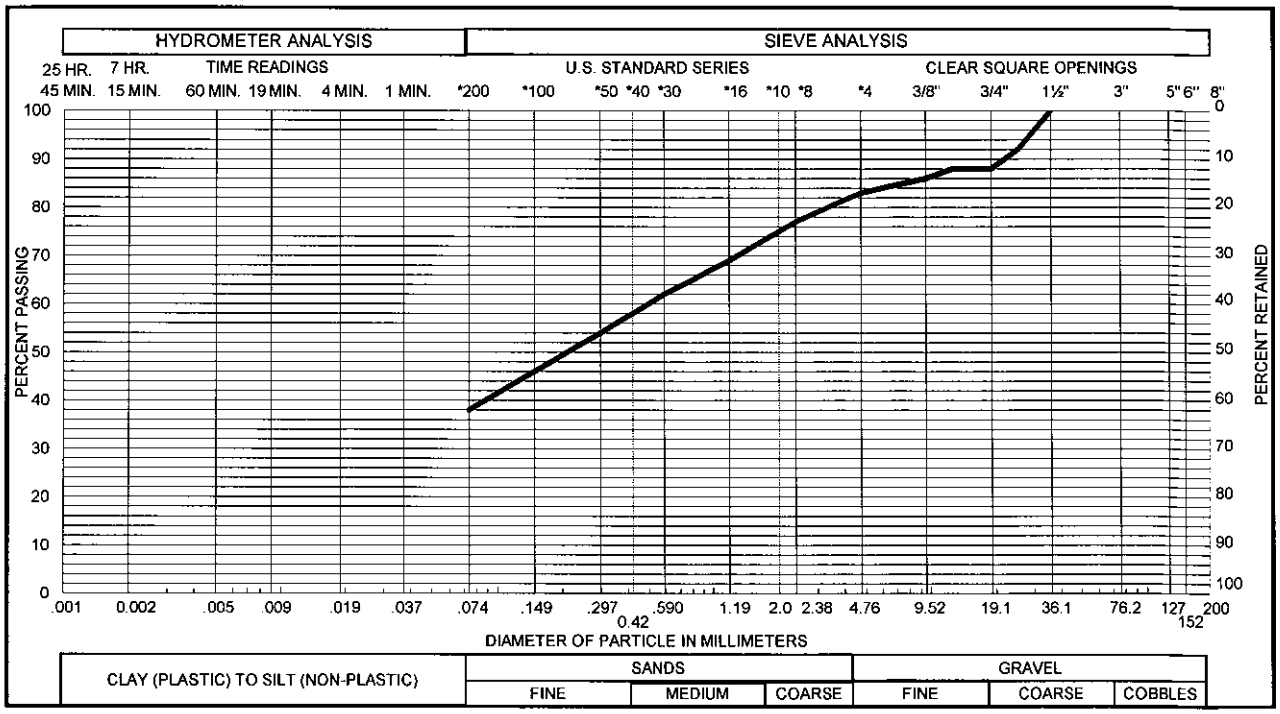
Gradation Test Results

FIG. A-4



Sample of CLAY, SANDY (CL)
From TH - 2 AT 14 FEET

GRAVEL 0 % SAND 40 %
SILT & CLAY 60 % LIQUID LIMIT
PLASTICITY INDEX



Sample of FILL, SAND, CLAYEY (SC)
From TH - 3 AT 4 FEET

GRAVEL 17 % SAND 45 %
SILT & CLAY 38 % LIQUID LIMIT
PLASTICITY INDEX

MULLER ENGINEERING COMPANY
BNSF RAILROAD BRIDGE (BRIDGE ID 0476-31.85) OVER WONDERLAND CREEK
PROJECT NO. DN46,992-125
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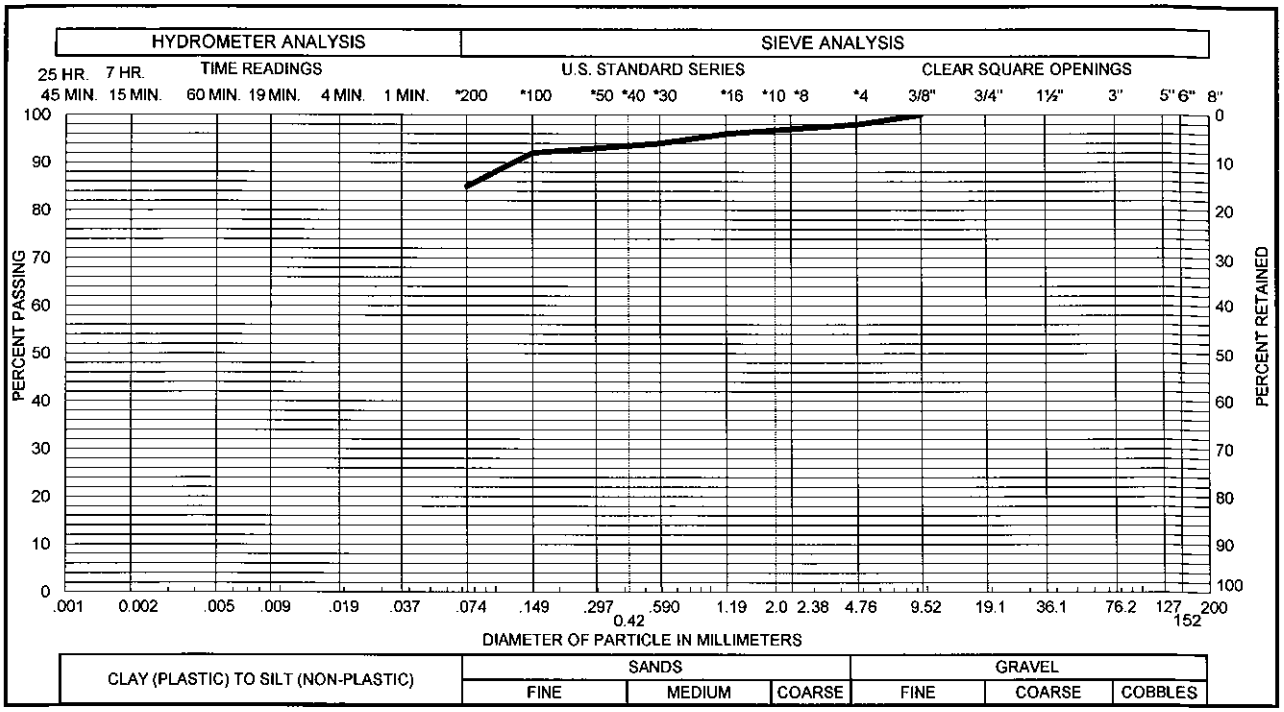
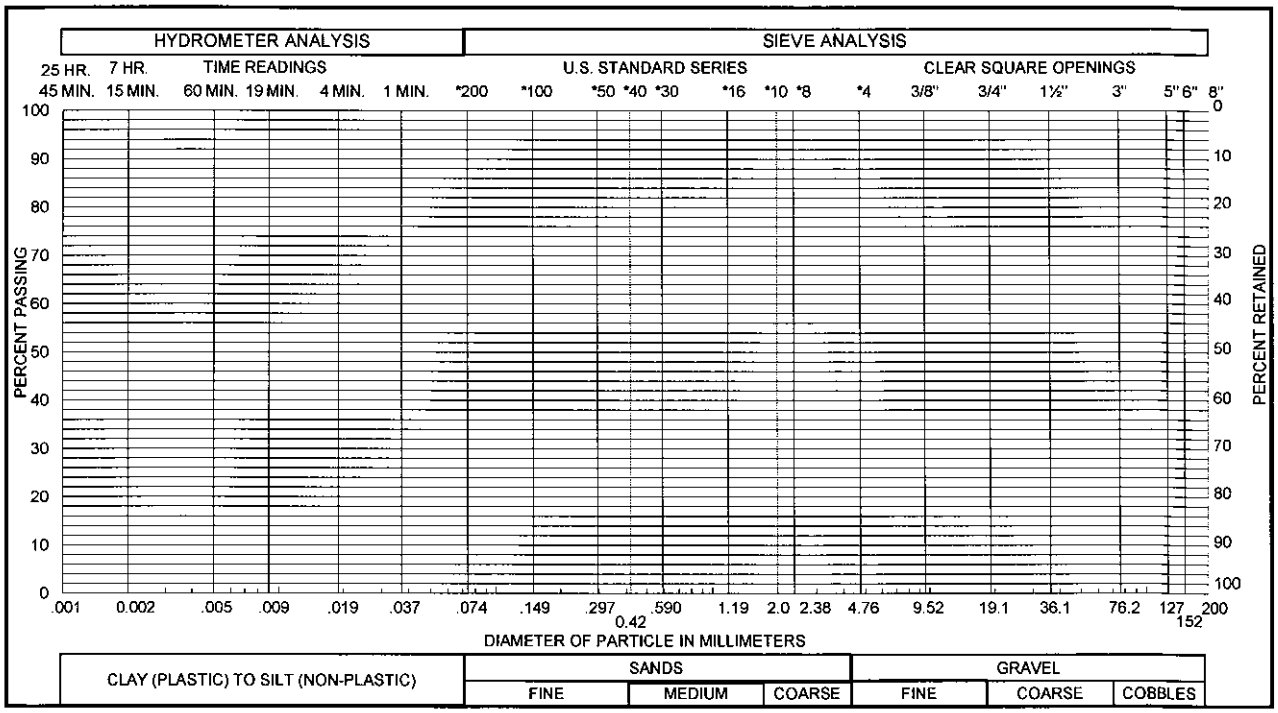
Gradation Test Results

FIG. A-5



Sample of CLAY, SANDY (CL)
From TH - 4 AT 14 FEET

GRAVEL 2 % SAND 13 %
SILT & CLAY 85 % LIQUID LIMIT
PLASTICITY INDEX



Sample of
From

GRAVEL % SAND %
SILT & CLAY % LIQUID LIMIT
PLASTICITY INDEX

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BNSF RAILROAD BRIDGE (BRIDGE ID 0476-31.85) OVER WONDERLAND CREEK
PROJECT NO. DN46,992-125
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Gradation Test Results FIG. A-6

TABLE A - I

SUMMARY OF LABORATORY TEST RESULTS

BORING	DEPTH (ft)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL TEST DATA		ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (psf)	SOLUBLE SULFATE CONTENT (%)	PASSING NO. 200 SIEVE (%)	SOIL TYPE
				SWELL (%)	APPLIED PRESSURE (psf)	LIQUID LIMIT	PLASTICITY INDEX				
TH-1	4	19.0	112							33	FILL, SAND, CLAYEY
TH-1	9	21.4	110	1.1	1,100				<0.01		CLAY, SANDY (CL)
TH-1	14	13.7	124	2.2	1,800						CLAYSTONE
TH-2	9	16.8	114			36	20			48	SAND, CLAYEY (SC)
TH-2	14	17.3	108					4,400		60	CLAY, SANDY (CL)
TH-3	4	17.4	107							38	FILL, SAND, CLAYEY
TH-3	9	24.2	100					4,800			CLAY, SANDY (CL)
TH-3	14	16.3	114					10,700			WEATHERED CLAYSTONE
TH-3	19	13.2	123			40	20			97	CLAYSTONE
TH-4	4	20.4	85						<0.01		FILL, CLAY, SANDY
TH-4	14	18.2	112							85	CLAY, SANDY (CL)
TH-4	19	16.6	114					10,800			CLAYSTONE
TH-5	4	20.5	109	4.3	500						WEATHERED CLAYSTONE
TH-5	9	26.0	98			61	40			99	WEATHERED CLAYSTONE
TH-5	14	15.6	120	0.2	1,800						WEATHERED CLAYSTONE
TH-5	19	10.0	120					15,200			CLAYSTONE

CTL | THOMPSON INCORPORATED

GEOTECHNICAL INVESTIGATION
WONDERLAND CREEK IMPROVEMENTS
BETWEEN 30TH STREET
AND FOOTHILLS PARKWAY
BOULDER, COLORADO

Prepared For:

MULLER ENGINEERING COMPANY
777 South Wadsworth Boulevard
Suite 4-100
Lakewood, Colorado 80226-4355

Attention: Christopher L. Kroeger, PE

Project No. DN45,648-145

November 23, 2011

1971 West 12th Avenue | Denver, Colorado 80204 | Phone: 303-825-0777 | Fax: 303-825-4252

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FIGS. 2 AND 3 – SUMMARY LOGS OF EXPLORATORY BORINGS

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FIG. 5 – TYPICAL EARTH RETAINING WALL DRAIN

FIGS. 6 AND 7 – SWELL CONSOLIDATION TEST RESULTS

FIG. 8 – GRADATION TEST RESULTS

TABLE I – SUMMARY OF LABORATORY TEST RESULTS

APPENDIX A – SUMMARY LOGS OF EXPLORATORY BORINGS

APPENDIX B – LABORATORY TEST RESULTS

APPENDIX C – FLEXIBLE AND RIGID PAVEMENT DESIGN NOMOGRAPHS AND CALCULATIONS

APPENDIX D – CONSTRUCTION, MATERIALS AND MAINTENANCE GUIDELINE RECOMMENDATIONS FOR FLEXIBLE AND RIGID PAVEMENTS

SCOPE

This report presents the results of our Geotechnical Investigation for the planned Wonderland Creek improvements between 30th Street and Foothills Parkway in Boulder, Colorado (Fig. 1). A forthcoming report will address the wetlands improvements in the Hayden Place HOA open space. The purpose of our investigation was to evaluate subsurface conditions and provide geotechnical design and construction criteria for this portion of the project. The scope was described in our Service Agreement (DN 11-0125R2) dated August 1, 2011. Environmental assessment was not part of the scope.

This report was prepared from data developed during field exploration, field and laboratory testing, engineering analysis, and experience with similar conditions. It includes descriptions of subsoil and bedrock conditions found in our exploratory borings and discussions on design and construction of the proposed improvements as influenced by geotechnical considerations. The recommendations presented in this report are based upon construction as currently planned. We should be contacted to review our recommendations if plans change. A brief summary of our conclusions and recommendations follows with detailed design criteria are presented within the report.

SUMMARY OF CONCLUSIONS

1. **Subsoils encountered in our borings generally consisted of nil to about 5.5 feet of sandy clay fill and about 7.5 to 16 feet of natural sandy clay, slightly silty to clayey sand and/or interlayered clay/sand, underlain by weathered and comparatively unweathered claystone bedrock to the maximum depth explored of 30 feet. The near-surface soils and bedrock are generally non-expansive or low swelling.**

2. **Ground water was noted at depths of about 5 to 13 feet in 7 of 8 borings at the time of drilling. Ground water was measured in all borings at depths of 4.8 to 10.2 feet when the holes were checked several weeks after drilling. We anticipate excavations will penetration ground water and temporary construction dewatering may be necessary. Excavation bottoms may require stabilization. These issues are discussed in the report. Ground water may fluctuate seasonally and rise in response to seasonal fluctuations and landscape irrigation.**

3. We believe the soils penetrated by our exploratory borings can generally be excavated with typical heavy-duty construction equipment. On-site soils are suitable for re-use in new fills provided they are substantially free of debris, vegetation and organic/deleterious material, moisture conditioned and compacted as discussed in SITE DEVELOPMENT.

4. Site soils are considered to be suitable to support lightly loaded structures such as culverts and retaining walls.

5. Foundations should be protected from scour and undermining during flood stage events.

6. New pavements for Iris Avenue can consist of either 8 inches of full-depth asphalt, a composite section of 5 inches of asphalt over 11 inches of aggregate base course or 7 inches of portland cement concrete.

7. Surface drainage should be designed, constructed, and maintained to provide rapid removal of surface water runoff away from structures and off pavements and flatwork. Water should not be allowed to pond adjacent to foundations or on pavements or flatwork. Conservative irrigation practices should be followed to avoid wetting of foundation soils and pavement subgrade.

SITE CONDITIONS

The reach of Wonderland Creek to be improved extends about 2,800 lineal feet from 30th Street and the Diagonal Highway (Highway 119) to Foothills Parkway (Highway 157) in Boulder, Colorado (Fig. 1). The portion included in this investigation is generally between Iris Avenue and Spring Creek Place.

This portion of Wonderland Creek is a southeasterly trending drainage. The ground surface slopes down gently to the southeast. The current channel appeared to be degraded and unstable, as evidenced by steep side slopes and down-cutting due to erosion. There is heavy vegetation along the banks including bushes and mature trees. Some debris was also observed on the banks and around the channel. Some utilities were observed either traversing the channel or running adjacent to it. Upstream flow exits a culvert under Diagonal Highway just to the northwest of the reach to be improved, and continues southeast in an open channel. Flow is diverted below Iris Avenue via a culvert and into another open channel which travels between

residential developments. Flow is then carried below Spring Creek Place by another culvert, into an open channel and below the BNSF railroad and Foothills Highway by a culvert. We understand flow from the creek spills over into the Boulder and Whiterock Ditch just west of the BNSF railroad.

PROPOSED CONSTRUCTION

We have not been provided with detailed plans at this time. Conceptual plans included in the RFP were reviewed. We understand the current size of the channel is insufficient to accommodate the 100-year flood stage event and many of the adjacent structures are in potentially impacted areas. The purpose of the project is to complete mitigation measures to contain the flood flow, separate Wonderland Creek flow from the Boulder and Whiterock Ditch and construct a multi-use trail. In addition, the project will aim to enhance surrounding wetlands and relieve some of the flooding observed in the downstream subdivisions.

The planned improvements include removing channel sediments from the existing creek, cutting/filling and grading to form an open channel from 30th Street to Bridger Trail, constructing a new box culvert below Iris Avenue between Bridger Trail and 34th Street, a new retaining wall south of Boulder HOA open space and a replacement culvert below Spring Creek Place. New pavements, curbs/gutters and sidewalks are planned where the culvert will be installed below Iris Avenue. The bottom of the box culvert will be about 8 to 10 feet below Iris Avenue. A pedestrian trail is planned adjacent to the north side of Wonderland Creek between 34th Street and Spring Creek Place. In a later design phase, we will drill borings for a potential ground water barrier and drop structures downstream of Spring Creek Place.

INVESTIGATION

We investigated subsurface conditions by drilling eight exploratory borings at the approximate locations shown on Fig. 1. Boring locations were determined by a representative of our firm referencing conceptual plans provided and landmarks. The borings (except TH-7) were drilled to depths of 20 to 30 feet using 4-inch diameter,

continuous-flight auger and a truck-mounted drill rig. TH-7 was drilled with 3-inch diameter, continuous-flight auger and a limited-access drill rig. Samples were obtained at 2 to 5-foot intervals using a 2.5-inch diameter (O.D.) modified California barrel sampler driven by blows of a 140-pound hammer falling 30 inches. Bulk samples were obtained from auger cuttings. Our field representative was present to observe drilling operations, log the soil and bedrock encountered, and obtain samples for laboratory tests. Upon completion of drilling, hand-slotted PVC pipe was inserted in the holes to facilitate delayed water level measurements. Summary logs of the exploratory borings including results of field penetration resistance tests and a portion of laboratory test results are presented in Appendix A.

Samples were returned to our laboratory where they were examined by our engineer and laboratory tests were assigned. Laboratory tests included dry density, moisture content, percent silt and clay-sized particles (passing No. 200 sieve), particle-size analysis (gradation and hydrometer), Atterberg limits, swell-consolidation, Hveem stabilometer (R-value, ASTM D 2844, AASHTO T 190) and water-soluble sulfate concentration. Swell-consolidation tests were performed by wetting the samples under approximate overburden pressures. Laboratory test results are presented in Appendix B and summarized in Table B-I.

SUBSURFACE CONDITIONS

The subsoils encountered in our exploratory borings generally consisted of nil to about 5.5 feet of sandy clay fill and 7.5 to 16 feet of natural sandy clay, slightly silty to clayey sand and/or interlayered clay/sand, underlain by weathered and comparatively unweathered claystone bedrock to the maximum depth explored of 30 feet. Some pertinent engineering characteristics of the soil and bedrock are described below.

About 5, 2 and 5.5 feet of sandy to very sandy clay fill was found from the ground surface in TH-4, 5 and 6, respectively. Some asphalt debris and organic material was observed in the 1-foot drive in TH-5. The fill was medium stiff to very stiff based on field penetration resistance test results. Two fill samples swelled 1.9

and 2.7 percent when wetted under applied pressures of 500 and 200 psf, respectively. Two fill samples contained 63 and 66 percent silt and clay-sized particles and one showed moderate plasticity with a liquid limit of 37 percent and a plasticity index of 20. We judge the sandy clay fill is expansive.

Natural soils generally included sandy to very sandy clay, slightly silty to clayey sand and interlayered clay/sand of similar composition and extended up to 19 feet deep. Sand and clay samples generally had small amounts of gravel (8 percent and less). The clay was medium stiff to very stiff and the sand was loose to medium dense. Very soft or very loose interlayered clay/sand was found below ground water in TH-1. Clay samples contained 52 to 89 percent silt and clay-sized particles and showed moderate plasticity with liquid limits of 35 to 45 percent and plasticity indices of 20 to 29. The 9-foot sample in TH-6 had 41 percent clay-sized particles and 48 percent silt-sized particles. The 9-foot sample from TH-5 had an unconfined compressive strength of about 3,300 psf. Sand samples contained 6 to 45 percent silt and clay-sized particles and showed low to moderate plasticity with liquid limits of 28 to 42 percent and plasticity indices of 7 to 25. Our test holes TH-2 and TH-7 caved below ground water. We consider the sand and clay to be non-expansive and low swelling, respectively. Permeability of the clay is estimated to be 10 to 1,000 ft/yr. The sand soils are expected to have permeability of about 10,000 to over 100,000 ft/yr.

Claystone bedrock was found at depths of about 12 to 19 feet. The bedrock was weathered to very hard. The weathered zone was up to 9.5 feet thick. Four claystone samples swelled 0.2 to 1.2 percent when wetted under approximate overburden pressures. A weathered claystone sample had an unconfined compressive strength of about 10,400 psf. Permeability of the claystone is expected to be negligible. We judge the claystone is low swelling.

Ground water was encountered during drilling in all borings except TH-5 at depths of about 5 to 13 feet from the existing ground surface. Water levels were measured at depths of 4.8 to 10.2 feet when the holes were checked on November 18, 2011. Excavations will likely penetrate ground water and temporary construction

dewatering may be necessary. Water levels may fluctuate seasonally and rise in response to precipitation and landscape irrigation.

SITE DEVELOPMENT

Demolition

We anticipate some tree and bush removal and demolition of existing culverts, utilities, structures and pavements. Utilities, structures or debris below improvements should be removed and replaced with moisture conditioned, compacted fill. Depending on type, size, depth, and location it may be possible to grout or abandon utilities in place if potential conflicts can be avoided.

We recommend the old drainage be substantially cleared of debris, vegetation, organics, and other deleterious materials. Loose, sloughed sides and soft bottoms should be grubbed out of existing drainages to be filled. The sides of the existing drainages should be trimmed back no steeper than 1:1 and benched at about 5-foot height intervals prior to placing fill, as shown on Fig. 2. Careful grubbing of existing drainages and filling them with compacted fine-grained soil such as sandy clay can reduce seepage.

Excavations

Based on planned construction, we anticipate cuts up to about 10 feet and fills up to about 3 feet will be required. We believe the soils penetrated by our exploratory borings can generally be excavated with typical heavy-duty construction equipment. We recommend the owner and the contractor become familiar with applicable local, state and federal safety regulations, including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Based on our investigation and OSHA standards, we anticipate the clay soils will classify as Type B soils and the sand as Type C. Based on OSHA regulations, maximum slope inclinations of 1:1 (horizontal:vertical) for Type B soils and 1½:1 for Type C may be used for temporary excavations in dry conditions.

Flatter slopes, possibly as flat as 6:1, will be necessary below ground water or where seepage is present. Excavation slopes specified by OSHA are dependent upon soil types and ground water conditions encountered. The contractor's "competent person" should identify the soils in the excavations and refer to OSHA standards to determine appropriate slopes. Stockpiles of soil and equipment should not be placed within a horizontal distance equal to one-half the excavation depth, from the edge of the excavation. A professional engineer should design excavations deeper than 20 feet.

Soft, wet soils are likely to be present in excavations. Soft, wet soil may slough to slopes of about 6:1 or shallower. This could impact efficiency of the contractor's work. They should be prepared to deal with soft and/or wet soil conditions. The bottoms of excavations can be stabilized by crowding crushed rock into the excavation bottom such that when compactive effort is applied it does not deform more than about 1 to 2 inches. Acceptable rock materials include, but are not limited to No. 2 and No. 57 rock, or 1 to 3 inch recycled concrete. Crushed rock on a layer of woven geofabric or geosynthetic grid can also be used, and should reduce the amount of aggregate needed to achieve stable subgrade. Typically, a biaxially woven fabric such as Mirafi 600x (or equal) or geogrid (such as Tensar BX1100 or equal) topped with 8 to 12 inches of crushed rock will provide a stable working surface. If available, crushed recycled concrete is a good choice. The actual need for, and elements of subgrade stabilization should be determined at the time of construction. Bedding material can consist of ASTM C33 No. 57 or 67 Coarse Concrete Aggregate mixed 50/50 with No. 8 Sand-Gravel.

<u>Fill and Backfill</u>

On-site soils are suitable for re-use as fill provided debris, vegetation, organics, and other deleterious materials are substantially removed prior to placement. Soil particles larger than 3 inches and cobbles larger than 6 inches should be broken down or removed prior to fill placement. Very moist or saturated soils should not be used as fill. If imported fill material is required, it should ideally

be similar to on-site materials. A sample of import material should be submitted to our office for approval prior to placement.

Prior to fill placement debris, organic, and deleterious matter should be substantially removed from areas to receive fill. Areas to receive fill should be scarified to a depth of 8 inches prior to fill placement and moisture conditioned according to the specifications below. Fill should be placed in thin (8 inches or less) loose lifts, moisture conditioned to within 2 percent of optimum moisture content and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698). Pipe culverts should be bedded and backfilled to the spring line with pea gravel or flow fill. Placement and compaction of fill and backfill should be observed and tested by a representative of our firm during construction.

Our experience indicates fill and backfill can settle, even if properly compacted to the criteria provided above. Factors that influence the amount of settlement are depth of fill, soil type, degree of compaction, and time. The length of time for the compression to occur can be a few weeks to several years. The degree of compression of fill under its own weight will likely range from low for granular soils (1 percent or less), moderate for clay/sand mixtures (1 to 2 percent) to high for claystone and highly plastic clay fills (greater than 2 percent). Any improvements placed over backfill should be designed to accommodate movement.

Water and sewer lines are often constructed beneath improvements. Compaction of utility trench backfill can have a significant effect on the life and serviceability of improvements and pavements. We recommend utility trench backfill be placed in thin, loose lifts, and moisture conditioned and compacted according to the specifications presented previously. The placement and compaction of utility trench backfill should be observed and tested by a representative of our firm during construction.

Permanent slopes should be stable at inclinations of 3:1 (horizontal to vertical). Shallower slopes can decrease erosion from run-off and sheet-flow. If increased resistance to erosion is desired, the soils can be stabilized with an

additive such as portland cement. The detrimental properties can include difficulty of re-vegetation, chemical leaching and high cost. Should the owner wish to consider chemical stabilization of a portion of the fill soils, we should perform tests to determine the most appropriate additive and amount. As an alternative, seeding and re-vegetation can also be used to reduce erosion.

Dewatering

We anticipate excavations will penetrate ground water and temporary construction dewatering systems may be needed. Current ground water levels are expected to be at the lower end of seasonal variations and levels could be up to two feet higher than our measurements. Ground water levels may fluctuate seasonally and rise in response to precipitation and landscape irrigation.

Several methods can be considered to temporarily dewater excavations. Well points or cased wells outside the excavation are alternatives commonly used to lower ground water levels. Excavations that extend only a foot or two into ground water can often be dewatered using sumps about 3 feet below grade, where the water is pumped down through the soils before being discharged.

The City and County of Boulder and/or The Colorado Department of Public Health and Environment may require dewatering permits. Our experience indicates periodic environmental testing is usually required with these permits, with reporting. Permitting requirements may also influence the construction schedule. We recommend researching these requirements and permit processing times well before dewatering begins.

Shoring/Bracing

Earth retention systems may be necessary to shore or brace excavations where temporary excavation side slopes discussed above cannot be established. We anticipate shoring/bracing may be necessary along Iris Avenue during culvert installation. Potential alternatives for trench shoring and bracing include soldier

piles (piers) and lagging, continuous drilled piers, diaphragm (slurry) walls or sheet piles. The presence of adjacent structures and sidewalks should be considered as part of the bracing design. The excavation and bracing plan should incorporate a monitoring program to document existing sidewalk, street and structure conditions and elevations before, during, and after construction.

Based on the planned construction and excavation depths, subsurface conditions, and our experience, we believe the most economical alternative may be sheet piles. All bracing systems undergo some movement. The degree of movement depends on the technique and the contractor's ability with the chosen system. These potential movements should be estimated and considered in design. Settlement and distress of adjacent sidewalks and/or streets may occur and replacement may be needed. An experienced specialty contractor should be consulted for relative costs.

Recommended design lateral earth pressures for various bracing conditions are presented on Fig. 3. The earth pressures presented do not include hydrostatic loads or surcharge from traffic or adjacent structures. Fig. 4 presents methods for evaluating additional pressures due to traffic surcharge, and line and uniform loading conditions. Experienced specialty contractors may choose to evaluate the soil data in this report and prepare their own geotechnical design criteria at their option and risk.

DROP STRUCTURES

We have not been provided with plans that show locations of drop structures. We anticipate drop structures may be installed and may consist of grouted rip rap boulders, sculpted concrete, and/or top-soiled riffle. We recommend a seepage cutoff wall to reduce uplift pressures at the toe of the drop structure. We recommend sheet pile or concrete cutoff walls extend down at least 2 feet into bedrock below the downstream toe of drop structures. Scour protection requirements should be evaluated based on the design flow velocities. Historic scour depth likely extends down to the top of weathered bedrock. Some scour protection can be obtained with a rip-rap blanket upstream and downstream of the drop structure.

FOUNDATIONS – BOX CULVERTS, WING WALLS AND RETAINING WALLS

Subsoils found at anticipated foundation levels for box culverts, wing walls and retaining walls consist of medium stiff to very stiff clay and/or loose to medium dense slightly silty to clayey sand. We recommend box culverts be constructed on a mat or with footing foundations. Wing walls may be constructed on footings. A mat with a turned-down upstream edge offers positive scour protection and makes the culvert more rigid. Scour protection requirements should be evaluated based on the design flow velocities. Some scour protection can be obtained with a rip-rap blanket upstream and downstream of the culvert. Potential differential movement between foundation elements is expected to be about 1 inch or less. Design and construction criteria for footings are presented below. These criteria were developed from analysis of field and laboratory data and our experience.

Footings

1. **Footings should be constructed on stable soils. Soils loosened during foundation excavation or in the forming process for footings should be removed and replaced with similar soils, moistened and compacted prior to placing concrete. Stabilization of excavation bottoms may be necessary. This can be achieved by crowing crushed rock into the excavation bottoms, possibly with geogrid or woven fabric, such that the bottoms do not deform more than 1 inch when compactive effort is applied.**

2. **Footings should be designed for a maximum allowable soil pressure of 3,000 psf.**

3. **Footings should have a minimum width of at least 18 inches. The footings may be wider depending upon foundation loads. Seepage cutoff walls can be 10 inches wide if poured-in-place concrete.**

4. **Lateral earth pressures can be calculated based on equivalent fluid density using at least 55 pcf for the active case. For the at-rest case, where essentially no lateral movement is allowed, we suggest using at least 70 pcf for drained conditions, increasing to 100 pcf for saturated conditions. Footing translation can be resisted using an equivalent fluid density of 300 pcf for the passive case, providing backfill is similar to the site soils, is well compacted and remains in-place. The coefficient of friction for sliding may be taken as 0.45. These values have not been factored. The structural engineer should apply appropriate factors of safety in design.**

5. **Foundation walls should be well reinforced, top and bottom. We recommend reinforcement sufficient to span an unsupported distance of at least 10 feet.**

6. **Footings must be protected from frost action. Normally, 3 feet of frost cover is assumed in this area.**

7. **The completed foundation excavation should be observed by a representative of CTL | Thompson, Inc. to confirm subsurface conditions are as anticipated. Placement and compaction of sub-excavation fill should be observed and tested by our representative.**

RETAINING WALLS

A retaining wall is planned along the north side of the creek near TH-7. Based on existing grades, we expect the wall will retain 5 feet of soil or less. Retaining walls will be subject to lateral earth loads which are dependent on the height of the wall, soil type, and backfill configuration. We assume use of on-site backfill or similar imported soils with a level backfill surface.

Where walls are free to rotate to mobilize the strength of the backfill, they may be designed to resist "active" earth pressures. We recommend design for "active" earth pressures using an equivalent fluid density of 55 pcf. Passive pressure can be used to resist lateral movements with an equivalent fluid density of 300 pcf. Passive resistance requires movement to generate the resistance. Passive resistance should only be used when movement is tolerable and the soil is well compacted and will be not be removed. The values given above do not include safety factors or allowances for surcharge loads such as sloping backfill, vehicle traffic, or hydrostatic pressure.

Mechanically stabilized earth (MSE) walls are often used in situations such as these. Concrete walls are also suitable. MSE retaining walls assume that some movement of the wall will occur to mobilize the shear strength of the soil. We assume retained soil and backfill above the reinforced zone will be on-site soils or similar soils. The onsite soil should not be used in the reinforced zone. We recommend the reinforced zone of MSE walls be constructed with imported, non-plastic sand and gravel meeting CDOT Class 5 or 6 Aggregate Road Base Specification (or better). Angular gravel meeting AASHTO No. 57 or 67 Specification

may be used for the reinforced soil (if desired) and is recommended for the leveling pad and drainage material.

Most MSE block retaining wall design programs require input of soil parameters for foundation soil, leveling pad, reinforced soil and retained soil. The parameters presented below can be used for the design of the wall.

MSE SOIL INPUT PARAMETERS

Material use	Material Description & Classification	Cohesion (psf)	Internal Friction Angle (degrees)	Unit Weight (pcf)
Foundation Soil	Clay	100	28	135
Leveling Pad	Gravel (imported) AASHTO #57 or 67 Coarse Concrete Aggregate	0	40	140
Reinforced Soil (import recommended)	Sand, Gravelly, Silty, CDOT Class 6 Road Base (or better)	0	36	140
Retained Soil	Clay	0	28	135

Free draining granular backfill should be used adjacent to the wall. We recommend a free-draining sand and gravel material with less than 3 percent fines (passing No. 200 sieve) be used as backfill for a zone within at least 1-foot behind the wall. Imported backfill should be tested and approved by our firm prior to importing. The upper 2 feet of wall backfill should be derived from the on-site clay. Fill should be placed and compacted to the criteria provided in Fill and Backfill. Special precautions should be taken to avoid over-stressing the wall during compaction. We recommend small, hand-operated compactors be used.

Drains are recommended behind walls to control hydrostatic pressures. The drain should consist of a 4-inch perforated PVC pipe encased in at least 1 foot of free draining gravel. The drain should lead to a positive gravity outlet or the wall could be provided with weep holes. Any pipe installed beneath the wall should be solid and strong enough to resist the overburden pressure from the weight of the wall. Drain discharge in front of the wall should occur to well drained areas at least 5 feet beyond the toe of the wall. Typical retaining wall drain details are shown on Fig. 5.

PAVEMENTS

Subgrade samples were obtained from the upper 5 feet of soils in borings TH-4 through TH-6. The soils consisted of sandy clay fill and natural sandy clay. The samples were combined to form a composite bulk sample and contained 70 percent silt and clay-sized particles and showed moderate plasticity with a liquid limit of 50 percent and plasticity index of 29. The sample classifies as A-7-6 with a Group Index of 19, based on criteria established by the American Association of State Highway and Transportation Officials (AASHTO). A Hveem stabilometer test (ASTM D 2844, AASHTO T 190) indicated a resistance value (R-value) of 20, as shown on Fig. B-10. The on-site soils possess fair pavement support characteristics. Pavement alternatives are discussed in the following sections. The pavement designs were based on our field and laboratory test results, the requirements of the City and County of Boulder and the Colorado Department of Transportation (CDOT), and our experience.

The 1-foot sample from TH-6 swelled 2.9 percent when wetted under an applied pressure of 200 psf. The 4-foot sample from TH-4 swelled 1.9 percent when wetted under 500 psf. We do not believe the subgrade possesses significant swell potential. According to the CDOT manual, removal and replacement of at least 3 feet below pavement is necessary for treatment of expansive soil. We do not believe removal and replacement is justified on this project. We judge normal scarification, moisture adjustment and recompaction of the upper 12 inches of subgrade will effectively mitigate risk of damaging heave.

We assumed an Equivalent Daily Load Application (EDLA) of 30 or Equivalent Single Axle Loads (ESALs) of 219,000 for Iris Avenue, which is the minimum value specified in the Boulder manual for Residential Collectors. The following equations from CDOT were used to determine the resilient modulus (M_R) of the subgrade from the correlated R-values and soil support values:

- S_1 = [(R-5) / 11.29] + 3 = 4.33 *(Eq. 2.1, page 2-7, CDOT 2011 Pavement Design Manual)*
- M_R = $10^{[(S_1 + 18.72) / 6.24]}$ = 4,940 psi *(Eq. 2.2, page 2-7, CDOT 2011 Pavement Design Manual)*

Where:

M_R = resilient modulus (psi)
S_1 = soil support value
R = 20

We calculated an effective resilient modulus (M_R) of 4,940 psi for the pavement subgrade. This value and the ESALs in conjunction with reliability (95 percent), standard deviation (0.44), and design serviceability loss (2.0) were used to determine the required structural number of 3.5. We recommend the following minimum design pavement alternatives. The design nomographs and calculations are provided in Appendix C.

SUMMARY OF RECOMMENDED PAVEMENT ALTERNATIVES
IRIS AVENUE

EDLA/ESALs	Hot-Mix Asphalt (HMA)	Hot-Mix Asphalt & Aggregate Base Course (HMA + ABC)	Portland Cement Concrete (PCC)
30/219,000	8" HMA	5" HMA + 11" ABC	7" PCC

The design of a pavement system is as much a function of paving materials as supporting characteristics of the subgrade. Pavement subgrades should be scarified, moisture conditioned, and compacted in accordance with the criteria provided in Fill and Backfill, prior to paving. The quality of each construction material is reflected by the strength coefficient used in the calculations. If the pavement system is constructed of inferior material, then the life and serviceability of the pavement will be substantially reduced. Materials and placement methods should conform to the requirements of The City and County of Boulder and CDOT. All materials planned for construction should be tested by our firm to confirm their compliance with project specifications.

A primary cause of early pavement deterioration is water infiltration into the pavement system. The addition of moisture usually results in softening of the subgrade and eventual failure of the pavement. We recommend drainage be designed for rapid removal of surface runoff. Curb and gutter should be backfilled and the backfill compacted to reduce ponding adjacent to the pavements. Final grading of the subgrade should be carefully controlled so that design cross-slope is maintained and low spots in the subgrade which could trap water are eliminated. Seals should be provided between curb and pavement and at all joints to reduce moisture infiltration. Landscaped areas in or near pavements should be avoided.

We have included construction, materials and maintenance recommendations for flexible and rigid pavements in Appendix D. Routine maintenance, such as sealing and repair of cracks annually, and overlays at five to seven-year intervals, are necessary to achieve the long-term life of an asphalt pavement system. If the design and construction recommendations cannot be followed or anticipated traffic loads are higher than those assumed in our calculations, we should be contacted to review our recommendations.

CONCRETE

Concrete in contact with soil can be subject to sulfate attack. We measured water-soluble sulfate concentrations of 0.03 percent and less in three samples from this site. Sulfate concentrations less than 0.1 percent indicate Class 0 exposure to sulfate attack for concrete in contact with the subsoils, according to the American Concrete Institute (ACI) *Guide To Durable Concrete (ACI 201.2R-01)*. For this level of sulfate concentration, ACI indicates any type of cement can be used for concrete in contact with the subsoils. In our experience, superficial damage may occur to the exposed surfaces of highly permeable concrete, even though sulfate levels are relatively low. To control this risk and to resist freeze-thaw deterioration, the water-to-cementitious material ratio should not exceed 0.50 for concrete in contact with soils that are likely to stay moist due to surface drainage or high water tables. Concrete should have a total air content of 6 percent ± 1.5 percent.

DESIGN CONSULTATION AND CONSTRUCTION OBSERVATIONS

This report has been prepared for the exclusive use of Muller Engineering Company for the purpose of providing geotechnical design and construction criteria for the portion of the project included. The information, conclusions, and recommendations presented herein are based upon the considerations of many factors including, but not limited to, the type of structure proposed, the geologic setting, and the subsurface conditions encountered. The conclusions and recommendations contained in the report are not valid for use by others. Standards of practice evolve in the area of geotechnical engineering. The recommendations provided are appropriate for about three years. If the proposed improvements are not constructed within about three years or the proposed construction changes, we should be contacted to determine if we should update this report.

CTL | Thompson, Inc. should be retained to provide general review of the design construction plans prior to construction. Our firm should also provide geotechnical and materials observations and testing during construction. The purpose is to observe the construction with respect to the geotechnical design concepts, specifications or recommendations, and to facilitate design changes in areas where the subsurface conditions differ from those anticipated prior to start of construction. This project will involve many activities that should be monitored during the construction phase. Excavations as well as placement and compaction of fill and backfill should be observed and tested. Installation of foundations and improvements should be observed. When construction schedules and quantities are defined, we can work with the owner's representatives to develop an appropriate scope of services and budget for construction monitoring.

GEOTECHNICAL RISK

The concept of risk is an important aspect with any geotechnical evaluation primarily because the methods used to develop geotechnical recommendations do not comprise an exact science. We never have complete knowledge of subsurface conditions. Our analysis must be tempered with engineering judgment and

experience. Therefore, the recommendations presented in any geotechnical evaluation should not be considered risk-free. Our recommendations represent our judgment of those measures that are necessary to increase the chances that the structure will perform satisfactorily. It is critical that all recommendations in this report are followed.

LIMITATIONS

Our borings were spaced to obtain a reasonable evaluation of subsurface conditions. The borings are representative of soils encountered only at the exact boring locations. Variations in the subsoil conditions not indicated by our borings are always possible. A representative of CTL | Thompson, Inc. should observe excavations, fill and backfill placement, and installation of foundations, culverts, pavements and other improvements.

We believe this investigation was conducted with that level of skill and care normally used by geotechnical engineers practicing in this area at this time. No warranty, express or implied, is made. If we can be of further service in discussing the contents of this report or in the analysis of the influence of the subsoil conditions on design of the structures, please call.

CTL | THOMPSON, INC.

Benny I. Lujan, EIT
Staff Geotechnical Engineer

Reviewed by:

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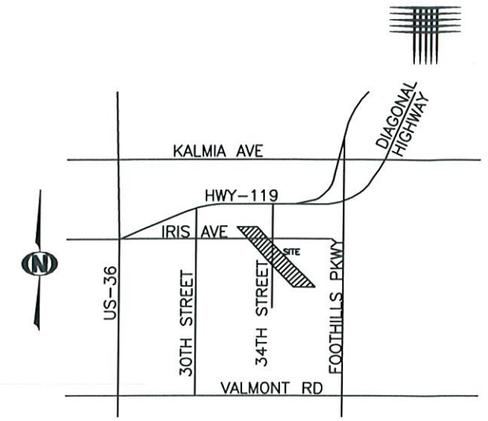

VICINITY MAP
NOT TO SCALE

LEGEND:

TH-1 ● APPROXIMATE LOCATION OF EXPLORATORY BORING

N

0 100 200
SCALE: 1" = 200'

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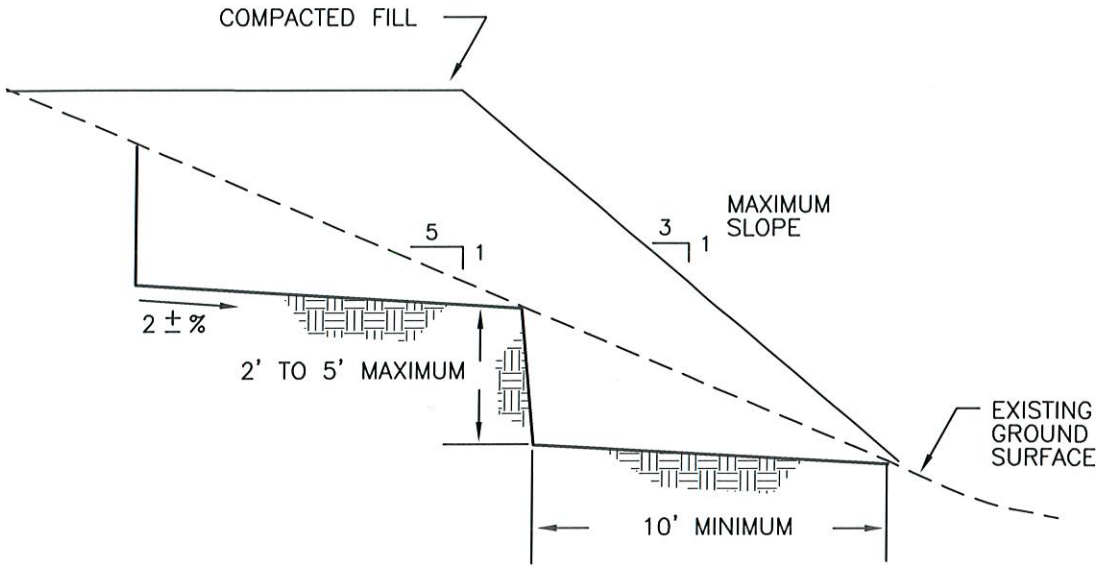
WONDERLAND CREEK IMPROVEMENTS
Project No. DN45,648-145

Locations of Exploratory Borings

Fig. 1

60-BENCHED-FILL_01



NOTES:

1) NATURAL SLOPES OF 20 PERCENT OR STEEPER ARE TO BE BENCHED PRIOR TO FILL PLACEMENT.

2) SLOPE BENCHES TO OUTSLOPE AT 2± PERCENT.

Benched Fill Detail

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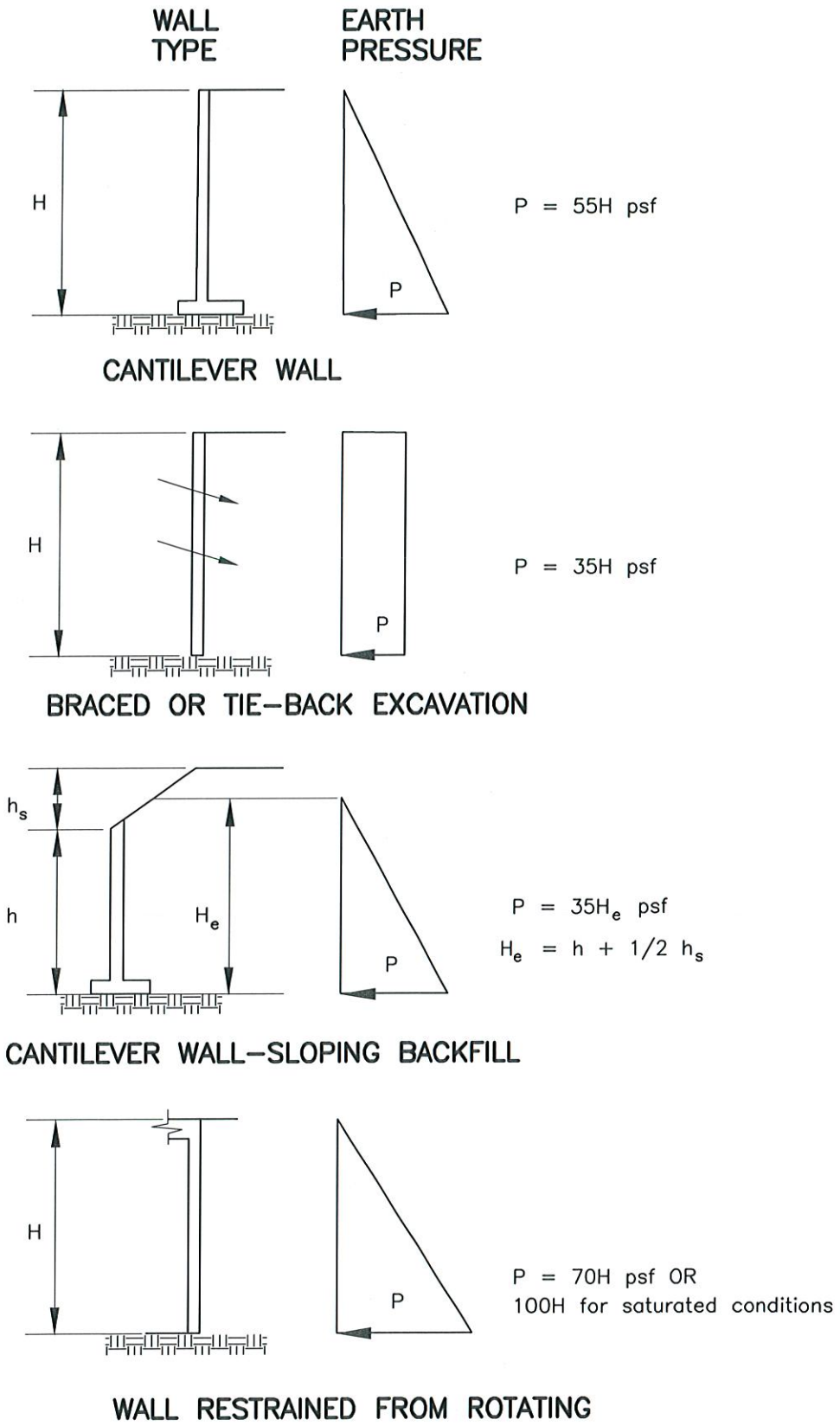
Fig. 2

65-EARTH-PRESSUSRE_01



Recommended Lateral Earth Pressure Distribution

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WONDERLAND CREEK

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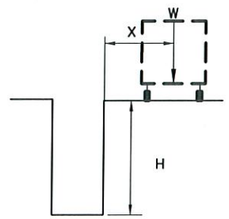
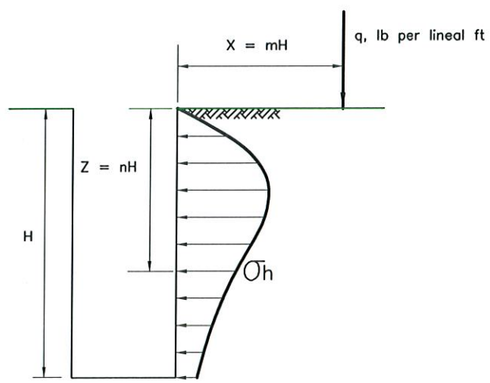
Fig. 3



W = TOTAL WEIGHT OF OBJECT
L or L_1 = LENGTH OF LOAD PARALLEL TO WALL/EXCAVATION
L_2 = LENGTH OF LOAD PERPENDICULAR TO WALL/EXCAVATION
X = DISTANCE FROM EDGE OF WALL/EXCAVATION MEASURED TO CENTER OF LOAD
H = TOTAL DEPTH OF WALL/EXCAVATION
Z = DEPTH OF WALL/EXCAVATION BELOW GROUND SURFACE



LATERAL PRESSURE AGAINST RIGID WALL DUE TO A LINE LOAD

q = LINE LOAD (plf)

$q = \frac{W}{L}$

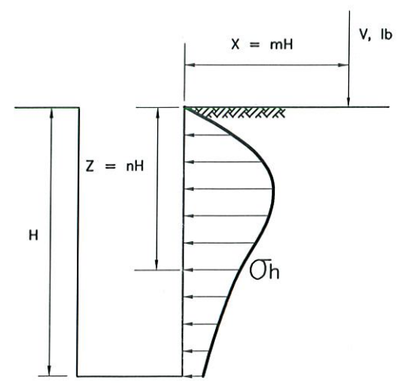
σ_h = LATERAL EARTH PRESSURE AT DEPTH Z DUE TO LINE LOAD q

FOR $m \leq 0.4$:

$$\sigma_h = \frac{q}{H} \times \frac{0.203n}{(0.16+n^2)^2}$$

FOR $m > 0.4$:

$$\sigma_h = \frac{4q}{\pi H} \times \frac{m^2 n}{(m^2+n^2)^2}$$



LATERAL PRESSURE AGAINST RIGID WALL DUE TO A POINT LOAD

V = POINT LOAD (lb)

V = W

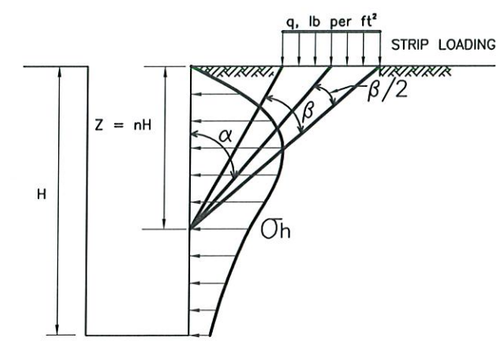
σ_h = LATERAL EARTH PRESSURE AT DEPTH Z DUE TO POINT LOAD V

FOR $m \leq 0.4$:

$$\sigma_h = \frac{0.28V}{H^2} \times \frac{n^2}{(0.16+n^2)^3}$$

FOR $m > 0.4$:

$$\sigma_h = \frac{1.77V}{H^2} \times \frac{m^2 n^2}{(m^2+n^2)^3}$$



LATERAL PRESSURE AGAINST RIGID WALL DUE TO A STRIP LOAD

q = STRIP LOAD (psf)

$q = \frac{W}{L_1 L_2}$

σ_h = LATERAL EARTH PRESSURE AT DEPTH Z DUE TO STRIP LOAD q

$$\sigma_h = \frac{2q}{\pi}(\beta - \sin\beta\cos 2\alpha)$$

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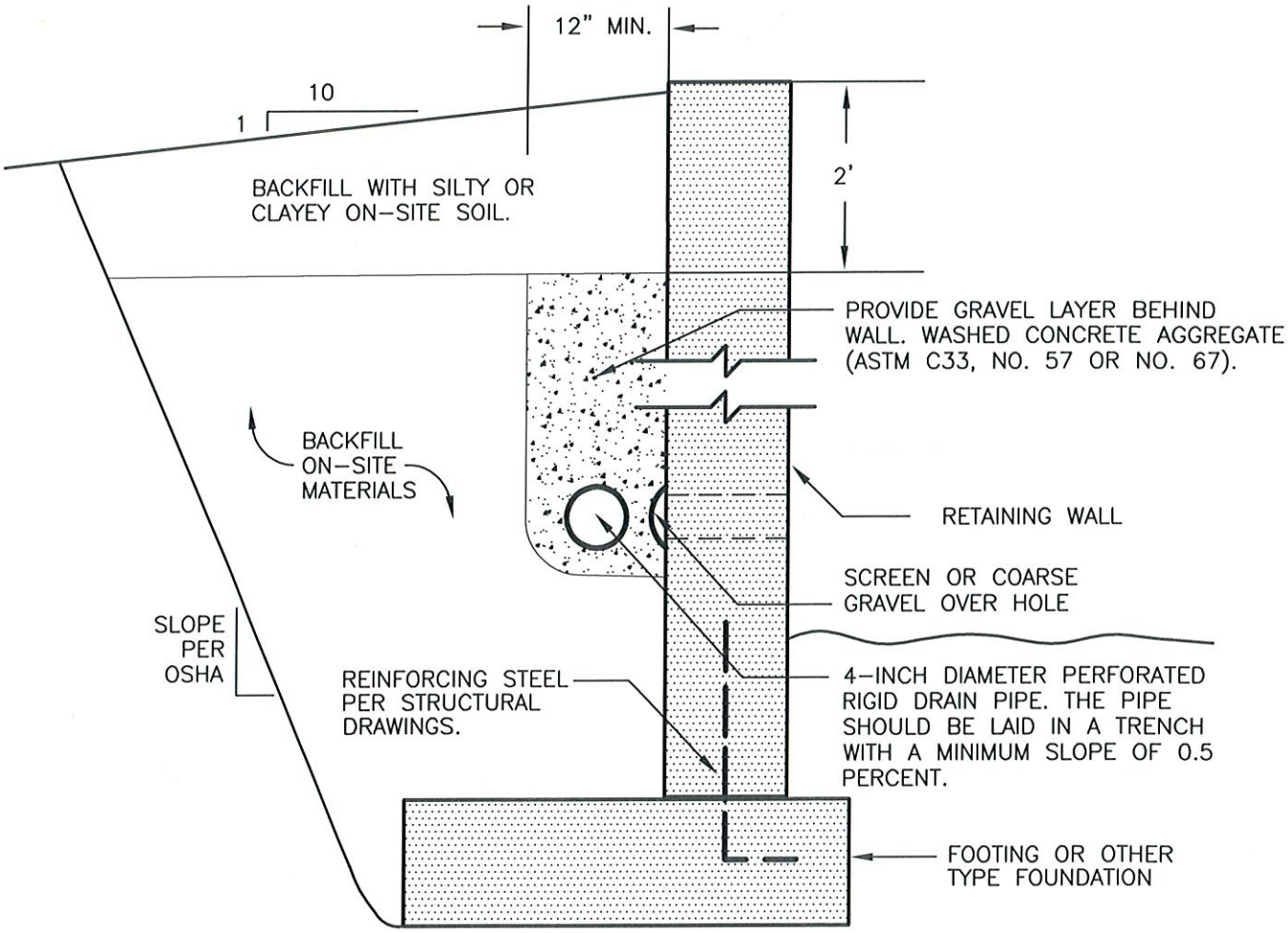
Surcharge Loads

Fig. 4

35-RETAINING-WALL_01



NOTE:
DRAIN PIPE TO GRAVITY OUTLET OR WEEP HOLES MAY BE USED.

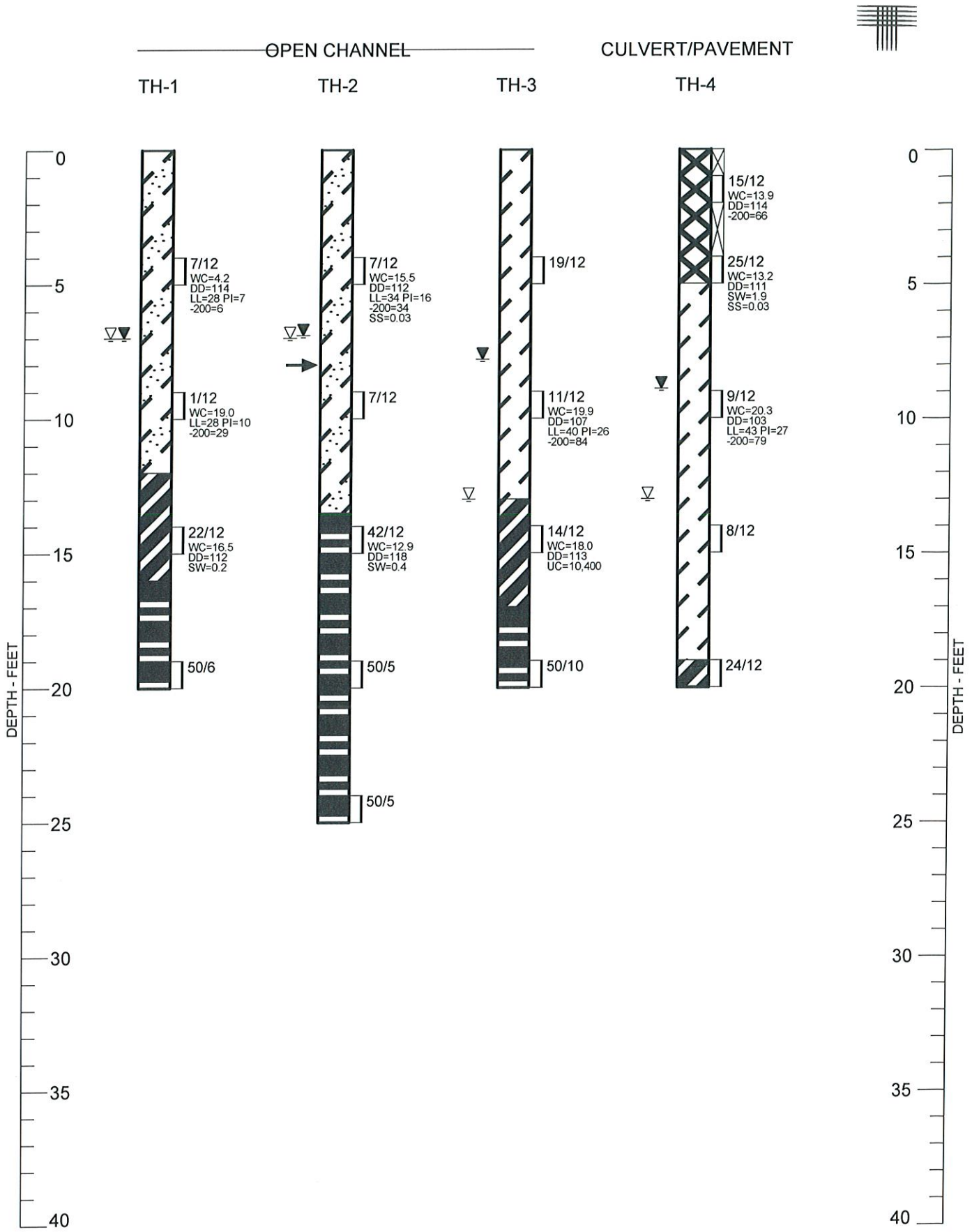
Typical Earth Retaining Wall Drain

MULLER ENGINEERING COMPANY
WONDERLAND CREEK IMPROVEMENTS
Project No. DN45,648-145

Fig. 5

APPENDIX A

SUMMARY LOGS OF EXPLORATORY BORINGS



SUMMARY LOGS OF EXPLORATORY BORINGS

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WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN45,648-145

FIG. A- 1

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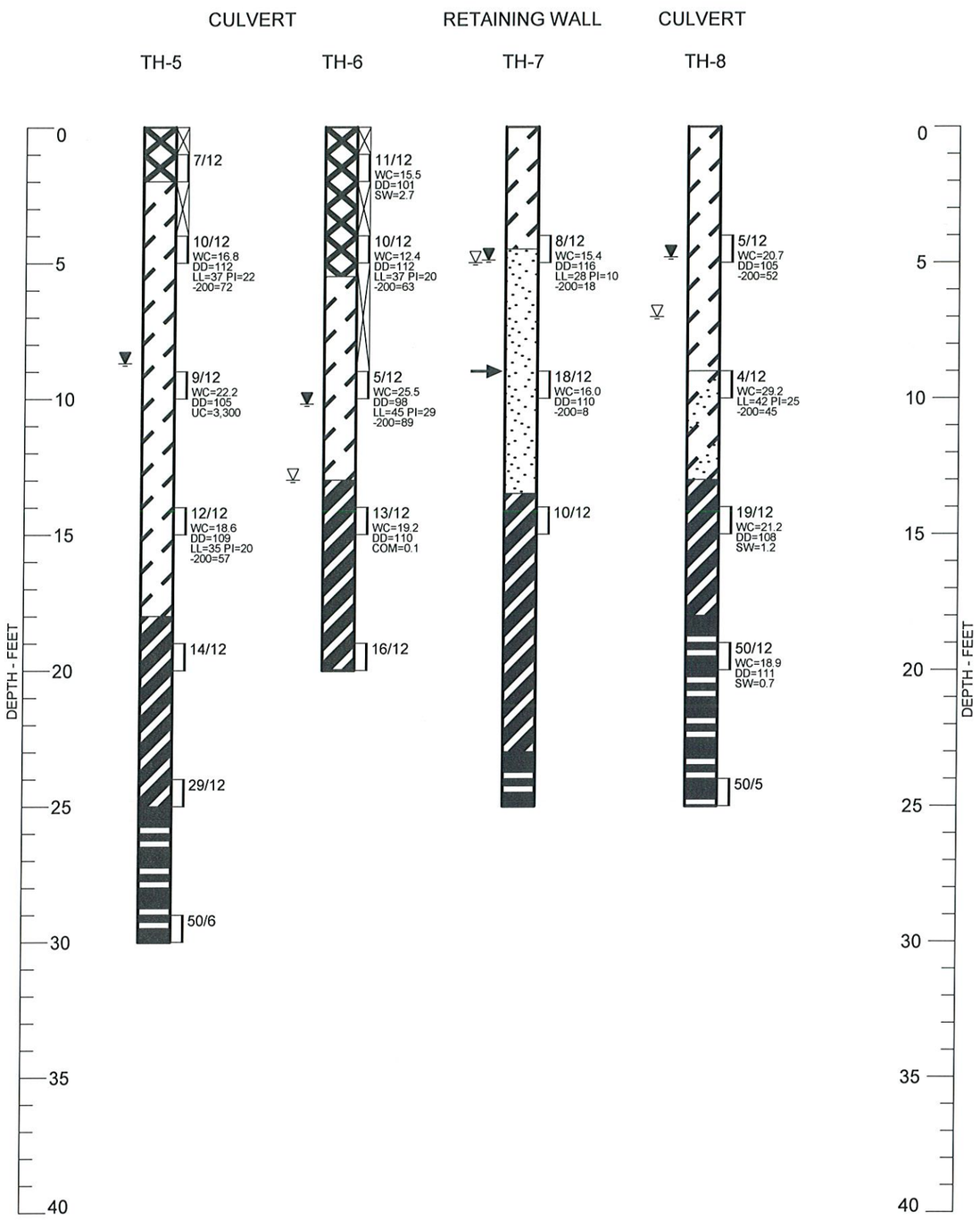

SUMMARY LOGS OF EXPLORATORY BORINGS

LEGEND:

- FILL, CLAY, SANDY TO VERY SANDY, SOME ASPHALT DEBRIS, MEDIUM STIFF TO VERY STIFF, MOIST, BROWN, WHITE, BLACK.
- CLAY, SANDY TO VERY SANDY, SLIGHTLY GRAVELLY, MEDIUM STIFF TO VERY STIFF, SLIGHTLY MOIST TO VERY MOIST, BROWN, WHITE, GRAY (CL).
- INTERLAYERED CLAY/SAND, SLIGHTLY GRAVELLY, VERY LOOSE TO LOOSE OR VERY SOFT TO MEDIUM SITFF, MOIST TO WET, BROWN, GRAY (CL, SM OR SC).
- SAND, SLIGHTLY SILTY TO SILTY, MEDIUM DENSE, MOIST TO WET, BROWN, (SP-SM, SW-SM, SM).
- WEATHERED CLAYSTONE, SANDY, MOIST, BROWN, GRAY.
- BEDROCK, CLAYSTONE, SANDY, MEDIUM HARD TO VERY HARD, SLIGHTLY MOIST TO MOIST, GRAY, BROWN.
- DRIVE SAMPLE. THE SYMBOL 7/12 INDICATES 7 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.
- BULK SAMPLE OBTAINED FROM AUGER CUTTINGS.
- WATER LEVEL MEASURED AT TIME OF DRILLING.
- WATER LEVEL MEASURED AFTER DRILLING ON NOVEMBER 18, 2011.
- INDICATES DEPTH WHERE HOLE CAVED.

NOTES:

1. THE BORINGS TH-1 THROUGH TH-6 AND TH-8 WERE DRILLED ON OCTOBER 18, 2011 USING 4-INCH DIAMETER, CONTINUOUS-FLIGHT AUGER AND A TRUCK-MOUNTED DRILL RIG. THE BORING TH-7 WAS DRILLED ON OCTOBER 24, 2011 USING 3-INCH DIAMETER AUGER AND A LIMITED-ACCESS RIG.
2. BORING LOCATIONS WERE DETERMINED BY REFERENCING LANDMARKS AND PLANS PROVIDED.
3. WC - INDICATES MOISTURE CONTENT (%).
   DD - INDICATES DRY DENSITY (PCF).
   SW - INDICATES SWELL WHEN WETTED UNDER APPLIED PRESSURE (%).
   COM- INDICATES COMPRESSION WHEN WETTED UNDER APPLIED PRESSURE (%).
   LL - INDICATES LIQUID LIMIT (%).
   PI - INDICATES PLASTICITY INDEX (%).
   -200 - INDICATES PASSING NO. 200 SIEVE (%).
   UC - INDICATES UNCONFINED COMPRESSIVE STRENGTH (psf).
   SS - INDICATES WATER-SOLUBLE SULFATE CONTENT (%).
4. THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS AND CONCLUSIONS CONTAINED IN THIS REPORT.

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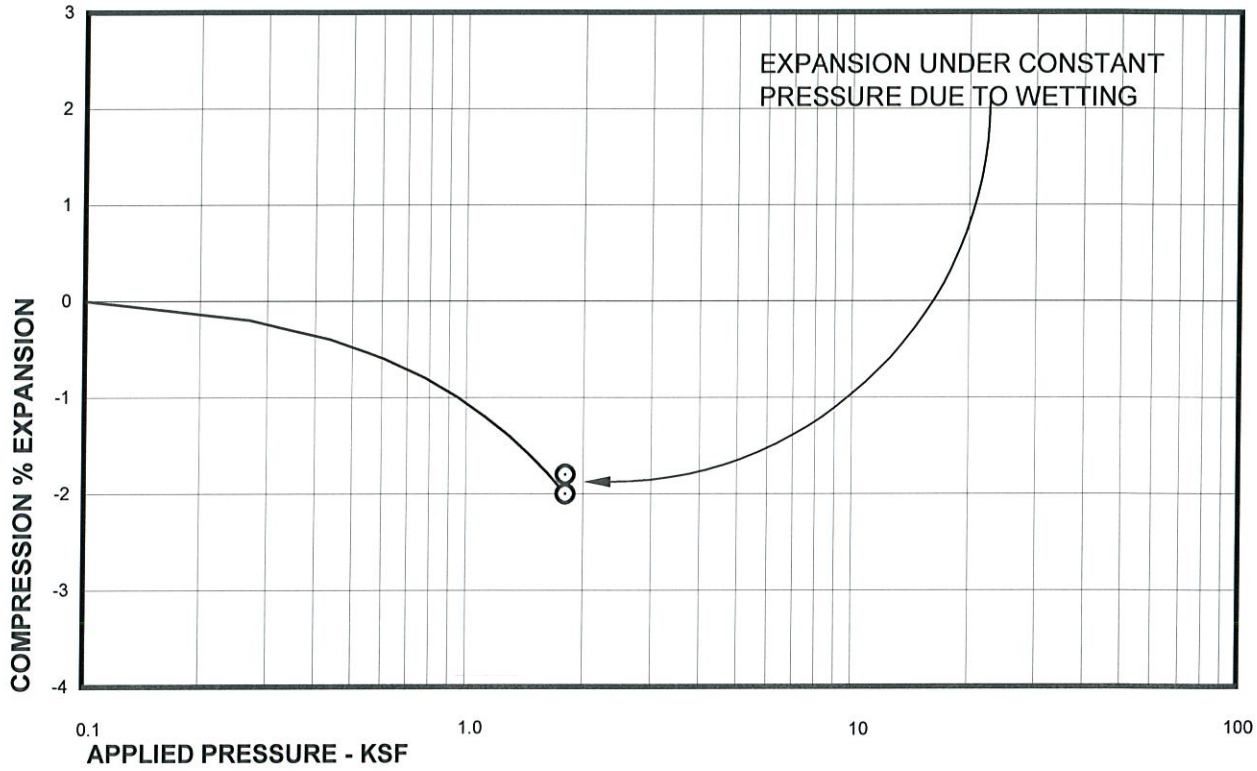
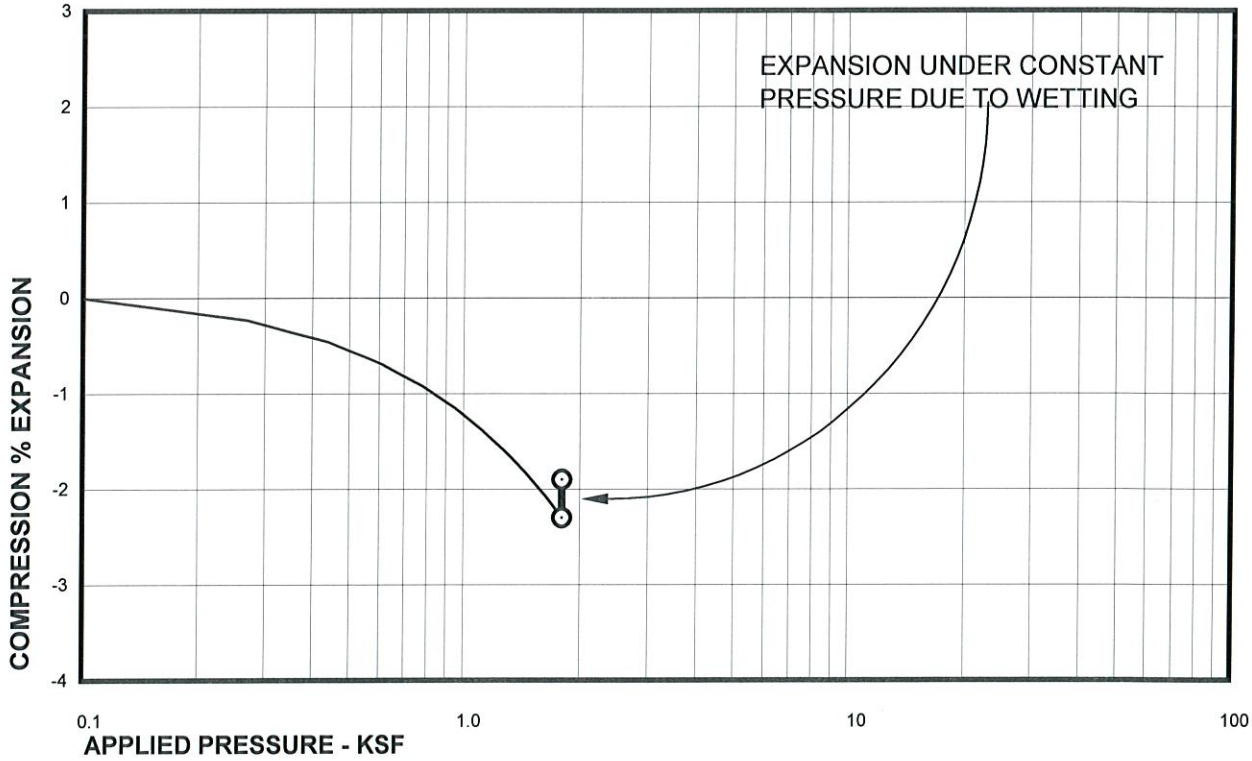
APPENDIX B

LABORATORY TEST RESULTS



Sample of WEATHERED CLAYSTONE
From TH-1 AT 14 FEET

DRY UNIT WEIGHT= 112 PCF
MOISTURE CONTENT= 16.5 %



Sample of CLAYSTONE
From TH-2 AT 14 FEET

DRY UNIT WEIGHT= 118 PCF
MOISTURE CONTENT= 12.9 %

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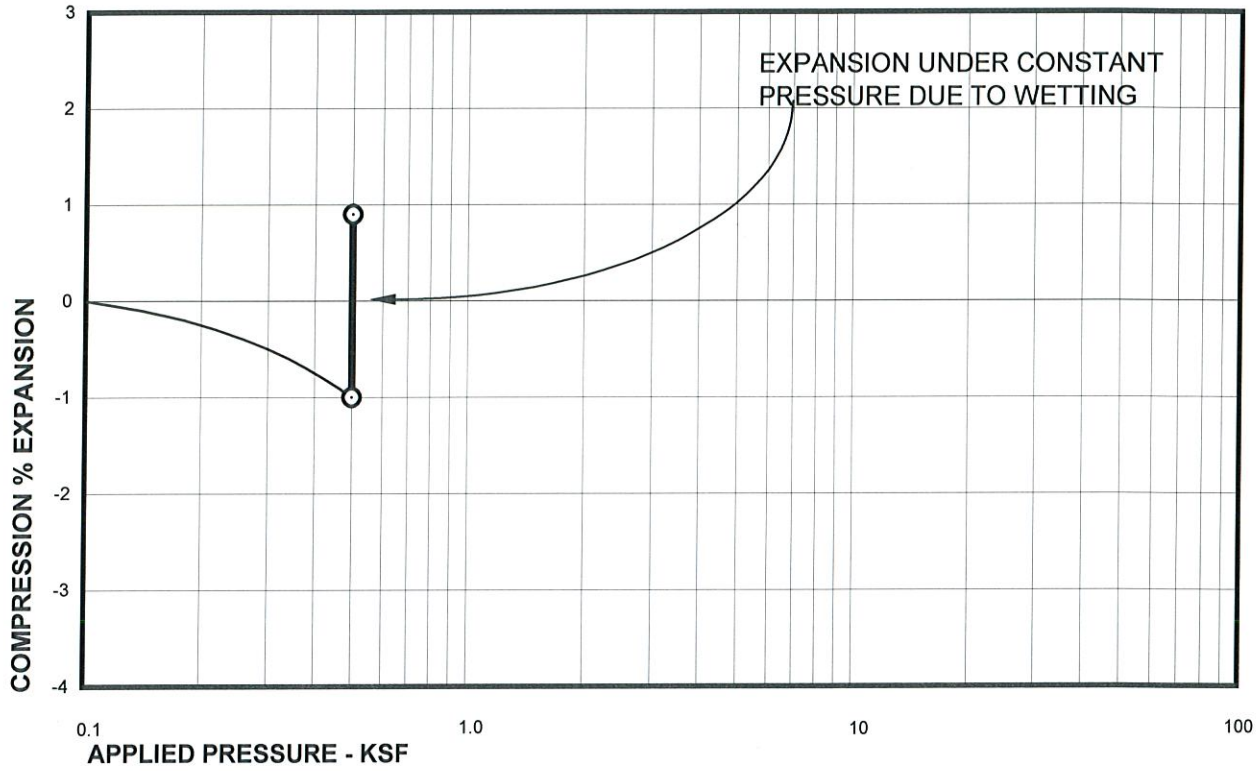
S:\PROJECTS\45600\DN45648.000\145\2. Reports\R1\DN45648-145-R1-X1(swell)

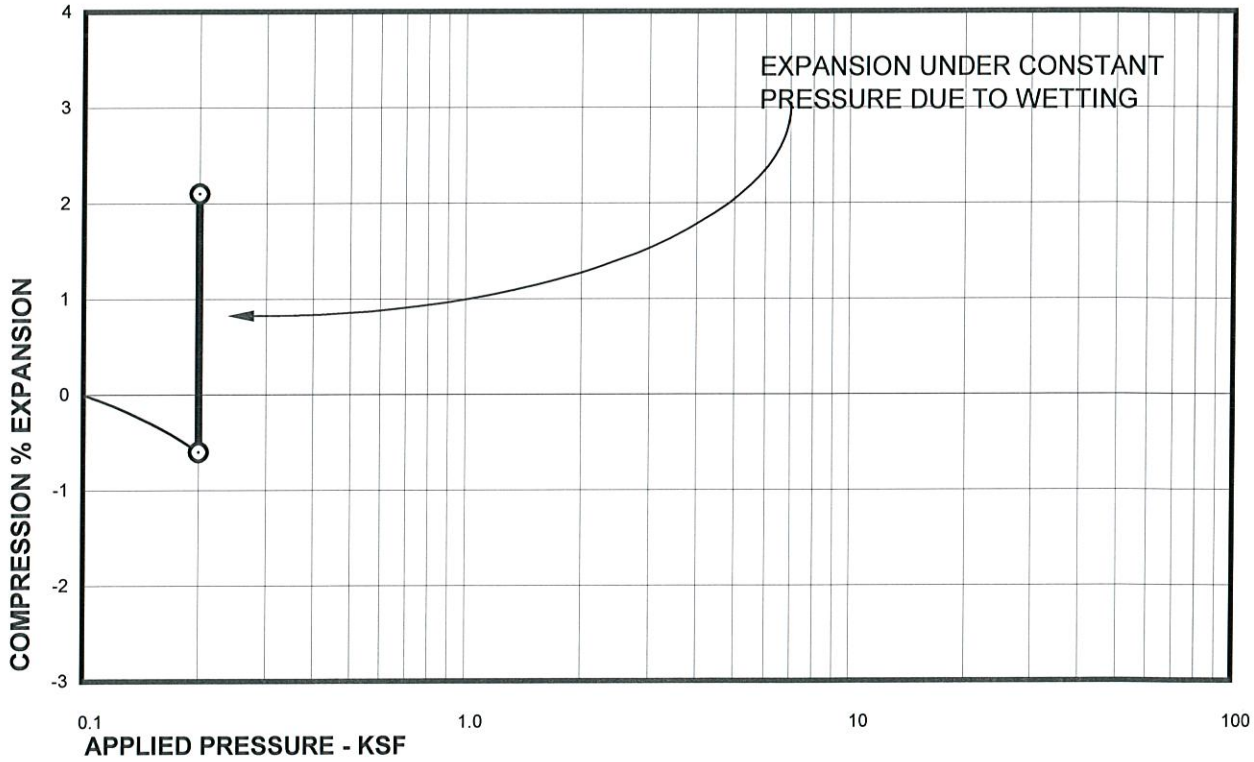
Swell Consolidation Test Results

FIG. B-1



Sample of FILL, CLAY, SANDY
From TH-4 AT 4 FEET

DRY UNIT WEIGHT= 111 PCF
MOISTURE CONTENT= 13.2 %



Sample of FILL, CLAY, SANDY
From TH-6 AT 1 FEET

DRY UNIT WEIGHT= 101 PCF
MOISTURE CONTENT= 15.5 %

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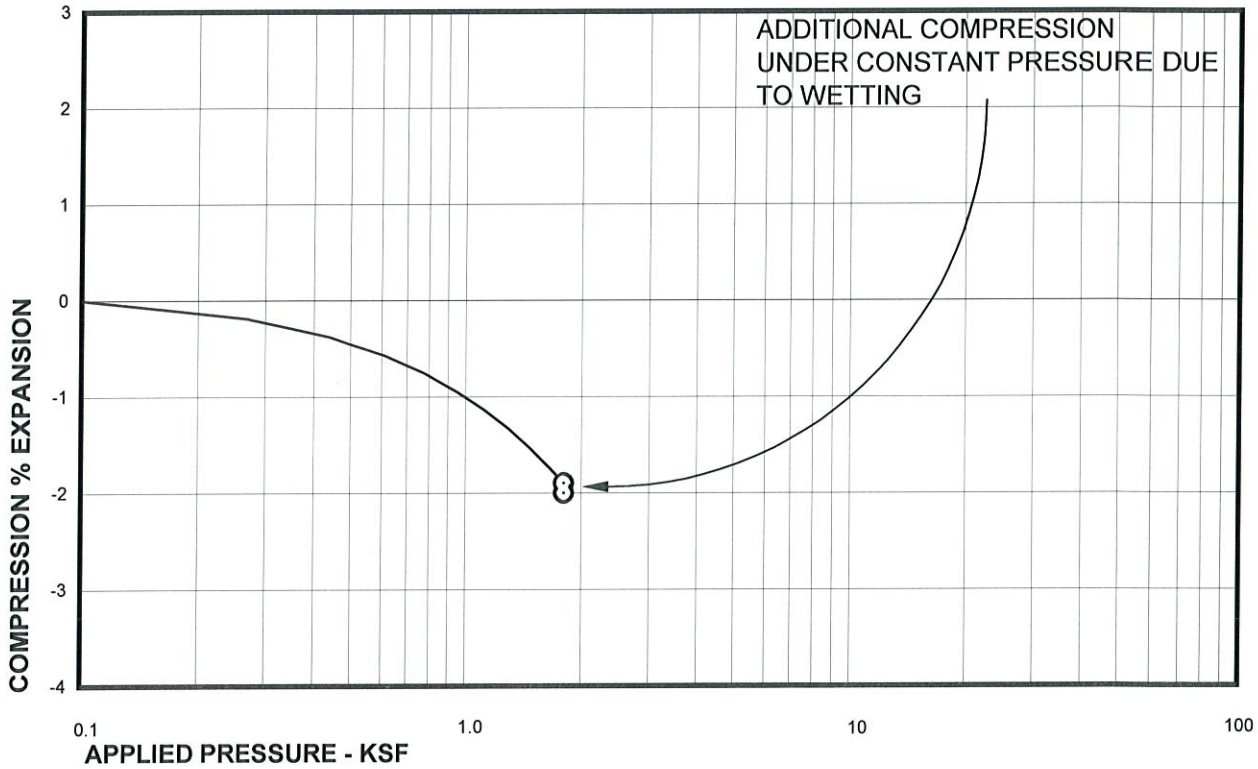
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN45,648-145
S:\PROJECTS\45600\DN45648.000\145\2. Reports\R1\DN45648-145-R1-X1(swell)

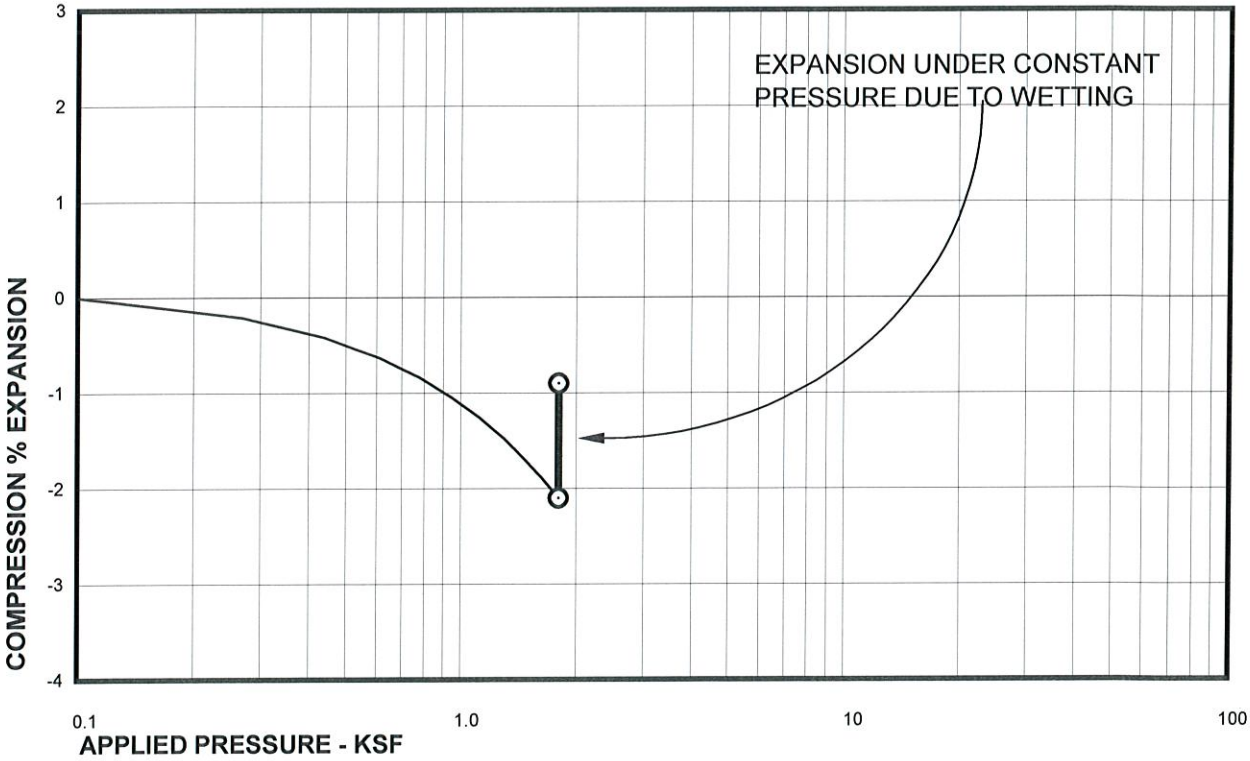
Swell Consolidation Test Results

FIG. B-2



Sample of WEATHERED CLAYSTONE
From TH-6 AT 14 FEET

DRY UNIT WEIGHT= 110 PCF
MOISTURE CONTENT= 19.2 %



Sample of WEATHERED CLAYSTONE
From TH-8 AT 14 FEET

DRY UNIT WEIGHT= 108 PCF
MOISTURE CONTENT= 21.2 %

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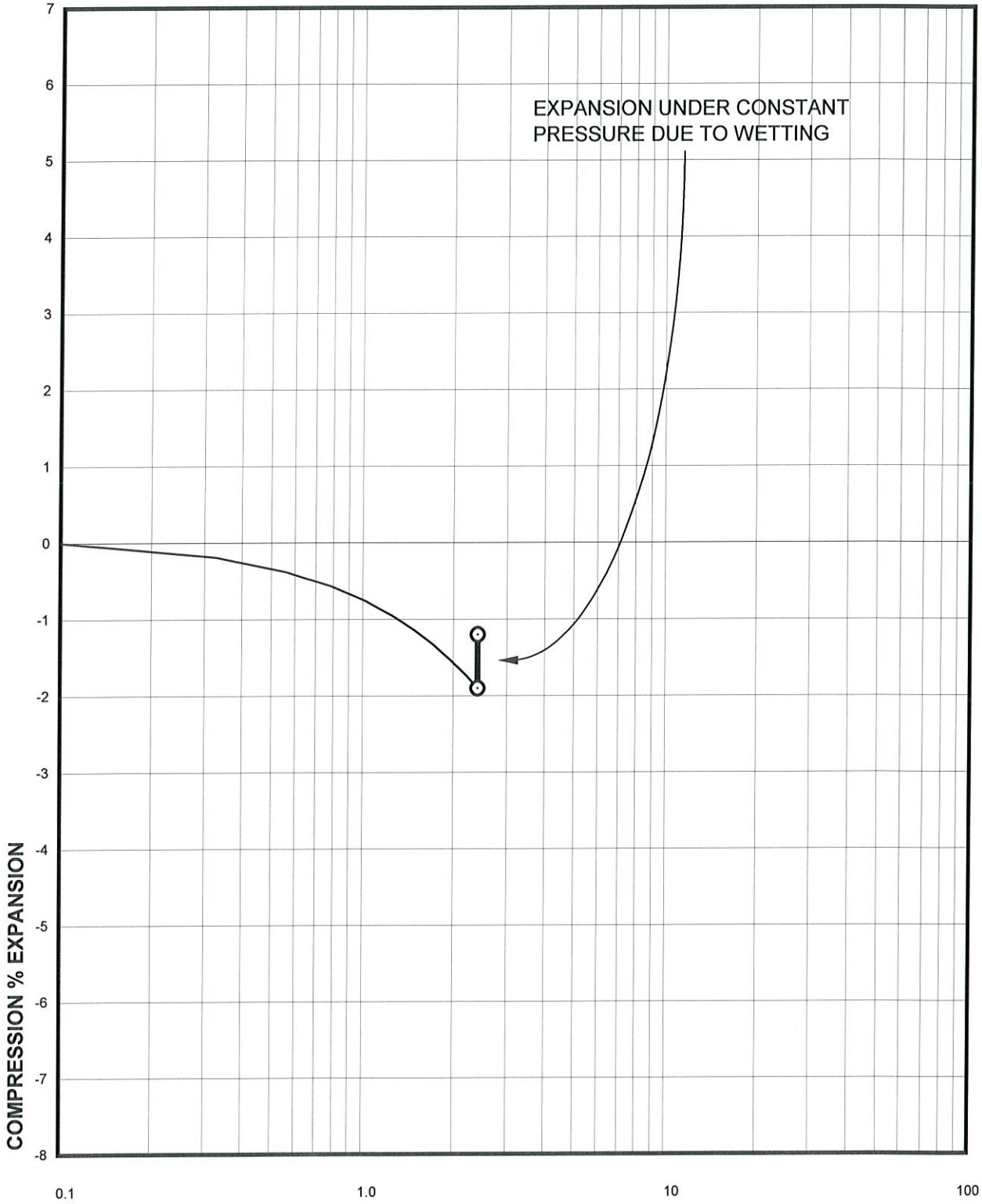
PROJECT NO. DN45,648-145
S:\PROJECTS\45600\DN45648.000\145\2. Reports\R1\DN45648-145-R1-X1(swell)

Swell Consolidation Test Results

FIG. B-3



Sample of CLAYSTONE

From TH-8 AT 19 FEET

DRY UNIT WEIGHT= 111 PCF

MOISTURE CONTENT= 18.9 %

Swell Consolidation Test Results

FIG. B-4

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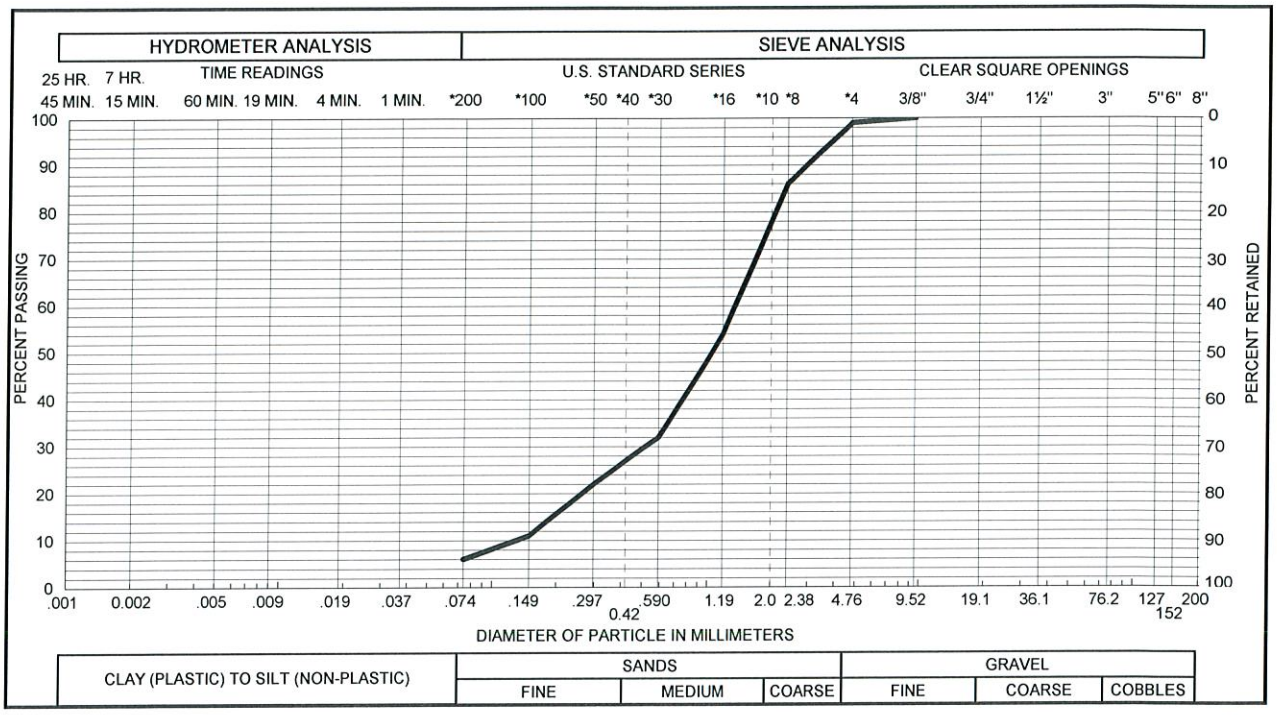
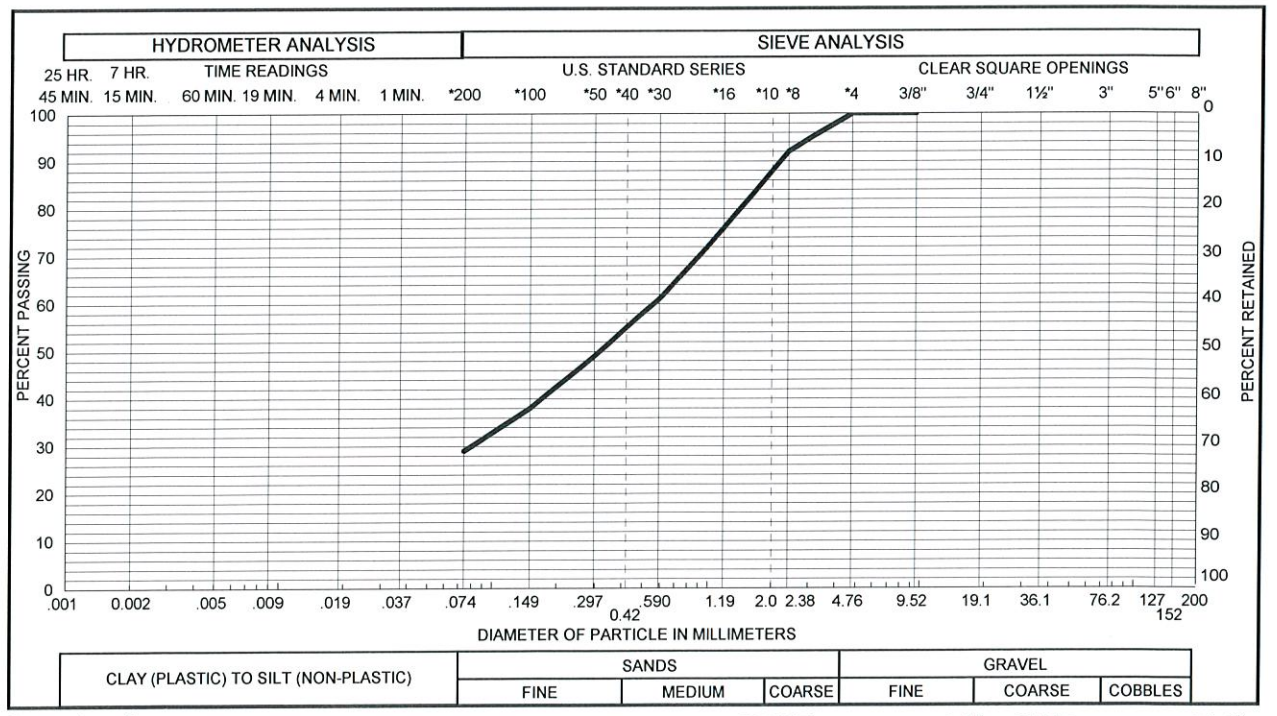
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN45,648-145
S:\PROJECTS\45600\DN45648.000\145\2. Reports\R1\DN45648-145-R1-X1(swell)



Sample of INTERLAYERED CLAY/SAND (SM, SC AND CL)
From TH - 1 AT 4 FEET

GRAVEL 1 % SAND 93 %
SILT & CLAY 6 % LIQUID LIMIT 28 %
PLASTICITY INDEX 7 %



Sample of INTERLAYERED CLAY/SAND (SM, SC AND CL)
From TH - 1 AT 9 FEET

GRAVEL 0 % SAND 71 %
SILT & CLAY 29 % LIQUID LIMIT 28 %
PLASTICITY INDEX 10 %

Gradation Test Results FIG. B-5

MULLER ENGINEERING COMPANY
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN45,648-145
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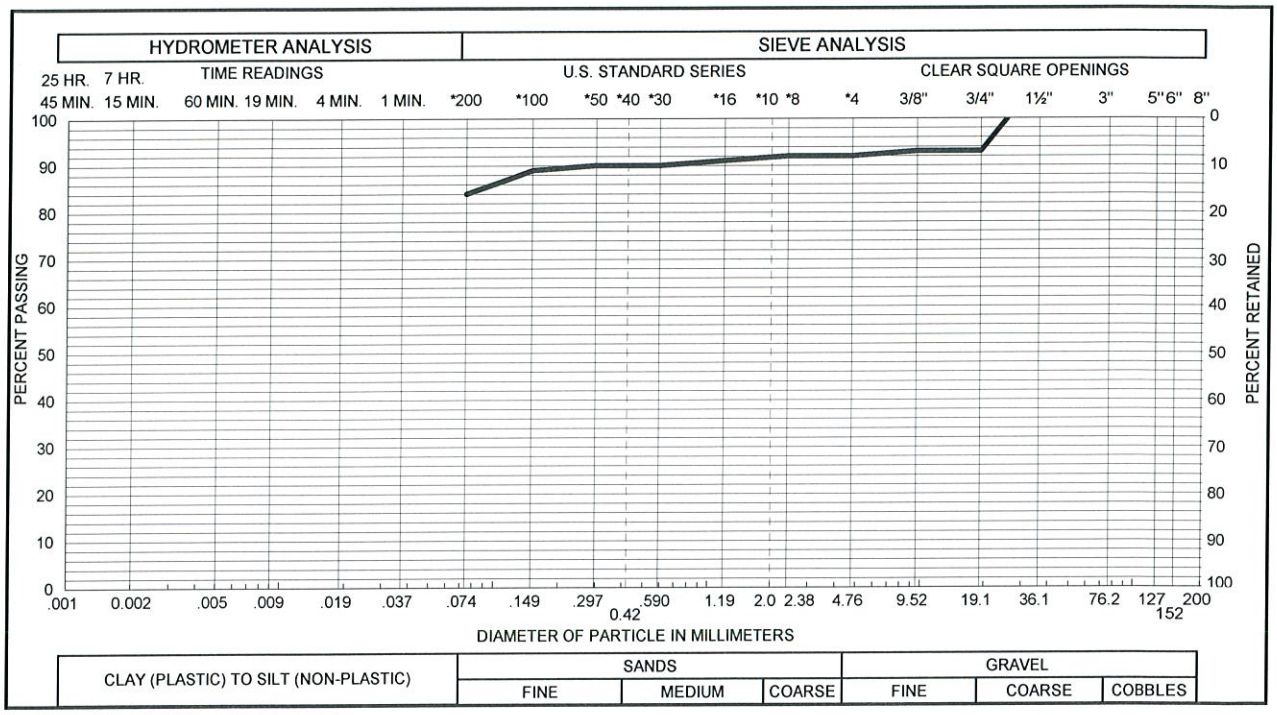
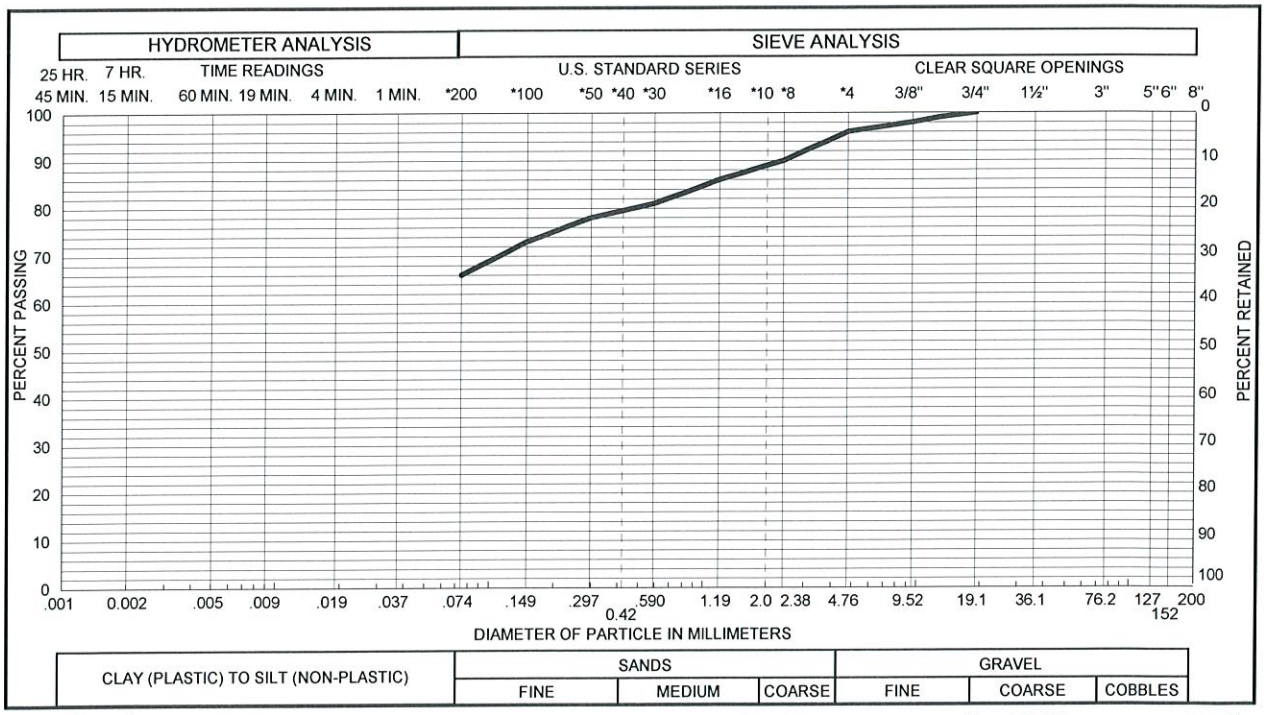


Sample of CLAY, SANDY (CL)
From TH - 3 AT 9 FEET

GRAVEL 8 % SAND 8 %
SILT & CLAY 84 % LIQUID LIMIT 40 %
PLASTICITY INDEX 26 %



Sample of FILL, CLAY, SANDY
From TH - 4 AT 1 FEET

GRAVEL 4 % SAND 30 %
SILT & CLAY 66 % LIQUID LIMIT %
PLASTICITY INDEX %

Gradation Test Results FIG. B-6

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WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN45,648-145
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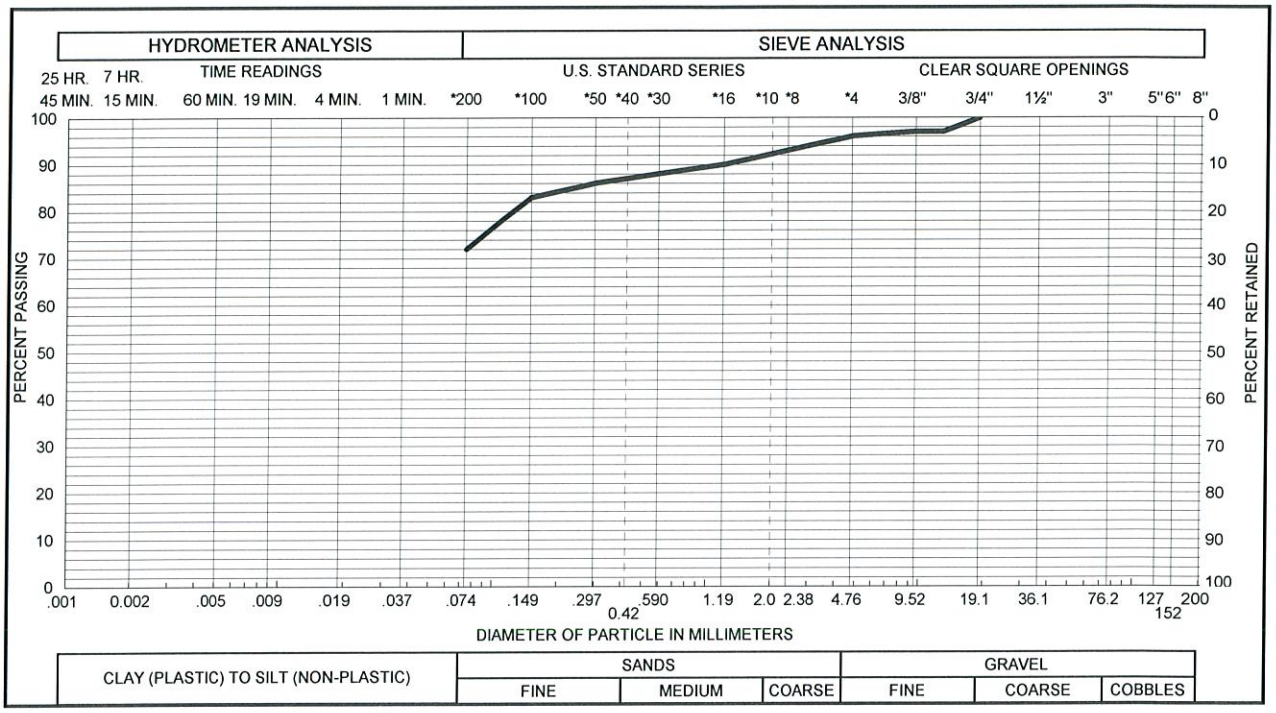
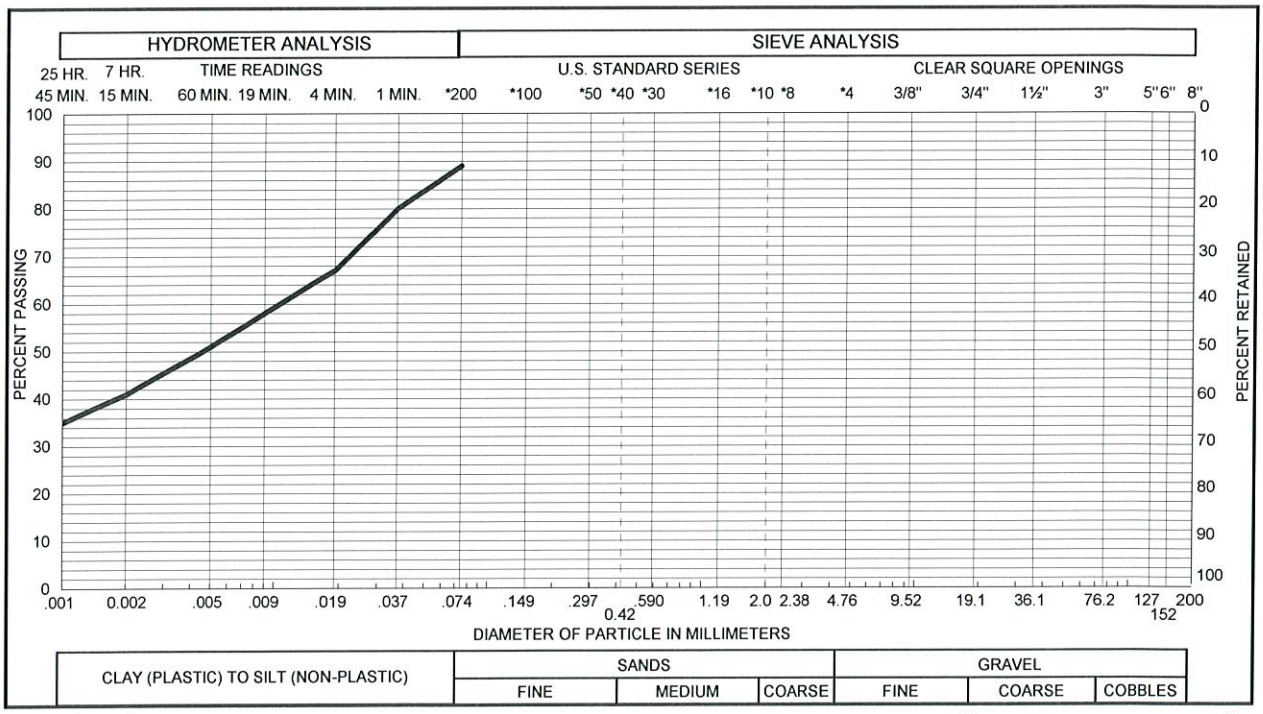


Sample of CLAY, SANDY (CL)
From TH - 5 AT 4 FEET

GRAVEL 4 % SAND 24 %
SILT & CLAY 72 % LIQUID LIMIT 37 %
PLASTICITY INDEX 22 %



Sample of CLAY, SANDY (CL)
From TH - 6 AT 9 FEET

GRAVEL 0 % SAND 11 %
SILT & CLAY 89 % LIQUID LIMIT 45 %
PLASTICITY INDEX 29 %

Gradation Test Results FIG. B-7

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WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN45,648-145
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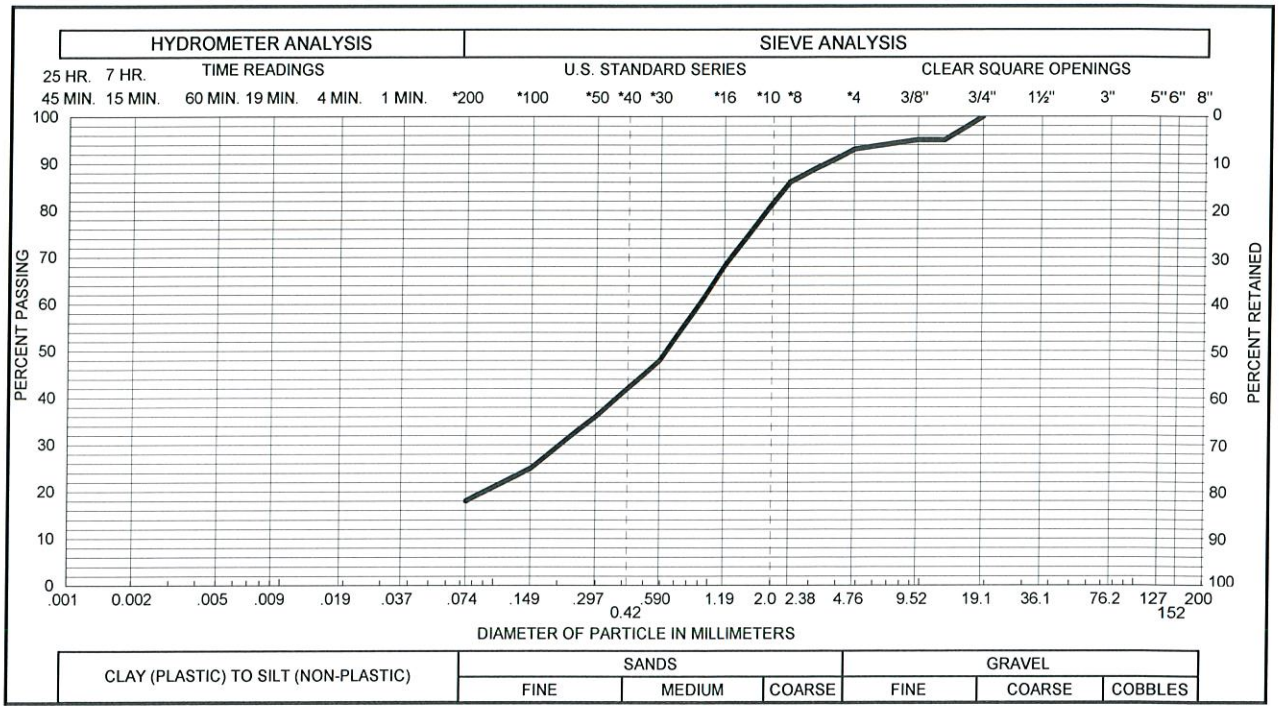
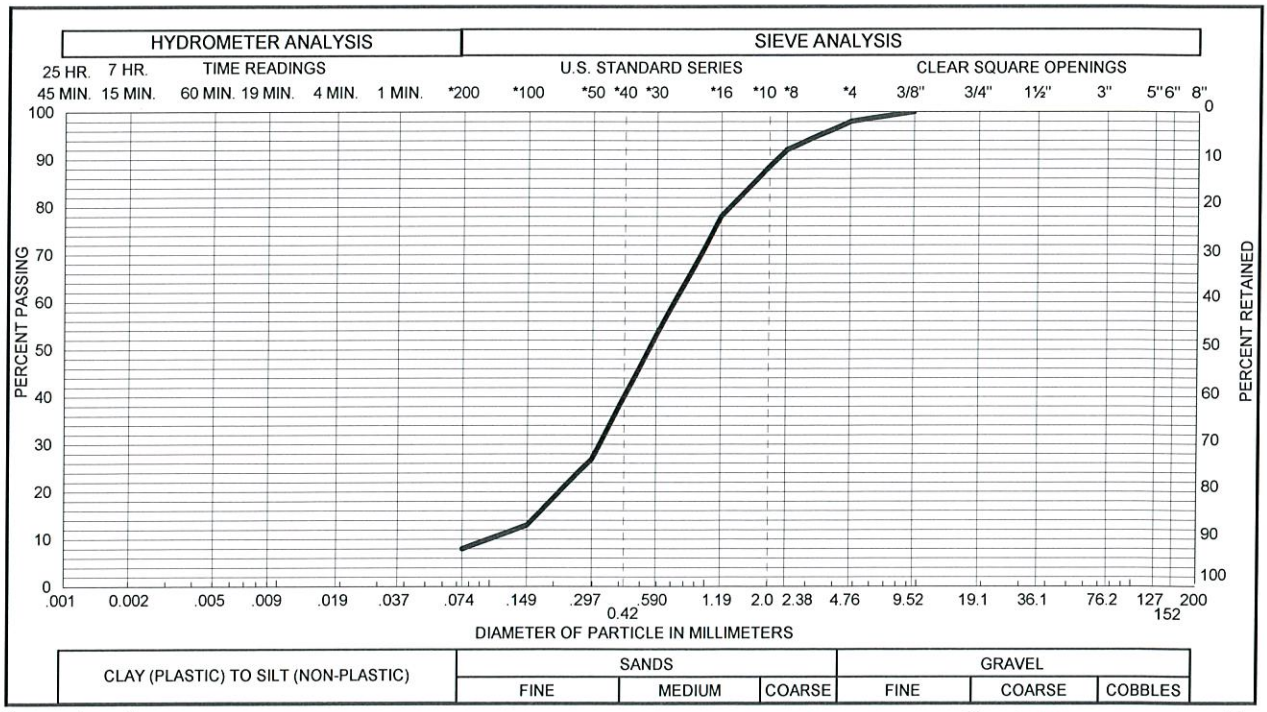


Sample of INTERLAYERED CLAY/SAND (SM, SC AND CL)
From TH - 7 AT 4 FEET

GRAVEL 7 % SAND 75 %
SILT & CLAY 18 % LIQUID LIMIT 28 %
PLASTICITY INDEX 10 %



Sample of SAND, SLIGHTLY SILTY (SW-SM)
From TH - 7 AT 9 FEET

GRAVEL 2 % SAND 90 %
SILT & CLAY 8 % LIQUID LIMIT %
PLASTICITY INDEX %

Gradation Test Results FIG. B-8

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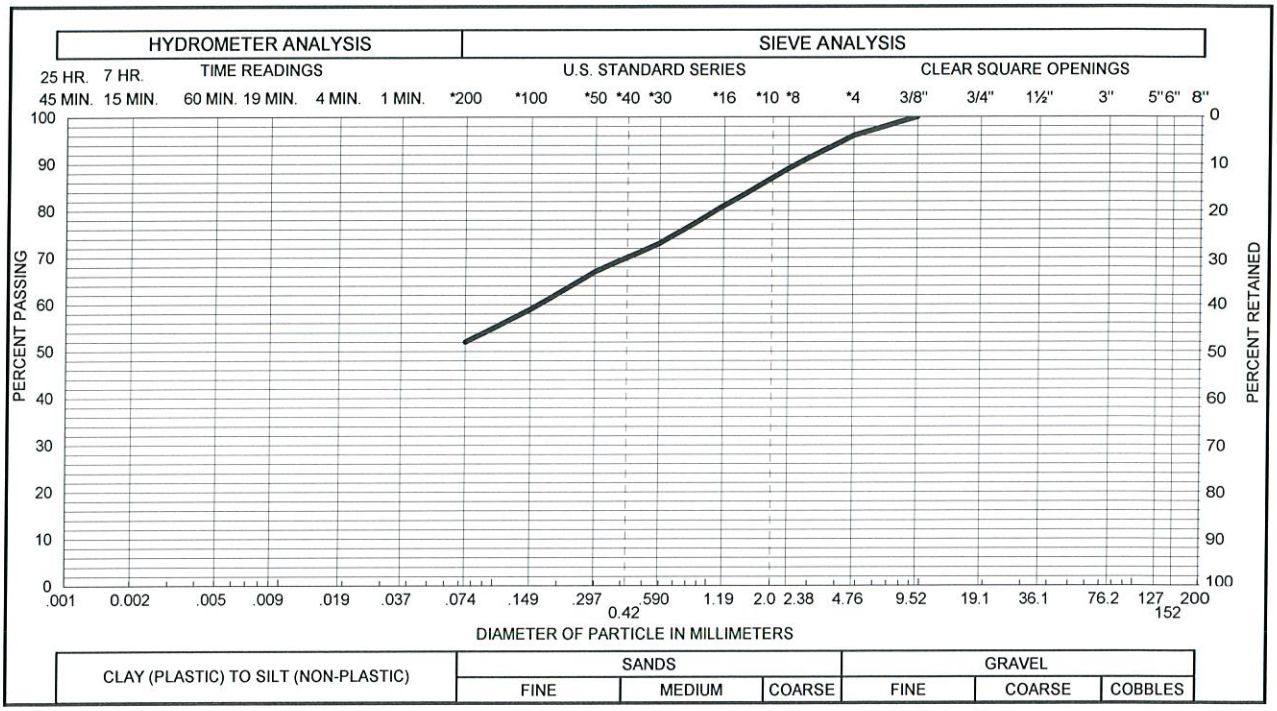
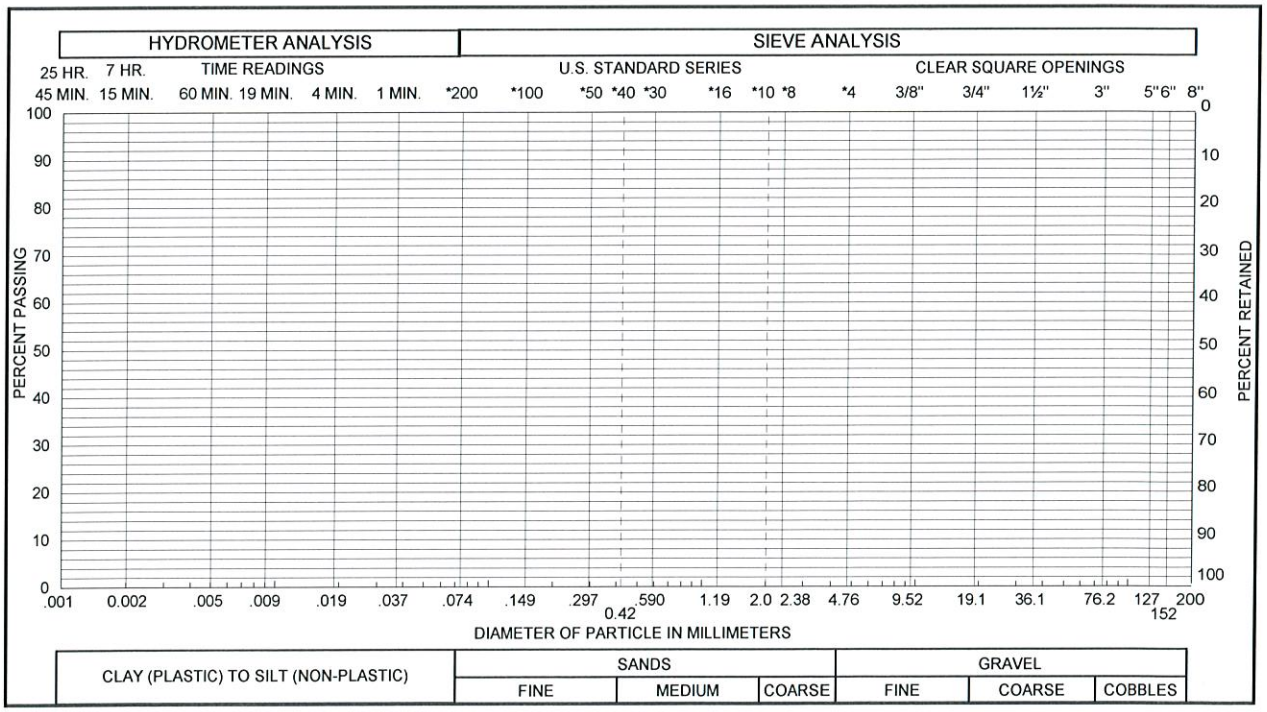
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN45,648-145
S:\PROJECTS\45600\DN45648.000\145\2. Reports\R1\DN45648-145-R1-X2(GRAD)



Sample of CLAY, SANDY (CL)
From TH - 8 AT 4 FEET

GRAVEL 4 % SAND 44 %
SILT & CLAY 52 % LIQUID LIMIT %
PLASTICITY INDEX %



Sample of
From

GRAVEL % SAND %
SILT & CLAY % LIQUID LIMIT %
PLASTICITY INDEX %

Gradation Test Results FIG. B-9

MULLER ENGINEERING COMPANY
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN45,648-145
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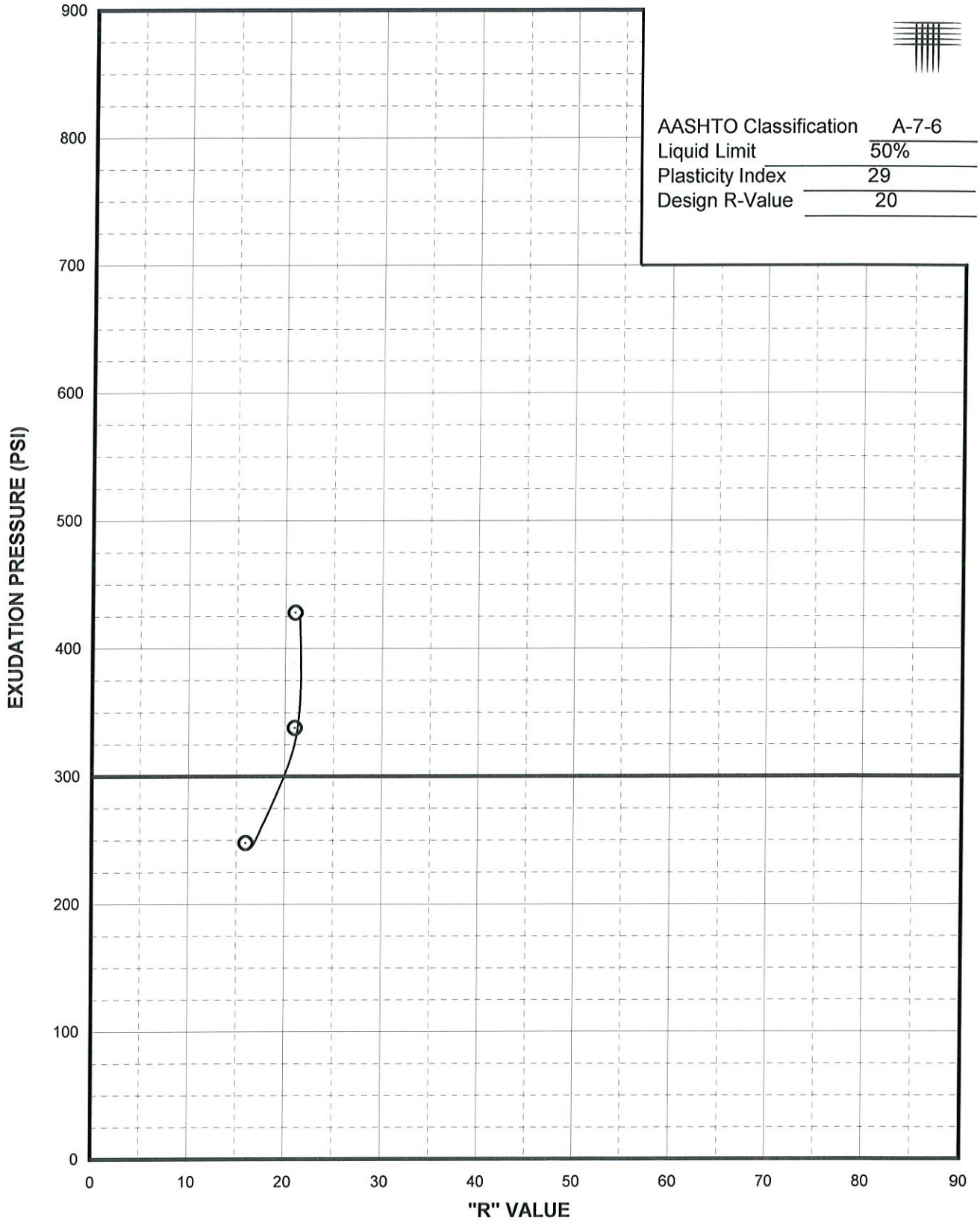

Sample Location: TH-4, 5 and TH-6 (0 to 5 feet)

Sample Description: CLAY, SANDY (CL) AND CLAY FILL

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WONDERLAND CREEK IMPROVEMENTS
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Hveem Stabilometer Test Results

Fig. B-10

TABLE B - I

SUMMARY OF LABORATORY TEST RESULTS

BORING	DEPTH (ft)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL TEST DATA			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (psf)	SOLUBLE SULFATE CONTENT (%)	PASSING NO. 200 SIEVE (%)	SOIL TYPE
				SWELL (%)	COMPRESSION (%)	APPLIED PRESSURE (psf)	LIQUID LIMIT (%)	PLASTICITY INDEX				
TH-1	4	4.2	114				28	7			6	INTERLAYERED CLAY/SAND
TH-1	9	19.0					28	10			29	INTERLAYERED CLAY/SAND
TH-1	14	16.5	112	0.2		1,800						WEATHERED CLAYSTONE
TH-2	4	15.5	112				34	16		0.03	34	INTERLAYERED CLAY/SAND
TH-2	14	12.9	118	0.4		1,800						CLAYSTONE
TH-3	9	19.9	107				40	26			84	CLAY, SANDY (CL)
TH-3	14	18.0	113						10,400			WEATHERED CLAYSTONE
TH-4	1	13.9	114								66	FILL, CLAY, SANDY
TH-4	4	13.2	111	1.9		500				0.03		FILL, CLAY, SANDY
TH-4	9	20.3	103				43	27			79	CLAY, SANDY (CL)
TH-5	4	16.8	112				37	22			72	CLAY, SANDY (CL)
TH-5	9	22.2	105						3,300			CLAY, SANDY (CL)
TH-5	14	18.6	109				35	20			57	CLAY, SANDY (CL)
TH-6	1	15.5	101	2.7		200						FILL, CLAY, SANDY
TH-6	4	12.4	112				37	20			63	FILL, CLAY, SANDY
TH-6	9	25.5	98				45	29			89	CLAY, SANDY (CL)
TH-6	14	19.2	110		0.1	1,800						WEATHERED CLAYSTONE
TH-7	4	15.4	116				28	10			18	CLAY, SANDY (CL) AND SAND, SLIGHTLY SILTY (SW-SM)
TH-7	9	16.0	110								8	SAND, SLIGHTLY SILTY (SW-SM)
TH-8	4	20.7	105								52	CLAY, SANDY (CL)
TH-8	9	29.2					42	25			45	INTERLAYERED CLAY/SAND
TH-8	14	21.2	108	1.2		1,800						WEATHERED CLAYSTONE
TH-8	19	18.9	111	0.7		2,400						CLAYSTONE
TH-4,5,6	0-5						50	29		0.01	70	CLAY, SANDY AND CLAY FILL

APPENDIX C

FLEXIBLE AND RIGID PAVEMENT DESIGN NOMOGRAPHS AND CALCULATIONS

FLEXIBLE PAVEMENT DESIGN CALCULATIONS
WONDERLAND CREEK IMPROVEMENTS - IRIS AVENUE
CTL | T PROJECT NO. DN45,648-135

DESIGN DATA

18k Equivalent Single Axle Load (ESAL) =	219000 (EDLA = 30)
R-value =	20
M_R =	4940 psi
Reliability =	95 %
Design Servicibility Loss =	2.0
Structural Number (SN)=	3.5 (See Fig. C-2)

DESIGN EQUATION

$SN = C_1D_1 + C_2D_2...$

C_1 = 0.44 - Strength Coefficient - Hot-Mix Asphalt Concrete (HMA)

C_2 = 0.12 - Strength Coefficient - Aggregate Base Course (ABC)

D_1 - Depth of Hot-Mix Asphalt (inches)

D_2 - Depth of Aggregate Base Course (inches)

HOT-MIX ASPHALT SECTION:

D_1 = 3.5 / 0.44 = 8.0 INCHES OF ASPHALT CONCRETE

HOT-MIX ASPHALT AND AGGREGATE BASE COURSE COMPOSITE SECTION:

D_2 = ((3.5) - (5)(0.44)) / (0.12) = 11 INCHES OF AGGREGATE BASE COURSE BELOW
5 INCHES OF HOT-MIX ASPHALT

RECOMMENDED SECTIONS

1) 8 INCHES OF HOT-MIX ASPHALT (HMA), OR
2) 5 INCHES OF HOT-MIX ASPHALT OVER 11 INCHES OF AGGREGATE BASE COURSE (ABC), OR
3) 7 INCHES OF PORTLAND CEMENT CONCRETE (PCC, SEE FIGS. C-3 AND C-4)

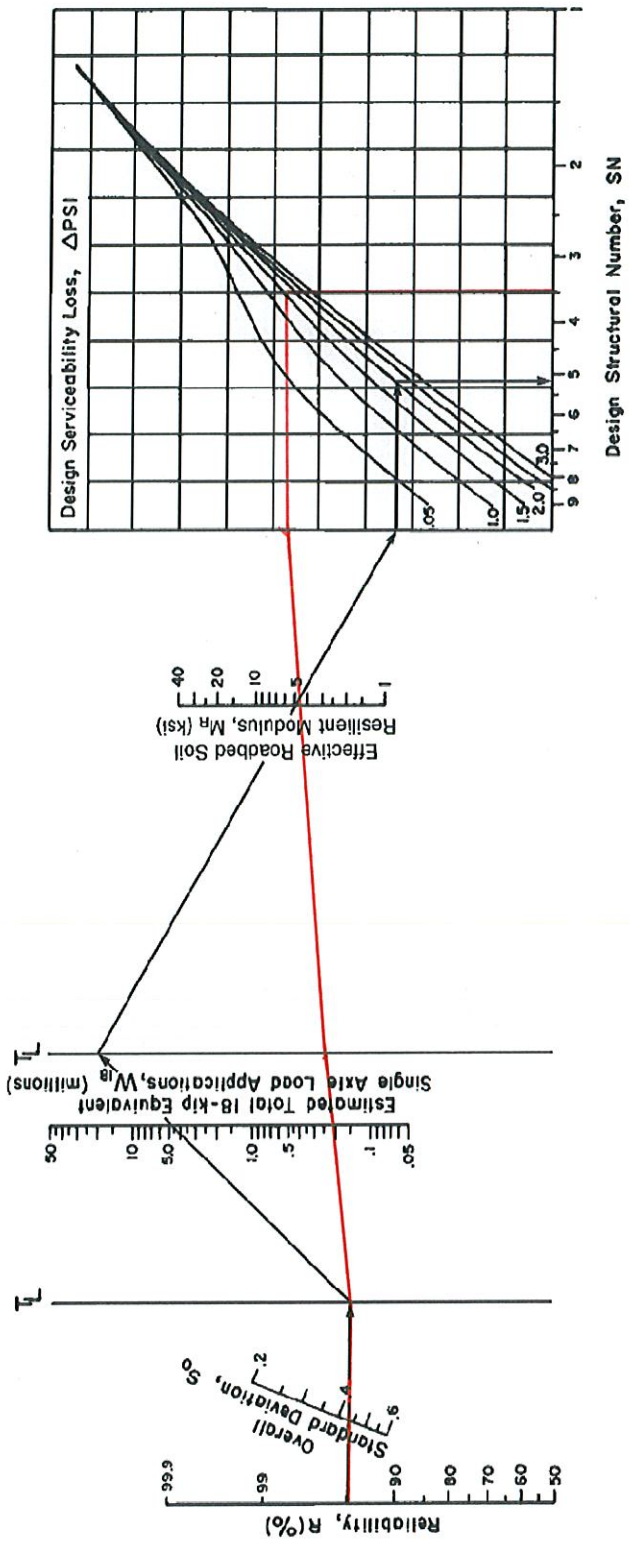
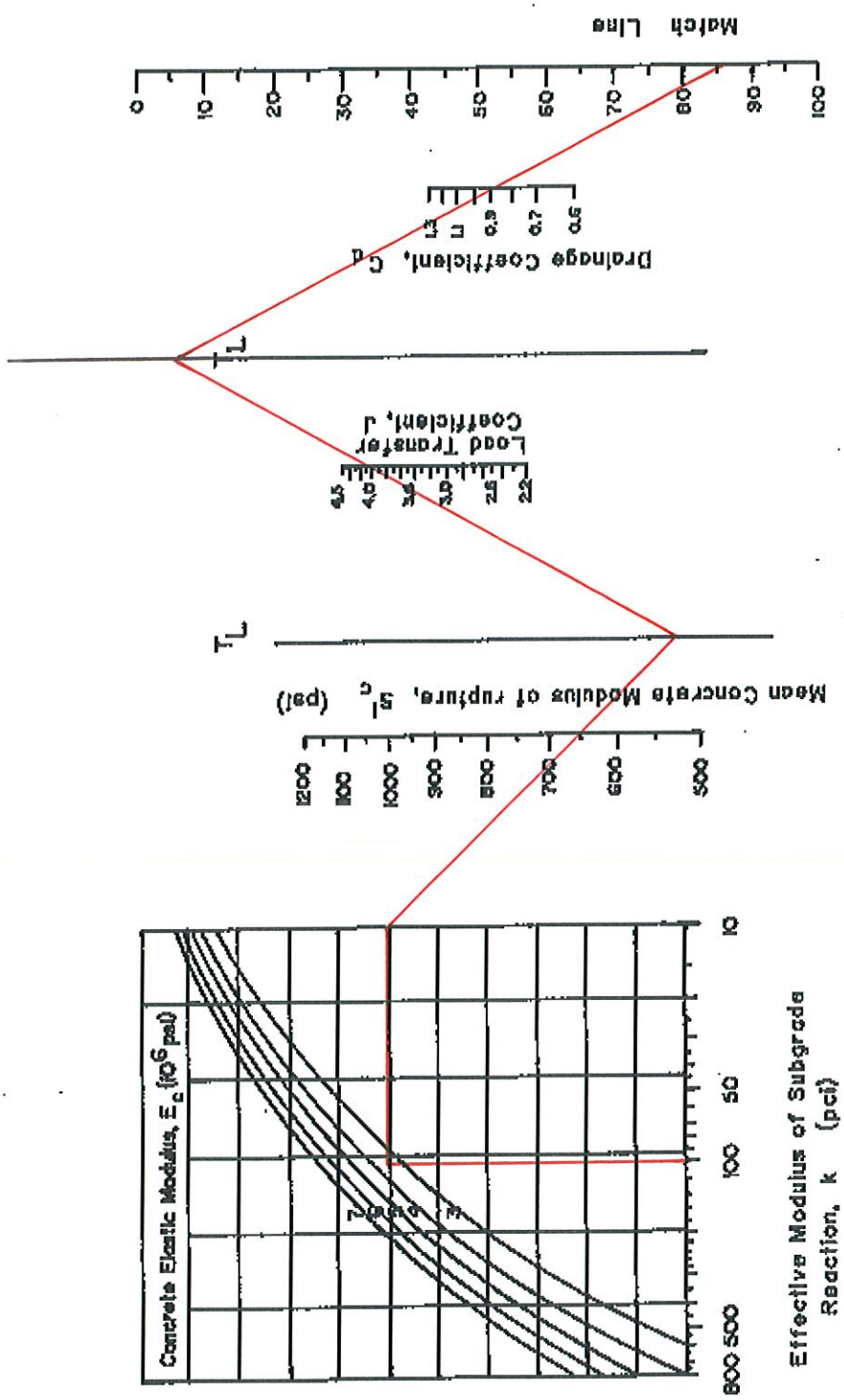


Figure 3.1 Design Nomograph for Flexible Pavements
(Modified from *1993 AASHTO Guide for Design of Pavement Structures*, pg. II-32, Fig. 3.1)

FIG. C-2



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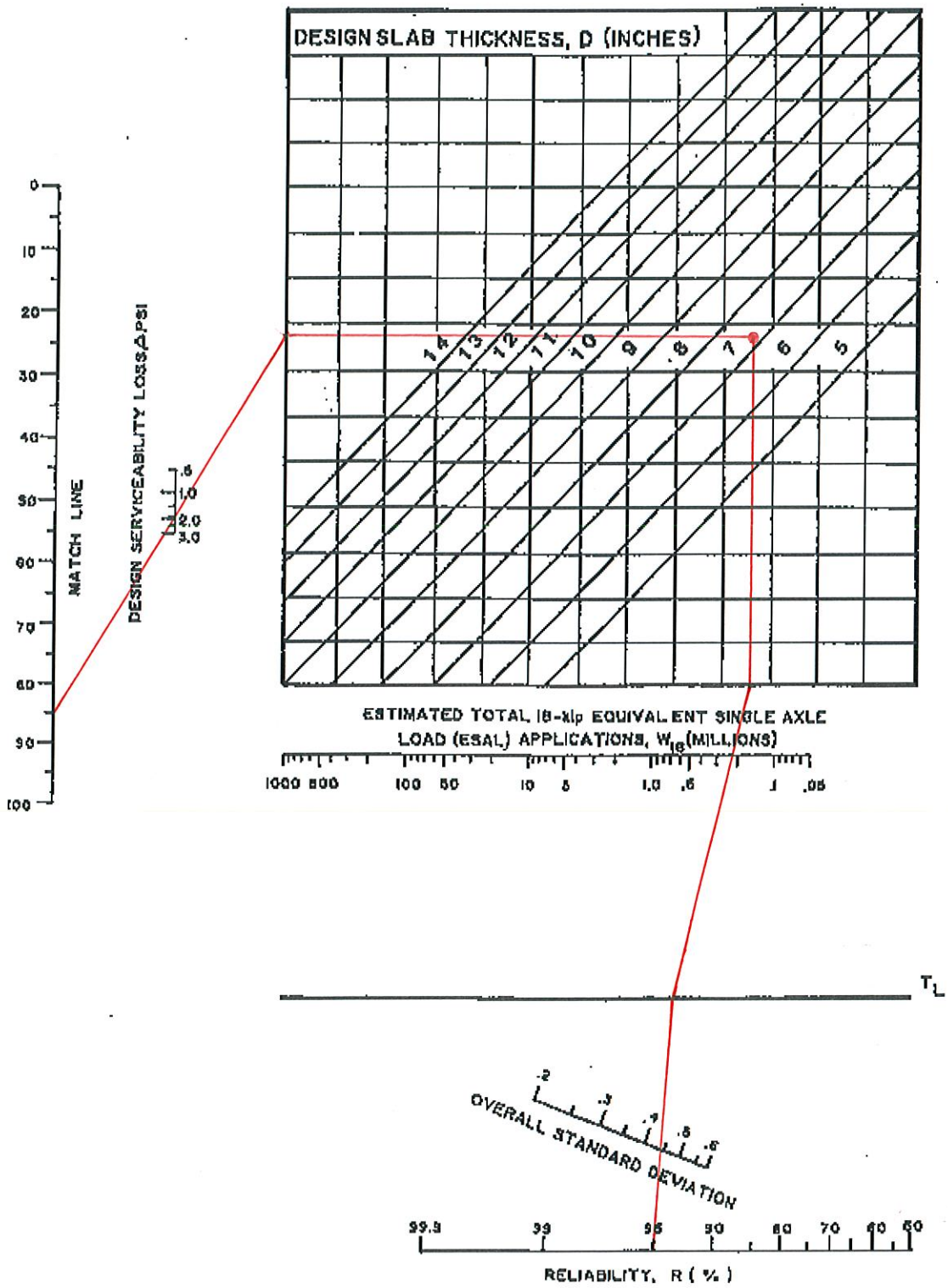
JOB NO.

DESIGN CHART FOR RIGID PAVEMENT

PART I

FIG. C-3



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DESIGN CHART FOR RIGID PAVEMENT
PART II

FIG. C-4

APPENDIX D

CONSTRUCTION, MATERIALS AND MAINTENANCE GUIDELINE RECOMMENDATIONS FOR FLEXIBLE AND RIGID PAVEMENTS

MATERIAL RECOMMENDATIONS FOR FLEXIBLE AND RIGID PAVEMENTS

Aggregate Base Course (ABC)

1. **A Class 5 or 6 Colorado Department of Transportation (CDOT) specified aggregate base course should be used. A recycled concrete alternative which meets the Class 5 or 6 designation is also acceptable.**

2. **Aggregate base course should have a minimum Hveem stabilometer value of 77. Aggregate base course or recycled concrete material must be moisture stable. The change in R-value from 300 psi to 100 psi exudation pressure should be 12 points or less.**

3. **Aggregate base course or recycled concrete should be laid in thin lifts not to exceed 9 inches, moisture treated to within 2 percent of optimum moisture content, and compacted to at least 95 percent of maximum modified Proctor dry density (ASTM D 1557, AASHTO T 180).**

4. **Placement and compaction of aggregate base course should be observed and tested by a representative of our firm. Placement should not commence until the underlying subgrade is properly prepared and tested.**

Hot-Mix Asphalt (HMA)

1. **HMA should be composed of a mixture of aggregate, filler, hydrated lime and asphalt cement. Some mixes may require polymer modified asphalt cement, or make use of up to 20 percent reclaimed asphalt pavement (RAP). A project mix design is recommended and periodic checks on the project site should be made to verify compliance with specifications.**

2. **HMA should be relatively impermeable to moisture and should be designed with crushed aggregates that have a minimum of 80 percent of the aggregate retained on the No. 4 sieve with two mechanically fractured faces.**

3. **Gradations that approach the maximum density line (within 5 percent between the No. 4 and 50 sieves) should be avoided. A gradation with a nominal maximum size of 1 or 2 inches developed on the fine side of the maximum density line should be used.**

4. **Total void content, voids in the mineral aggregate (VMA) and voids filled should be considered in the selection of the optimum asphalt cement content. The optimum asphalt content should be selected at a total air void content of about 4 percent. The mixture should have a minimum VMA of 14 percent and between 65 percent and 80 percent of voids filled.**

5. **Asphalt cement should meet the requirements of the Superpave Performance Graded (PG) Binders. The minimum performing asphalt cement should be PG 64-22 for use along the Front Range. The use of PG 58-28 or PG 58-22 asphalt cement has been known to cause tenderness in pavements in the Front Range area and should be avoided.**

6. Hydrated lime should be added at the rate of 1 percent by dry weight of the aggregate and should be included in the amount passing the No. 200 sieve. Hydrated lime for aggregate pretreatment should conform to the requirements of ASTM C 207, Type N.

7. Paving should only be performed when subgrade temperatures are above 40°F and air temperature is at least 40°F and rising.

8. HMA should not be placed at a temperature lower than 245°F for mixes containing PG 64-22 asphalt, and 290°F for mixes containing polymer modified asphalt. The breakdown compaction should be completed before the mixture temperature drops 20°F.

9. The maximum compacted lift should be 3.0 inches and joints should be staggered. No joints should be placed within wheel paths.

10. HMA should be compacted to between 92 and 96 percent of Maximum Theoretical Density. The surface shall be sealed with a finish roller before the mix cools to 185°F.

11. Placement and compaction of HMA should be observed and tested by a representative of our firm. Placement should not commence until the subgrade is properly prepared, tested and proof-rolled. Proof-rolling should be performed with the heaviest machine available at the time. The proof roller should be selected from machines providing both mass and high contact pressure.

Portland Cement Concrete (PCC)

1. Portland cement concrete should meet CDOT Class P concrete and have a minimum compressive strength of 4,200 psi at 28 days and a minimum modulus of rupture (flexural strength) of 650 psi. A job mix design is recommended and periodic checks on the job site should be made to verify compliance with specifications.

2. Portland cement should be Type II "low alkali" and should conform to ASTM C 150. Portland cement should conform to ASTM C 150.

3. Portland cement concrete should not be placed when the subgrade or air temperature is below 40°F.

4. Free water should not be finished into the concrete surface. Atomizing nozzle pressure sprayers for applying finishing compounds are recommended whenever the concrete surface becomes difficult to finish.

5. Curing of the portland cement concrete should be accomplished by the use of a curing compound. The curing compound should be applied in accordance with manufacturer recommendations.

6. **Curing procedures should be implemented, as necessary, to protect the pavement against moisture loss, rapid temperature change, freezing, and mechanical injury.**

7. **Construction joints, including longitudinal joints and transverse joints, should be formed during construction or sawed after the concrete has begun to set, but prior to uncontrolled cracking.**

8. **All joints should be properly sealed using a rod back-up and approved epoxy sealant.**

9. **Traffic should not be allowed on the pavement until it has properly cured and achieved at least 80 percent of the design strength, with saw joints already cut.**

10. **Placement of portland cement concrete should be observed and tested by a representative of our firm. Placement should not commence until the subgrade is properly prepared and tested.**

FLEXIBLE PAVEMENT CONSTRUCTION RECOMMENDATIONS

Experience has shown that construction methods can significantly affect the life and serviceability of a pavement system. A site-specific mix design is recommended and periodic checks during the project should be made to verify compliance with specifications. We recommend the proposed pavement be constructed in the following manner:

1. **The subgrade should be stripped of organic matter, scarified, moisture conditioned and compacted. Subgrade soils should be moisture conditioned to within 2 percent above optimum moisture content and compacted to at least 95 percent of maximum standard Proctor dry density (ASTM D 698, AASHTO T 99).**

2. **Utility trenches and all subsequently placed fill should be moisture conditioned, compacted, and tested prior to paving. As a minimum, fill should be compacted to 95 percent of maximum standard Proctor dry density.**

3. **After final subgrade elevation has been reached and the subgrade compacted, the resulting subgrade should be checked for uniformity and all soft or yielding materials should be replaced prior to paving. Concrete should not be placed on soft, spongy, frozen, or otherwise unsuitable subgrade.**

4. **If areas of soft or wet subgrade are encountered, the material should be removed and replaced with moisture conditioned, properly-compacted fill. Where extensively soft, yielding subgrade is encountered, we recommend the excavation be inspected by a representative of our office.**

5. **Aggregate base course should be laid in thin, loose lifts, moisture treated to within 2 percent of optimum moisture content, and compacted to at least 95 percent of modified Proctor maximum dry density (ASTM D 1557, AASHTO T 180).**

6. **Asphaltic concrete should be hot plant-mixed material compacted to between 92 and 96 percent of maximum Theoretical density. The temperature at laydown time should be at least 245°F. The surface shall be sealed with a finish roller prior to the mix cooling to 185°F.**

7. **The maximum compacted lift should be 3.0 inches and joints should be staggered. No joints should be within wheel paths.**

8. **Paving should only be performed when subgrade temperatures are above 40°F and air temperature is at least 40°F and rising.**

9. **Subgrade preparation and placement and compaction of all pavement material should be observed and tested. Compaction criteria should be met prior to the placement of the next paving lift. The additional requirements of the City and County of Boulder and CDOT should apply.**

RIGID PAVEMENT CONSTRUCTION RECOMMENDATIONS

Rigid pavement sections are not as sensitive to subgrade support characteristics as flexible pavement. Due to the strength of the concrete, wheel loads from traffic are distributed over a large area and the resulting subgrade stresses are relatively low. The critical factors affecting the performance of a rigid pavement are the strength and quality of the concrete, and the uniformity of the subgrade. We recommend subgrade preparation and construction of the rigid pavement section be completed in accordance with the following recommendations:

1. **The subgrade should be stripped of organic matter, scarified, moisture conditioned and compacted. Subgrade soils should be moisture conditioned to within 2 percent above optimum moisture content and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698, AASHTO T 99).**

2. **After final subgrade elevation has been reached and the subgrade compacted, the resulting subgrade should be checked for uniformity and all soft or yielding materials should be replaced prior to paving. Concrete should not be placed on soft, spongy, frozen, or otherwise unsuitable subgrade.**

3. **The subgrade should be kept moist prior to paving.**

4. **Curing procedures should protect the concrete against moisture loss, rapid temperature change, freezing, and mechanical injury for at least 3 days after placement. Traffic should not be allowed on the pavement for at least one week.**

5. **Curing of the portland cement concrete should be accomplished by use of a curing compound in accordance with manufacturer recommendations.**

6. **Construction joints, including longitudinal joints and transverse joints, should be formed during construction or should be sawed shortly after the concrete has begun to set, but prior to uncontrolled cracking. All joints should be sealed.**

7. **Construction control and inspection should be performed during the subgrade preparation and paving procedures. Concrete should be carefully monitored for quality control. The additional requirements of the City and County of Boulder and CDOT should apply.**

The design sections are based upon 10-year and 20-year periods. Experience in the Denver area indicates virtually no maintenance or overlays are necessary for a 20-year design period. We believe some maintenance and sealing of concrete joints will help pavement performance by helping to keep surface moisture from wetting and softening or heaving subgrade. To avoid problems associated with scaling and to continue the strength gain, we recommend deicing salts not be used for the first year after placement.

MAINTENANCE RECOMMENDATIONS FOR FLEXIBLE PAVEMENTS

A primary cause for deterioration of pavements is oxidative aging resulting in brittle pavements. Tire loads from traffic are necessary to "work" or knead the asphalt concrete to keep it flexible and rejuvenated. Preventive maintenance treatments will typically preserve the original or existing pavement by providing a protective seal or rejuvenating the asphalt binder to extend pavement life.

Annual Preventive Maintenance

- **Visual pavement evaluations should be performed each year.**
- **Reports documenting the progress of distress should be kept current to provide information on effective times to apply preventive maintenance treatments.**
- **Crack sealing should be performed annually as new cracks appear.**

3 to 5-Year Preventive Maintenance

- **The owner should budget for a preventive treatment (e.g. chip seal, fog seal, slurry seal) at approximate intervals of 3 to 5 years to reduce oxidative embrittlement problems.**

5 to 10-Year Corrective Maintenance

- **Corrective maintenance (e.g. full-depth patching, milling and overlay) may be necessary, as dictated by the pavement condition, to correct rutting, cracking and structurally failed areas.**

MAINTENANCE RECOMMENDATIONS FOR RIGID PAVEMENTS

High traffic volumes create pavement rutting and smooth, polished surfaces. Preventive maintenance treatments will typically preserve the original or existing pavement by providing a protective seal and improving skid resistance through a new wearing course.

Annual Preventive Maintenance

- **Visual pavement evaluations should be performed each spring or fall.**
- **Reports documenting the progress of distress should be kept current to provide information of effective times to apply preventive maintenance.**
- **Crack sealing should be performed annually as new cracks appear.**

4 to 8 Year Preventive Maintenance

- **The owner should budget for a preventive treatment at approximate intervals of 4 to 8 years to reduce joint deterioration.**
- **Typical preventive maintenance for rigid pavements includes patching, crack sealing and joint cleaning and sealing.**
- **Where joint sealants are missing or distressed, resealing is mandatory.**

15 to 20 Year Corrective Maintenance

- **Corrective maintenance for rigid pavements includes patching and slab replacement to correct subgrade failures, edge damage and material failure.**
- **Asphalt concrete overlays may be required at 15 to 20 year intervals to improve the structural capacity of the pavement.**

CTL | THOMPSON INCORPORATED

GEOTECHNICAL INVESTIGATION
WONDERLAND CREEK IMPROVEMENTS
BETWEEN DIAGONAL HIGHWAY 119
AND WINDING TRAIL DRIVE
BOULDER, COLORADO

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Project No. DN46,599-125

July 3, 2013

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SCOPE

This report presents the results of our Geotechnical Investigation for the planned Wonderland Creek improvements between Diagonal Highway 119 and Winding Trail Drive in Boulder, Colorado (Fig. 1). The purpose of our investigation was to evaluate subsurface conditions and provide geotechnical design and construction criteria for this portion of the project. The scope was described in our Service Agreement (DN 13-0053) dated January 24, 2013. Environmental assessment was not part of the scope.

This report was prepared from data developed during field exploration, field and laboratory testing, engineering analysis, previous investigation, and experience with similar conditions and projects. It includes descriptions of soil and bedrock conditions and groundwater levels found in our exploratory borings and discussions on design and construction of the proposed improvements as influenced by geotechnical considerations. The recommendations presented in this report are based upon construction as currently planned. We should be contacted to review our recommendations if plans change. A brief summary of our conclusions and recommendations follows with detailed design criteria are presented within the report.

SUMMARY OF CONCLUSIONS

1. Strata found in our borings consisted of nil to about 9 feet of fill and/or 1 to 21 feet of natural sandy clay and/or slightly silty to clayey sand and gravel, underlain by weathered and comparatively unweathered claystone bedrock. Claystone bedrock was shallow in three borings. Testing indicates the soils are non-expansive or low swelling and the claystone bedrock is low to moderately swelling.

2. Groundwater was encountered in ten borings during drilling at depths of about 3 to 14 feet below grade. When the holes were checked after drilling, water levels were measured in all borings at depths of 1.0 to 11.9 feet. We anticipate excavations will penetrate groundwater and temporary construction dewatering may be necessary. Excavation bottoms may require stabilization. These issues are discussed in the re-

port. Groundwater may fluctuate seasonally and rise in response to precipitation, landscape irrigation and flow in Wonderland Creek. Permeability is estimated to be 10 to 1,000 ft/yr for clay, 10,000 to over 100,000 ft/yr for sand, and negligible for claystone.

3. We believe the soils and bedrock penetrated by our exploratory borings can generally be excavated with typical heavy-duty construction equipment. On-site soils are suitable for re-use in new fills provided they are substantially free of debris, vegetation/organics and other deleterious materials, moisture conditioned and compacted as discussed in **SITE DEVELOPMENT**.

4. Site soils at probable foundation depths are considered non-expansive or low swelling and are suitable to support lightly loaded structures such as culverts, wing/retaining walls and pedestrian bridges or trail crossings. Footing or mat foundations can be used. Soft, wet soils may require stabilization. The vehicle bridge should utilize deep foundations. Shallow expansive claystone near the pedestrian underpass presents risk of heave. Foundations should be protected from scour and undermining during flood stage events.

5. Cutoff walls for drop structures of 3 feet or less should be provided with a cutoff wall extending at least 8 feet below the downstream toe (or to bedrock). Sheet piles or cast-in-place concrete can be used.

6. Surface drainage should be designed, constructed, and maintained to provide rapid removal of surface water runoff away from structures and off pavements and flatwork. Water should not be allowed to pond adjacent to foundations or on flatwork. Conservative irrigation practices should be followed to avoid wetting of foundation or subgrade soils.

SITE CONDITIONS

The reach of Wonderland Creek to be improved extends about 3,000 lineal feet from Diagonal Highway 119 to Winding Trail Drive in Boulder, Colorado (Fig. 1 and Photo 1). Fourmile Canyon Creek is about ¼-mile north of the upstream end and the Boulder and Whiterock Ditch (irrigation) is about ½-mile south of the downstream end. A pond and Sale Lake are about 300 and 500 feet northeast of the downstream areas.

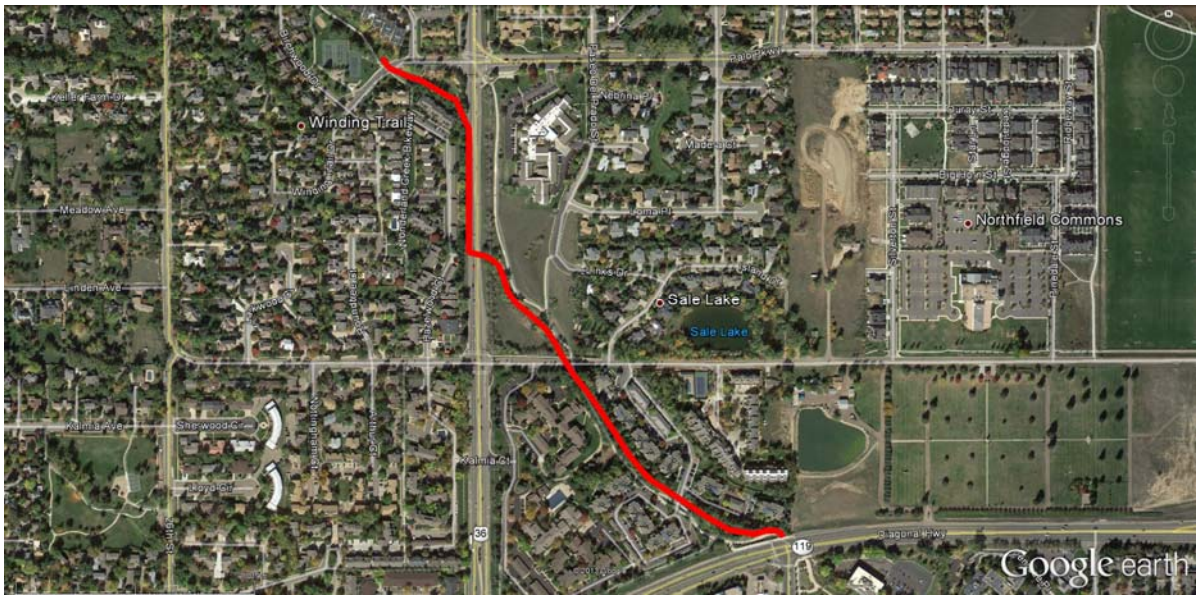

Photo 1 – Google Earth© Aerial Site Photo, October 2012

This reach of Wonderland Creek is a southeasterly trending drainage. The ground surface slopes down toward the creek along the bank areas; overall the terrain slopes down toward the southeast. The current channel appeared to be degraded and unstable, as evidenced by steep side slopes and down-cutting due to erosion. There is heavy vegetation along the banks including bushes and trees. Some debris was also observed on the banks and around the channel. Some utilities were observed either traversing the channel or running adjacent to it.

Upstream flow exits a culvert under Winding Trail Drive and is directed through an open channel within a greenbelt area southwest of Palo Parkway and 28th Street. Flow is diverted below 28th Street via a relatively long culvert and into another open channel which travels along the east side of 28th Street. Flow is then carried below Kalmia Avenue by another culvert and through an open channel between multifamily residential developments, where it passes below two trail crossings. Flow exits the subject reach via culvert below Diagonal Highway 119. Recreational trails follow adjacent to the drainage for the majority of the reach. The downstream trail runs below Diagonal Highway 119 in a culvert shared with the drainage.

PROPOSED CONSTRUCTION

We have not been provided with detailed plans at this time. We performed a Geotechnical Investigation for improvements planned for the downstream reach of Wonderland Creek south of Diagonal Highway 119. For that reach, the channel size was deemed insufficient to accommodate the 100-year flood stage event and many of the adjacent structures were designated to be in potentially impacted areas. The purpose of the previous project was to complete mitigation measures to contain the flood flow, separate Wonderland Creek flow from the Boulder and Whiterock Ditch and construct a multi-use trail. In addition, the project aimed to enhance surrounding wetlands and relieve some of the flooding observed in the downstream subdivisions. We expect similar concepts will be employed for this upstream reach.

Conceptual plans indicate the project will consist of:

- culvert replacements below Winding Trial Drive and Kalmia Avenue,
- construction of a pedestrian underpass with low flow trail crossing below 28th Street,
- grading along the east side of 28th Street south of Winding Trail Drive,
- construction of a 9-foot deep overflow channel with five drop structures east of 28th Street,
- two crossing/bridge replacements downstream of Kalmia Avenue, and
- grading to form the reach of the channel.

Some recreational trails will be improved. We expect drop structures will be no more than 3 feet high and consist of grouted riprap boulders, sculpted concrete, and/or top-soiled riffle. The existing drainage will likely be grubbed and sediments removed from the bottom. Culverts will likely be reinforced concrete box or pipe. Pedestrian bridges or crossings are expected to carry relatively light foundation loads. The vehicular bridge to serve the multifamily development will likely have heavy structural loads.

INVESTIGATION

We investigated subsurface conditions by drilling thirteen exploratory borings at the approximate locations shown on Figs. 1 through 9. Boring locations were determined by a representative of our firm referencing conceptual plans provided and site features. Locations and elevations were surveyed by Lund Partnership. The borings were drilled to depths of 20 to 30 feet using continuous-flight, solid-stem auger; TH-3 was drilled with a 3-inch auger and a limited-access drill rig and the remaining borings were drilled using 4-inch diameter auger and a truck-mounted drill rig. Samples were obtained at 5-foot intervals using either 2.5-inch diameter (O.D.) modified California barrel samplers or 2.0-inch O.D. standard split-spoon samplers driven by blows of a 140-pound hammer falling 30 inches. We obtained a bulk sample of the creek bottom sediment at the downstream end of the project. Our field representative was present to observe drilling operations, log the soil and bedrock encountered, and obtain samples for laboratory tests. Upon completion of drilling, hand-slotted PVC pipe was inserted in the holes to facilitate delayed water level measurements. Summary logs of the exploratory borings including results of field penetration resistance tests and a portion of laboratory test results are presented in Appendix A.

Samples were returned to our laboratory where they were examined by our engineer and laboratory tests were assigned. Laboratory tests included dry density, moisture content, particle-size analysis (percent passing No. 200 sieve, gradation and hydrometer), Atterberg limits, swell-consolidation, unconfined compressive strength, pH, resistivity (ASTM G57-78), and water-soluble sulfate concentration. We subcontracted Colorado Analytical Laboratories, Inc. to perform water-soluble chloride testing (ASTM D4327). Swell-consolidation tests were performed by wetting the samples under approximate overburden pressures. Laboratory test results are presented in Appendix B and summarized in Table B-I.

SUBSURFACE CONDITIONS

Strata encountered in our exploratory borings generally consisted of nil to about 9 feet of fill and/or 1 to 21 feet of natural sandy clay and/or slightly silty to clayey sand and gravel, underlain by weathered and comparatively unweathered claystone bedrock to the maximum depth explored of 30 feet. Bedrock was relatively deep in all borings except TH-3 through TH-5 drilled along the north end of 28th Street where claystone was about 1 to 7.5 feet deep. Some pertinent engineering characteristics of the soil and bedrock are described below.

About 8 and 9 feet of gravelly sand and clay fill was encountered in two borings, TH-6 and TH-11. The fill was difficult to discern from the natural soils and more or less may be present. The fill is likely associated with grading of the channel and/or surrounding improvements. The fill was stiff or medium dense based on field penetration resistance test results. A sand fill sample contained 9 percent silt and clay-sized particles and 17 percent gravel.

About 1 to 21 feet of natural soils were found at the ground surface or below fill in all borings. Soils generally consisted of sandy to very sandy clay, slightly silty to clayey sand and gravel, or interlayered clay/sand of similar composition. A sandy clay sample swelled 0.3 percent when wetted under an applied pressure of 500 psf. Two clay samples exhibited unconfined compressive strengths of about 1,700 and 4,000 psf. Three samples contained 84 to 86 percent fines and two showed moderate plasticity with liquid limits of 43 and 44 and plasticity indices of 27. Based on hydrometer testing, one contained 38 percent clay-sized particles (less than about 2 microns). The 9-foot sample from TH-7 was dark brown and had an organic appearance, however no odor was noted.

Fifteen sand and gravel samples contained 8 to 36 percent fines and two showed low plasticity with liquid limits of 26 and 30 and plasticity indices of 8 and 11. Eight samples contained 2 to 49 percent gravel and one 3 percent clay-sized parti-

cles. Sand and gravel layers caved below groundwater in four borings at depths of about 12 to 18 feet. We consider the sand and clay to be non-expansive and low swelling, respectively. Permeability of the clay is estimated to be 10 to 1,000 ft/yr. The sand soils are expected to have permeability of about 10,000 to over 100,000 ft/yr.

Claystone bedrock was found at depths of about 1 to 21 feet. Bedrock was about 13 to 21 feet deep in all borings except three, TH-3 through TH-5, where claystone was 1 to 7 feet deep. An approximate 3.5-foot thick weathered bedrock layer was found in TH-7. The bedrock was weathered to very hard. Three claystone samples swelled 1.0 to 4.7 percent and one was non-expansive when wetted. Two samples showed unconfined compressive strengths of approximately 12,900 and 22,400 psf. A claystone sample contained 99 percent silt and clay-sized particles and showed moderate plasticity with a liquid limit of 41 and plasticity index of 23. One contained about 39 percent clay-sized particles. Permeability of the claystone is expected to be negligible.

Groundwater was encountered in ten borings during drilling at depths of about 3 to 14 feet below grade. When the holes were checked after drilling on May 16, 2013, water levels were measured in all borings at depths of 1.0 to 11.9 feet. We anticipate excavations will penetrate groundwater and temporary construction de-watering may be necessary. Excavation bottoms may require stabilization. These issues are discussed in the following section. Groundwater may fluctuate seasonally and rise in response to precipitation, landscape irrigation and flow in Wonderland Creek.

SITE DEVELOPMENT

Demolition

We anticipate some tree and bush removal and demolition of existing culverts, utilities, structures and surface improvements (i.e., pavements, flatwork, curb/gutter). Utilities, structures or debris below improvements should be removed and replaced with moisture conditioned, compacted fill. Depending on type, size, depth, and location it may be possible to grout or abandon utilities in place if potential conflicts can be avoided.

We recommend the existing drainage be substantially cleared of debris, vegetation/organics, and other deleterious materials. Loose, sloughed sides and soft bottoms should be grubbed out of existing drainages to be filled. The sides of the existing drainages should be trimmed back no steeper than 1:1 and benched at about 5-foot height intervals prior to placing fill, as shown on Fig. 10. Careful grubbing of existing drainages and filling them with compacted fine-grained soil, such as clay, can reduce seepage.

Excavations

Based on planned construction, we anticipate cuts and fills up to about 5 to 10 feet will be required. We believe the soils and bedrock penetrated by our exploratory borings can generally be excavated with typical heavy-duty construction equipment. We recommend the owner and the contractor become familiar with applicable local, state and federal safety regulations, including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Based on our investigation and OSHA standards, we anticipate the clay will classify as Type B soil, the sand as Type C, and the claystone as Type A or B, depending on weathering. Based on OSHA regulations, Type A, B and C soils require maximum slope inclinations of ½:1, 1:1 and 1½:1 (horizontal:vertical) for temporary excavations in dry

conditions, respectively. Flatter slopes, possibly as flat as 6:1, will be necessary below groundwater or where seepage is present. Excavation slopes specified by OSHA are dependent upon soil types and groundwater conditions encountered. The contractor's "competent person" should identify the soils in the excavations and refer to OSHA standards to determine appropriate slopes. Stockpiles of soil and equipment should not be placed within a horizontal distance equal to one-half the excavation depth, from the edge of the excavation. A professional engineer should design excavations deeper than 20 feet.

Soft/loose, wet soils are likely to be present in excavations. Soft, wet soil may slough to slopes of about 6:1 or shallower. This could impact efficiency of the contractor's work. They should be prepared to deal with soft and/or wet soil conditions. The bottoms of excavations can be stabilized by crowding crushed rock into the excavation bottom such that when compactive effort is applied it does not deform more than about 1 to 2 inches. Acceptable rock materials include, but are not limited to No. 2 and No. 57 rock, or 1 to 3 inch recycled concrete. Crushed rock on a layer of woven geofabric or geosynthetic grid can also be used, and should reduce the amount of aggregate needed to achieve stable subgrade. Typically, a biaxially woven fabric such as Mirafi 600x (or equal) or geogrid (such as Tensar TR160 or equal) topped with 8 to 12 inches of crushed rock will provide a stable working surface. If available, crushed recycled concrete is a good choice. The actual need for, and elements of subgrade stabilization should be determined at the time of construction. Bedding material can consist of ASTM C33 No. 57 or 67 Coarse Concrete Aggregate mixed 50/50 with No. 8 Sand-Gravel.

Fill and Backfill

On-site soils are suitable for re-use as fill provided debris, vegetation/organics, and other deleterious materials are substantially removed prior to placement. Soil particles larger than 3 inches and cobbles larger than 6 inches should be broken down or removed prior to fill placement. Very moist or saturated soils should not be

used as fill. If imported fill material is required, it should ideally be similar to on-site materials. Soils with 100 percent passing the 2-inch sieve, less than 60 percent passing the No. 200 sieve, and a plasticity index less than 15 are generally suitable import. Other materials may also be suitable depending on the planned use. A sample of import material should be submitted to our office for approval prior to placement.

Debris, vegetation/organics and deleterious matter should be substantially removed from areas to receive fill. Areas to receive fill should be scarified to a depth of 8 inches prior to fill placement and moisture conditioned according to the specifications below. Fill should be placed in thin (8 inches or less) loose lifts, moisture conditioned to within 2 percent of optimum moisture content and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698). Pipe culverts should be bedded and backfilled to the spring line with pea gravel or flow fill prior to placing soil backfill. Placement and compaction of fill and backfill should be observed and tested by a representative of our firm during construction.

Our experience indicates fill and backfill can settle, even if properly compacted to the criteria provided above. Factors that influence the amount of settlement are depth of fill, soil type, degree of compaction, and time. The length of time for the compression to occur can be a few weeks to several years. The degree of compression of fill under its own weight will likely range from low for granular soils (1 percent or less), moderate for clay/sand mixtures (1 to 2 percent) to high for claystone and highly plastic clay fills (greater than 2 percent). Any improvements placed over backfill should be designed to accommodate movement.

Water and sewer lines are often constructed beneath improvements. Compaction of utility trench backfill can have a significant effect on the life and serviceability of improvements and pavements. We recommend utility trench backfill be placed in thin, loose lifts, and moisture conditioned and compacted according to the specifica-

tions presented previously. The placement and compaction of utility trench backfill should be observed and tested by a representative of our firm during construction.

Permanent slopes should be stable at inclinations of 3:1 (horizontal to vertical). Shallower slopes can decrease erosion from run-off and sheet-flow. If increased resistance to erosion is desired, the soils can be stabilized with an additive such as portland cement. The detrimental properties can include difficulty of re-vegetation, chemical leaching and high cost. Should the owner wish to consider chemical stabilization of a portion of the fill soils, we should perform tests to determine the most appropriate additive and amount. As an alternative, seeding and re-vegetation can also be used to reduce erosion.

Dewatering

We anticipate excavations will penetrate groundwater and temporary construction dewatering may be needed. Several methods can be considered to temporarily dewater excavations. Well points or cased wells outside the excavation are alternatives commonly used to lower groundwater levels. Excavations that extend only a foot or two into groundwater can often be dewatered using sumps about 3 feet below grade, where the water is pumped down through the soils before being discharged.

The City and County of Boulder and/or The Colorado Department of Public Health and Environment may require dewatering permits. Our experience indicates periodic environmental testing is usually required with these permits, with reporting. Permitting requirements may also influence the construction schedule. We recommend researching these requirements and permit processing times well before dewatering begins.

DROP STRUCTURES

We have not been provided with plans that show exact locations of drop structures or drop heights. We understand up to 10 drops may be constructed between about TH-5 and TH-11. We anticipate drop structures may be 3 feet tall or less and consist of grouted riprap boulders, sculpted concrete, and/or top-soiled riffle. We recommend a seepage cutoff wall to reduce uplift pressures at the toe of the drop structure. We recommend sheet pile or concrete cutoff walls extend down at least 8 feet below the downstream toe of drop structures or to bedrock, whichever is shallower. Scour protection requirements should be evaluated based on the design flow velocities. Historic scour depth likely extends down to the top of bedrock where it is shallow. Some scour protection can be obtained with a rip-rap blanket upstream and downstream of the drop structure.

FOUNDATIONS – BOX CULVERTS, WING/RETAINING WALLS AND BRIDGES

We found non-expansive or low swelling soils at anticipated foundation levels for the majority of the project reach. Some relatively soft/loose, wet soils were identified at 9-foot depth in TH-9 through TH-11 near the crossing replacements. Soft soils should be stabilized as discussed previously. Expansive claystone was found at shallow depths in TH-4 and TH-5 near the planned pedestrian underpass below 28th Street. Box culverts, wing/retaining walls and pedestrian bridges or trail crossings can be constructed on a mat or with footing foundations with expected movements of about 1 inch. A mat with a turned-down upstream edge offers positive scour protection and makes the culvert more rigid. Where the underpass or other improvements are planned in shallow claystone areas, we estimate up to about 2 inches of post-construction heave could occur. We judge there is a low risk that heave of the bedrock will affect the underpass. Footings or a mat can be used as long as some heave can be tolerated. Deep foundations should be used to support relatively heavy structural loads from the vehicular bridge. Drilled piers bottomed in bedrock would be difficult to install due to the presence of caving sand and gravel soils below ground-

water. Driven piles would likely be a better choice. Design and construction criteria for footings, mats and driven piles are presented below. These criteria were developed from analysis of field and laboratory data and our experience.

Footings

1. Footings should be constructed on stable soils. Soils loosened during foundation excavation or in the forming process for footings should be removed and replaced with similar soils, moistened and compacted prior to placing concrete. Stabilization of excavation bottoms may be necessary. This can be achieved by crowing crushed rock into the excavation bottoms, possibly with geogrid or woven fabric, as discussed in Stabilization.

2. Footings should be designed for a maximum allowable soil pressure of 2,000 psf.

3. Footings should have a minimum width of at least 18 inches. The footings may be wider depending upon foundation loads. Seepage cutoff walls can be 10 inches wide if poured-in-place concrete.

4. Lateral earth pressures for soils can be calculated based on equivalent fluid densities presented in the table below relative to the expected materials to be retained. The values below have not been factored. The structural engineer should apply appropriate factors of safety in design.

LATERAL EQUIVALENT FLUID DENSITIES FOR BACKFILL

Retained Material	Backfill Type			Coefficient of Sliding Friction
	Active Equivalent Fluid Density (pcf)	At Rest Equivalent Fluid Density (pcf)	Passive Equivalent Fluid Density (pcf)*	
Clay and Sand	55	70 (100 for saturated)	300	0.45
Claystone	65	85	300	0.25
CDOT Class 5 or 6 Aggregate Base Course or Class 1 Structural Fill	35	55	200	0.50

*Assumes compacted backfill will never be removed.

5. Foundation walls should be well reinforced, top and bottom. We recommend reinforcement sufficient to span an unsupported distance of at least 10 feet.

6. Footings must be protected from frost action. Normally, 3 feet of frost cover is assumed in this area.

7. The completed foundation excavations should be observed by a representative of CTL | Thompson, Inc. to confirm subsurface conditions are as anticipated. Placement and compaction of fill and backfill should be observed and tested by our representative.

Driven Piles

1. Piles should be driven to practical refusal in the bedrock. The piles can consist of steel H-piles or concrete filled steel, closed-end pipe piles. The pile capacity will be controlled by the structural strength of the pile when driven to refusal in the bedrock. We define practical refusal at this site as penetration of 1 inch or less for the final 20 blows using a hammer delivering at least 28,000 foot-pounds of energy per blow. The hammer for pile driving should operate at the manufacturer's recommended stroke and speed when "practical refusal" is measured. The efficiency of the hammer and impact should be monitored during driving. The contractor should select a driving hammer and cushion combination that is capable of installing selected piles without over-stressing the pile. The contractor should submit the pile driving plan and the pile hammer cushion combination to the structural engineer for evaluation of the driving stress in advance of the pile installation.

2. Lateral resistance to horizontal loads can be provided by battered piles or as discussed in the Laterally Loaded Piles section below. It is normal to assume a battered pile can resist the same axial load as a vertical pile of the same type and size and driven to the same elevation. The vertical and horizontal components will depend upon the batter. Batters should not exceed 1:6 (horizontal to vertical). Groups of piles placed closer than three diameters, center to center, should be evaluated as a group to determine their reduced capacity.

3. All pile-driving operations should be observed and records kept of penetration resistance, pile length, and other factors that could affect the performance of the foundation.

Laterally Loaded Piles

Lateral load analysis of piers can be performed with the software analysis package LPILE by Ensoft, Inc. We believe this method of analysis is appropriate for piers with a pier length to diameter ratio of seven or greater. Suggested criteria for LPILE analysis are presented in the following table.

SOIL INPUT DATA FOR "LPILE"

Soil Type	Fill and Clay	Sand and Gravel and Interlayered Clay/Sand	Bedrock
Effective Unit Weight (pci)	0.07	0.07 (0.035 below groundwater)	0.075
Cohesive Strength, c (psi)	10	0	50
Friction Angle, ø (degree)	28	32	-
Soil Strain, ε_{50} (in/in)	0.007	-	0.004
p-y Modulus, k_s (pci)	500	175 (90 below groundwater)	2,000
p-y Modulus, k_c (pci)	200	90 (60 below groundwater)	800

The ε_{50} represents the strain corresponding to 50 percent of the maximum principal stress difference.

Other procedures require input of a horizontal modulus of subgrade reaction (K_h). We believe the following formulas are appropriate for calculating horizontal modulus of subgrade reaction (K_h) values.

Closely Spaced Pier Reduction Factors

For axial loading, no reduction is needed for a minimum spacing of three diameters (center to center). At one diameter (piers touching), the skin friction reduction factor for both piers would be 0.5. End pressure values would not be reduced provided the bases of the piers are at similar elevations. Interpolation can be used between one and three diameters.

For lateral loading, no reduction is needed for piers in-line with the direction of lateral loads with a minimum spacing of six diameters (center-to-center) based upon the larger pier. If a closer spacing is required, the modulus of subgrade reaction for initial and trailing piers should be reduced. At a spacing of three diameters, the effective modulus of subgrade reaction of the first pier can be estimated by multiplying the given modulus by 0.6; for trailing piers in a line at three-diameter spacing, the factor is 0.4. Linear interpolation can be used for spacing between three and six diameters.

Reductions to the modulus of subgrade reaction can be accomplished in LPILE by inputting the appropriate modification factors for p-y curves. Reducing the modulus of subgrade reaction in trailing piers will result in greater computed deflections on these piers. In practice, a grade beam can force deflections of all piers to be equal. Load-deflection graphs can be generated for each pier by using the appropriate p-multiplier values. The sum of the piers lateral load resistance at selected deflections can be used to develop a total lateral load versus deflection graph for the system of piers.

For lateral loads perpendicular to the line of piers, a minimum spacing of three diameters can be used with no capacity reduction. At one diameter (piers touching) the piers should be analyzed as one unit. Interpolation can be used for intermediate conditions.

RETAINING WALLS

We anticipate retaining walls of up to about 10 feet are planned. Retaining walls will be subject to lateral earth loads which are dependent on the height of the wall, soil type, and backfill configuration. We assume use of on-site backfill or imported soils with level backfill surface.

We recommend designing walls using the equivalent fluid density values presented above. Passive resistance requires movement to generate the resistance. Passive resistance should only be used when movement is tolerable and the soil is well compacted and will be not be removed. The values given above do not include safety factors or allowances for surcharge loads such as sloping backfill, vehicle traffic, or hydrostatic pressure.

Mechanically stabilized earth (MSE) walls are often used in situations such as these. Concrete walls are also suitable. MSE retaining walls assume that some movement of the wall will occur to mobilize the shear strength of the soil. We assume retained soil and backfill above the reinforced zone will be on-site soils or similar soils. The onsite soil should not be used in the reinforced zone. We recommend the reinforced zone of MSE walls be constructed with imported, non-plastic sand and gravel meeting CDOT Class 5 or 6 Aggregate Road Base Specification (or better). Angular gravel meeting AASHTO No. 57 or 67 Specification may be used for the reinforced soil (if desired) and is recommended for the leveling pad and drainage material.

Most MSE block retaining wall design programs require input of soil parameters for foundation soil, leveling pad, reinforced soil and retained soil. The parameters presented below can be used for the design of the wall.

MSE SOIL INPUT PARAMETERS

Material use	Material Description & Classification	Cohesion (psf)	Internal Friction Angle (degrees)	Unit Weight (pcf)
Foundation Soil	Clay and Sand	100	28	135
Leveling Pad	Gravel (imported) AASHTO #57 or 67 Coarse Concrete Aggregate	0	40	140
Reinforced Soil (import recommended)	Sand, Gravelly, Silty, CDOT Class 6 Road Base (or better)	0	36	140
Retained Soil	Clay and Sand	0	28	135

Free draining granular backfill should be used adjacent to the wall. We recommend a free-draining sand and gravel material with less than 3 percent fines (passing No. 200 sieve) be used as backfill for a zone within at least 1-foot behind the wall. Imported backfill should be tested and approved by our firm prior to importing. The upper 2 feet of wall backfill should be derived from the on-site clay. Fill should be placed and compacted to the criteria provided in Fill and Backfill. Special precautions should be taken to avoid over-stressing the wall during compaction. We recommend small, hand-operated compactors be used.

Drains are recommended behind walls to control hydrostatic pressures. The drain should consist of a 4-inch perforated PVC pipe encased in at least 1 foot of free draining gravel. The drain should lead to a positive gravity outlet or the wall could be provided with weep holes. Any pipe installed beneath the wall should be solid and strong enough to resist the overburden pressure from the weight of the wall. Drain discharge in front of the wall should occur to well drained areas at least 5 feet beyond the toe of the wall. Typical retaining wall drain details are shown on Fig. 11.

RESISTIVITY AND CHLORIDE

Resistivity testing was conducted according to ASTM G57-78 on a bulk sample of the clay soils within 10 feet of the ground surface from TH-1. For Trial No. 1, the sample was tested at relatively dry moisture content and Trial No. 2 was performed under saturated conditions. Most soils in the Denver area are pH balanced or slightly basic.

Soil	Trial No.	Moisture Content (%)	Resistivity (ohm-cm)
Sandy Clay	1	13.5	5400
	2	28.6	2800

The Denver Water Department, over a period of years, has established apparent resistivity versus corrosion potential of the subsoils for their underground pipelines. They concluded from their studies that apparent resistivity of less than 1,000 ohm-cm indicates severe corrosion potential for metal pipes; 1,000 ohm-cm to 2,500 ohm-cm indicates moderate corrosion potential; and greater than 2,500 ohm-cm indicates low corrosion potential. Using these guidelines, the clay can be considered to have low corrosion potential.

We subcontracted Colorado Analytical Laboratories, Inc. to perform water-soluble chloride testing (ASTM D4327) on a bulk sample of the creek bottom at the downstream end near TH-13. The sample contained 0.0013 percent water-soluble chloride.

CONCRETE

Concrete in contact with soil can be subject to sulfate attack. We measured water-soluble sulfate concentrations of 0.04 percent and less in four samples from this site, and similar concentrations were measured during our previous study. Sulfate concentrations less than 0.1 percent indicate Class 0 exposure to sulfate attack for concrete in contact with the subsoils, according to the American Concrete Institute (ACI) *Guide To Durable Concrete (ACI 201.2R-01)*. For this level of sulfate concentration, ACI indicates any type of cement can be used for concrete in contact with the subsoils. In our experience, superficial damage may occur to the exposed surfaces of highly permeable concrete, even though sulfate levels are relatively low. To control this risk and to resist freeze-thaw deterioration, the water-to-cementitious material ratio should not exceed 0.50 for concrete in contact with soils that are likely to stay moist due to surface drainage or high water tables. Concrete should have a total air content of 6 percent ± 1.5 percent.

DESIGN CONSULTATION AND CONSTRUCTION OBSERVATIONS

This report has been prepared for the exclusive use of Muller Engineering Company, Inc. for the purpose of providing geotechnical design and construction criteria for the portion of the project included. The information, conclusions, and recommendations presented herein are based upon the considerations of many factors including, but not limited to, the type of structure proposed, the geologic setting, and the subsurface conditions encountered. The conclusions and recommendations contained in the report are not valid for use by others. Standards of practice evolve in the area of geotechnical engineering. The recommendations provided are appropriate for about three years. If the proposed improvements are not constructed within about three years or the proposed construction changes, we should be contacted to determine if we should update this report.

CTL | Thompson, Inc. should be retained to provide general review of the design construction plans prior to construction. Our firm should also provide geotechnical and materials observations and testing during construction. The purpose is to observe the construction with respect to the geotechnical design concepts, specifications or recommendations, and to facilitate design changes in areas where the subsurface conditions differ from those anticipated prior to start of construction. This project will involve many activities that should be monitored during the construction phase. Excavations as well as placement and compaction of fill and backfill should be observed and tested. Installation of foundations and improvements should be observed. When construction schedules and quantities are defined, we can work with the owner's representatives to develop an appropriate scope of services and budget for construction monitoring.

GEOTECHNICAL RISK

The concept of risk is an important aspect with any geotechnical evaluation primarily because the methods used to develop geotechnical recommendations do

not comprise an exact science. We never have complete knowledge of subsurface conditions. Our analysis must be tempered with engineering judgment and experience. Therefore, the recommendations presented in any geotechnical evaluation should not be considered risk-free. Our recommendations represent our judgment of those measures that are necessary to increase the chances that the structure will perform satisfactorily. It is critical that all recommendations in this report are followed.

LIMITATIONS

Our borings were spaced to obtain a reasonable evaluation of subsurface conditions. The borings are representative of soils encountered only at the exact boring locations. Variations in the subsoil conditions not indicated by our borings are always possible. A representative of CTL | Thompson, Inc. should observe excavations, fill and backfill placement, and installation of foundations, culverts, walls and other improvements.

We believe this investigation was conducted with that level of skill and care normally used by geotechnical engineers practicing in this area at this time. No warranty, express or implied, is made. If we can be of further service in discussing the contents of this report or in the analysis of the influence of the subsoil conditions on design of the structures, please call.

CTL | THOMPSON, INC.

COLORADO LICENSED
BENNY I. LUJAN
46531
6/3/13
PROFESSIONAL ENGINEER

Benny I. Lujan, P.E.
Project Engineer

Reviewed by:

David A. Glater, P.E., C.P.G.
Principal Geological Engineer

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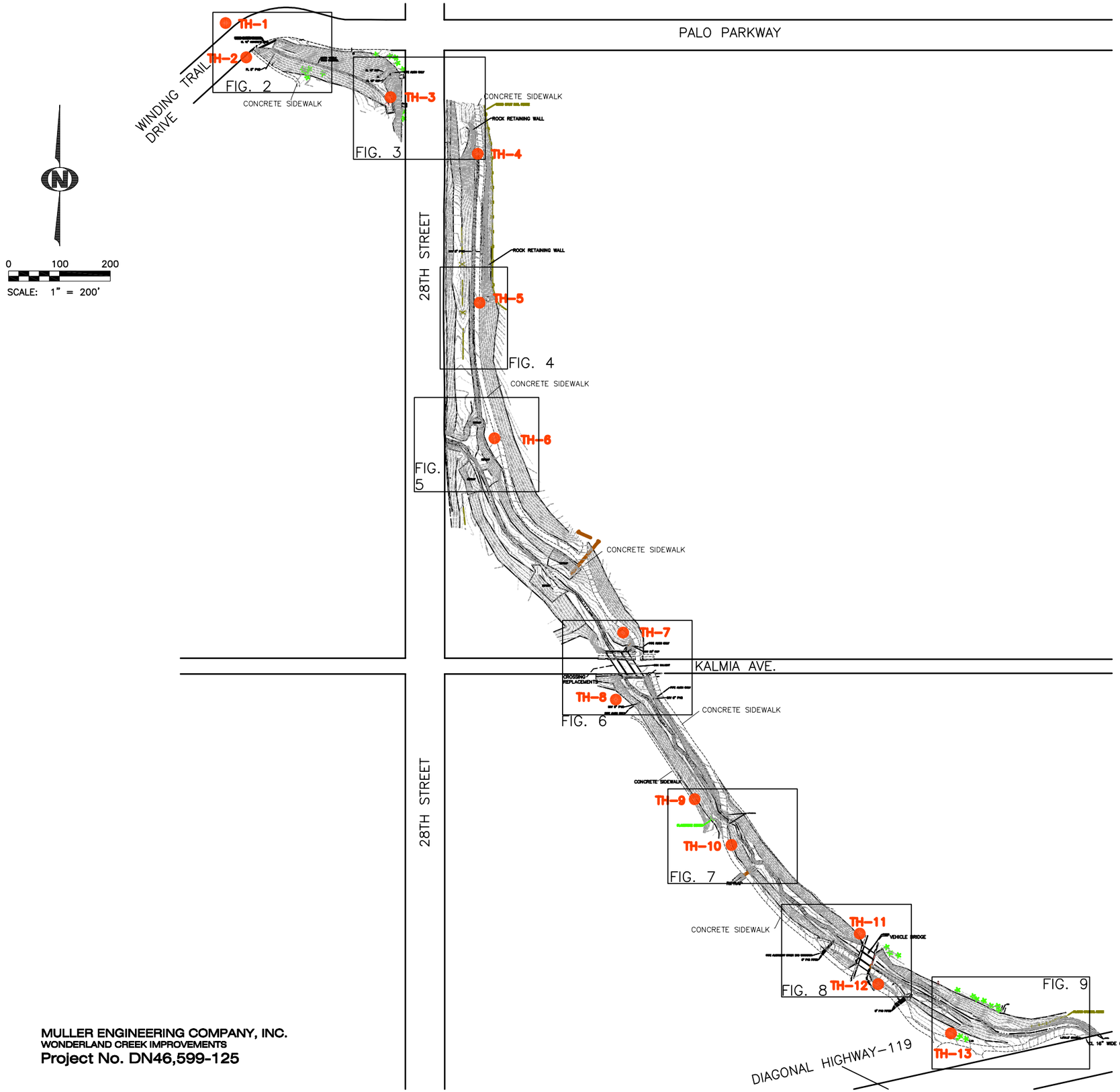

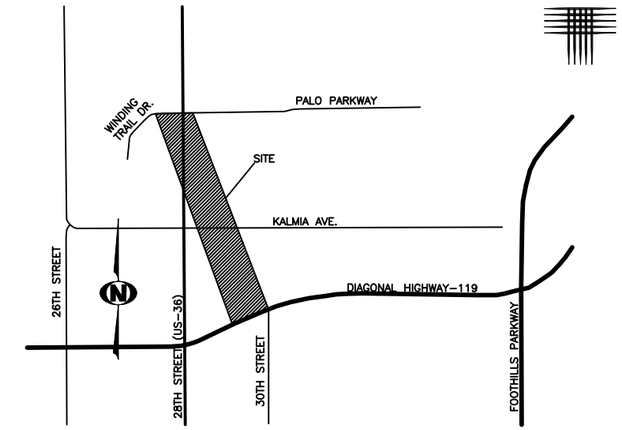

VICINITY MAP
NOT TO SCALE

LEGEND:

TH-1 APPROXIMATE LOCATION OF EXPLORATORY BORING

— — 5325 EXISTING GROUND SURFACE ELEVATION (FEET)

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Project No. DN46,599-125

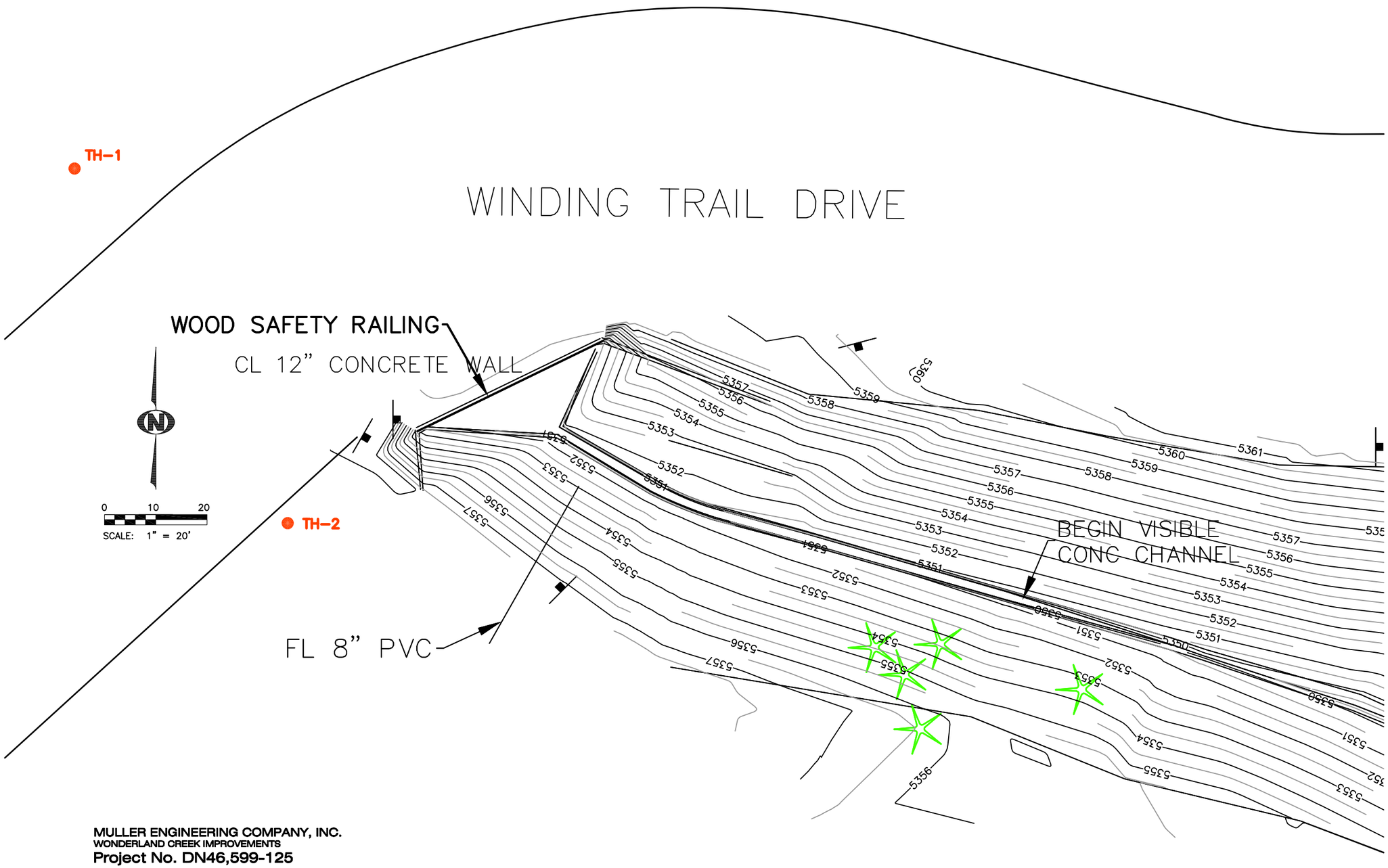
Overall Site Plan

Fig. 1

LEGEND:

TH-1 APPROXIMATE LOCATION OF EXPLORATORY BORING

5355 EXISTING GROUND SURFACE ELEVATION (FEET)



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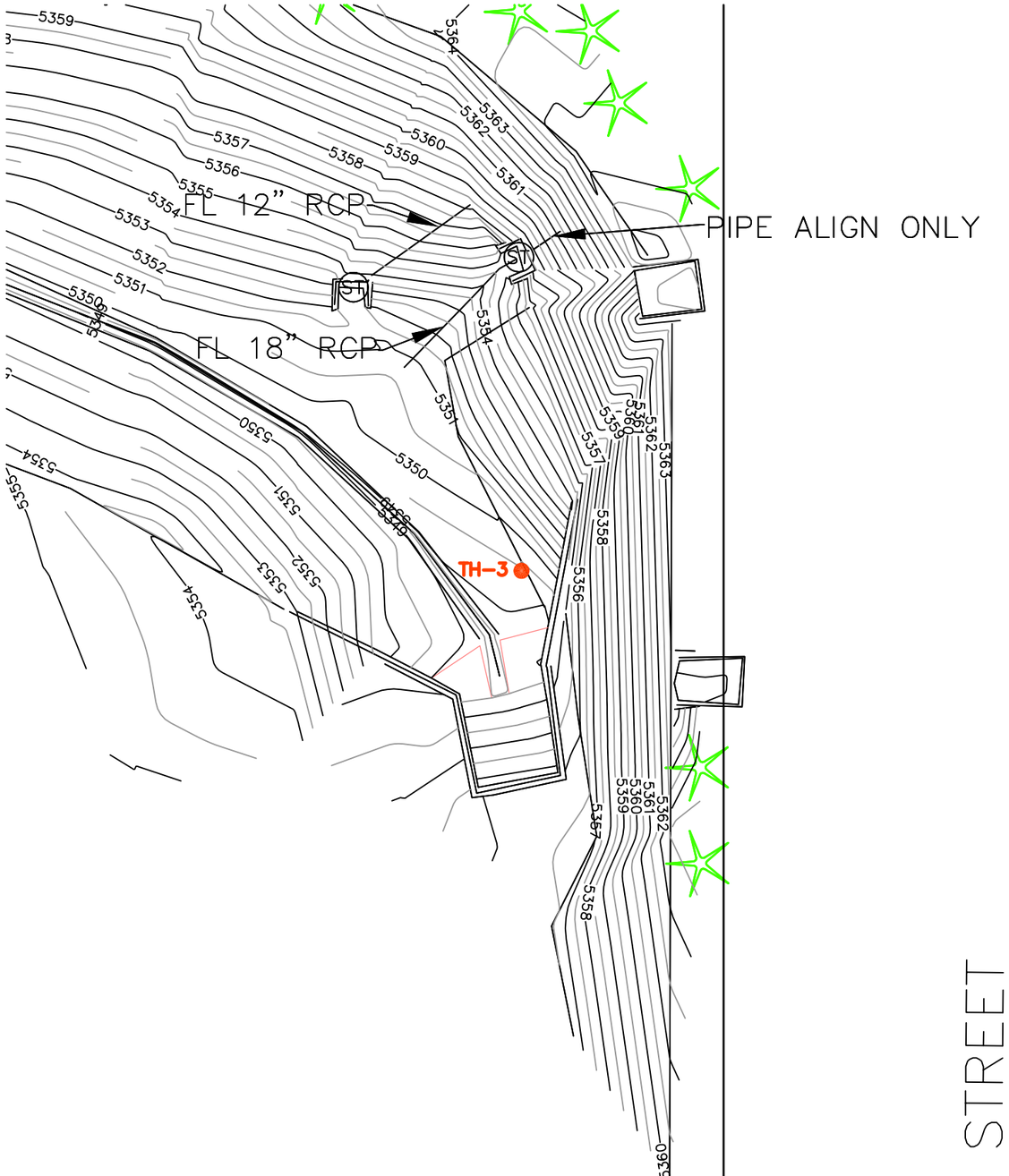
Locations of Exploratory Borings

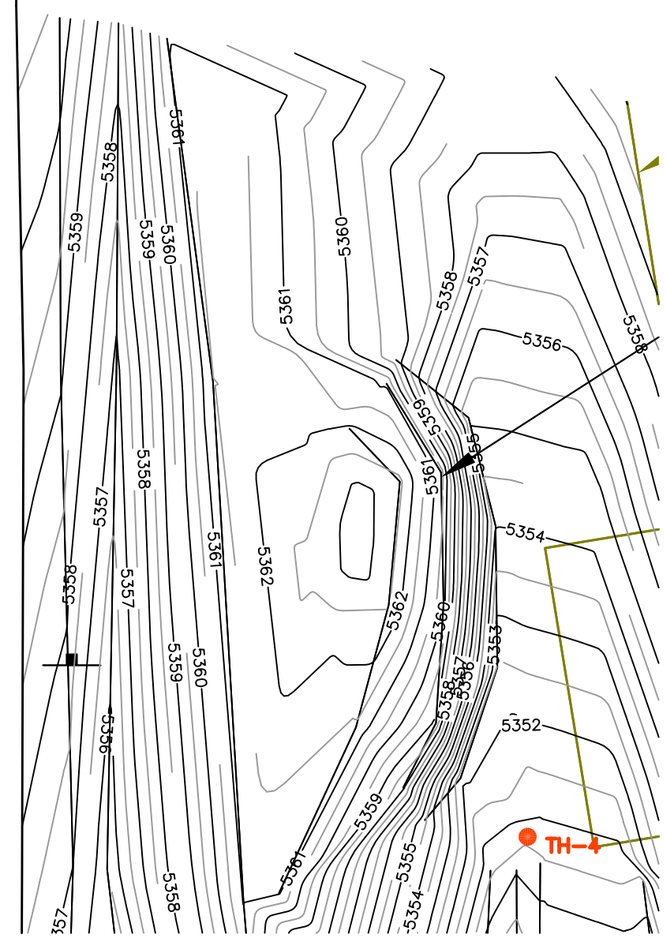
Fig. 2



LEGEND:

TH-3 APPROXIMATE LOCATION OF EXPLORATORY BORING

5360 EXISTING GROUND SURFACE ELEVATION (FEET)



0 10 20

SCALE: 1" = 20'

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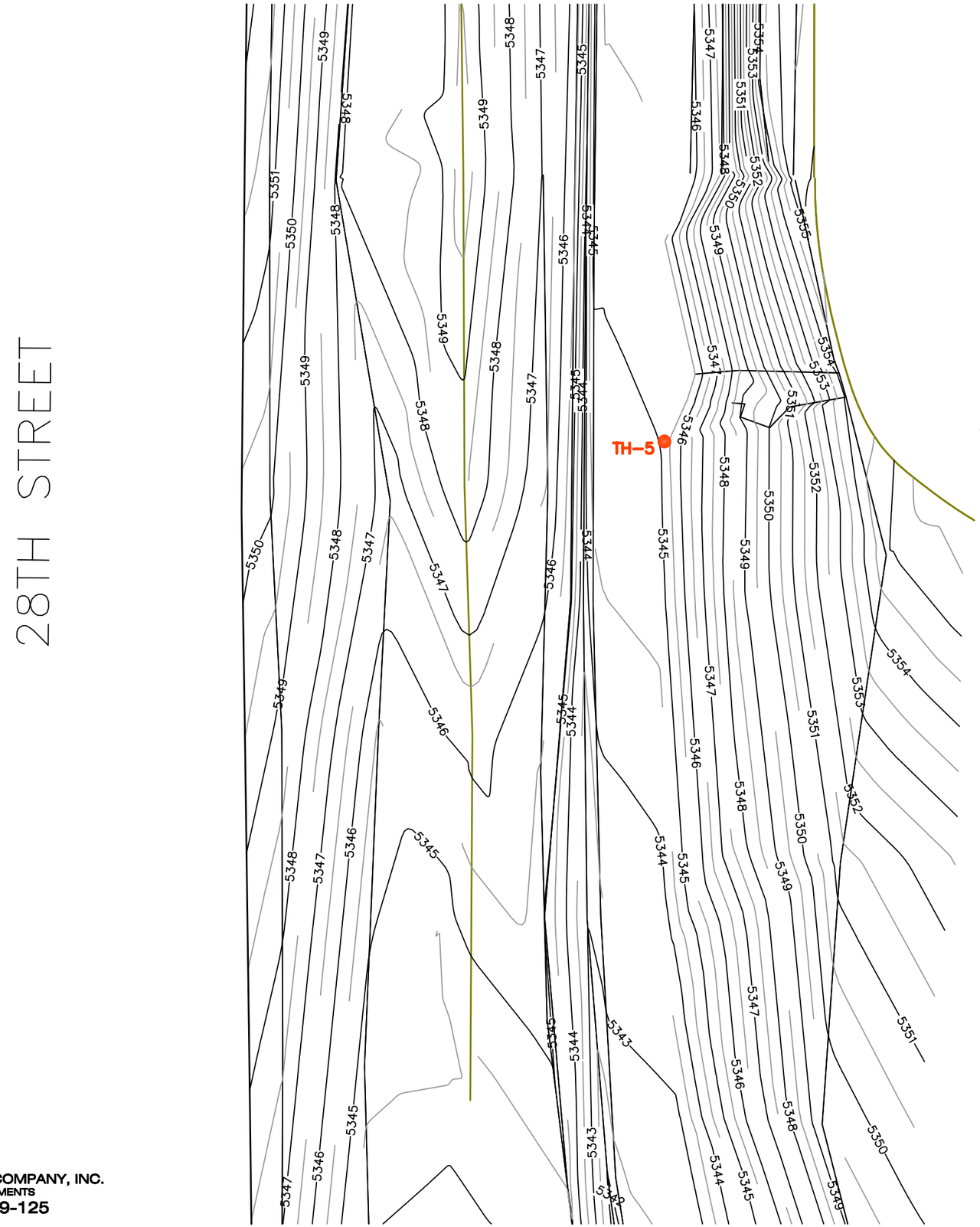
Locations of Exploratory Borings

Fig. 3



LEGEND:

TH-5 APPROXIMATE LOCATION OF EXPLORATORY BORING

5355 EXISTING GROUND SURFACE ELEVATION (FEET)

0 10 20

SCALE: 1" = 20'

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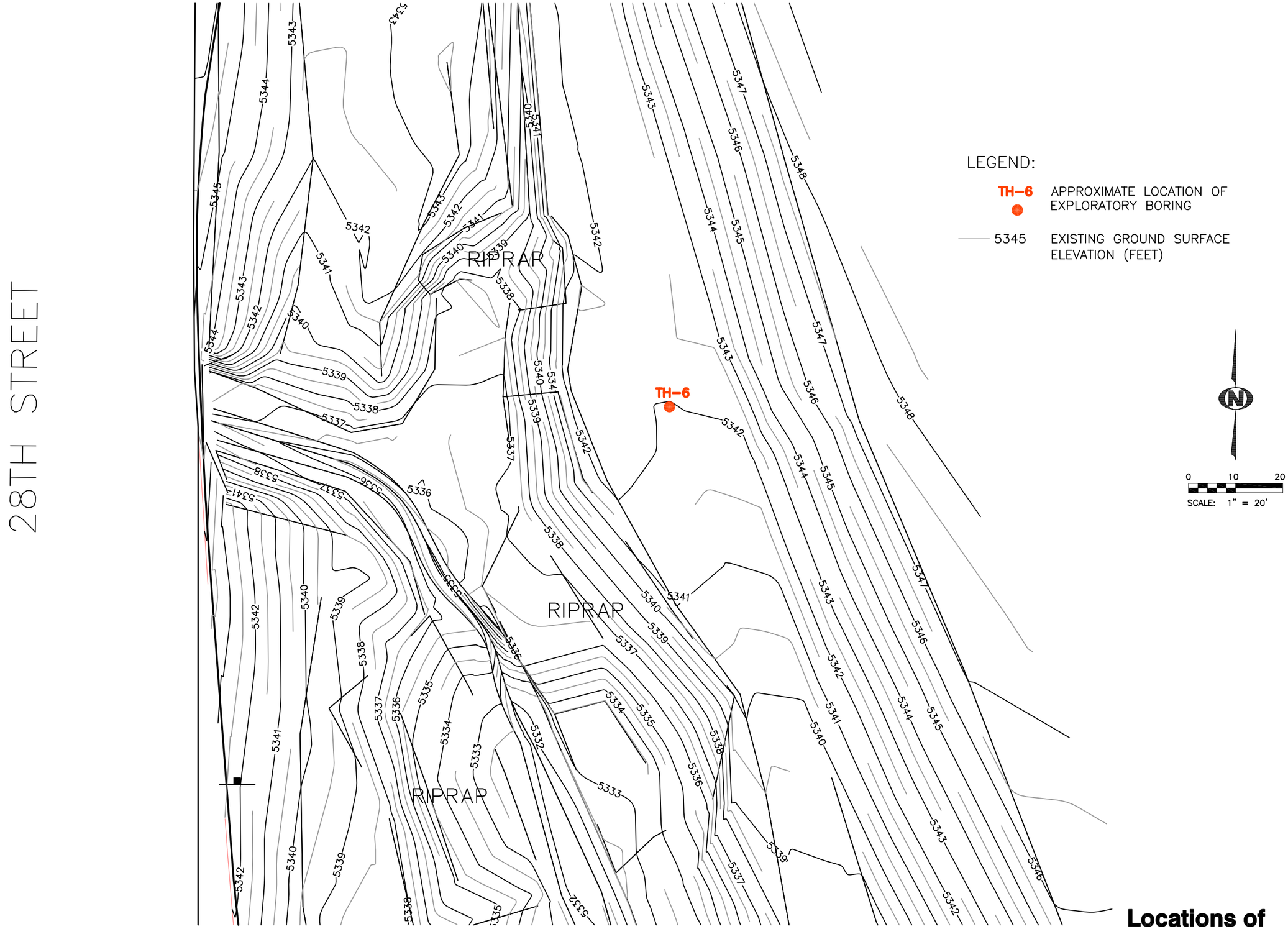
Locations of Exploratory Borings

Fig. 4



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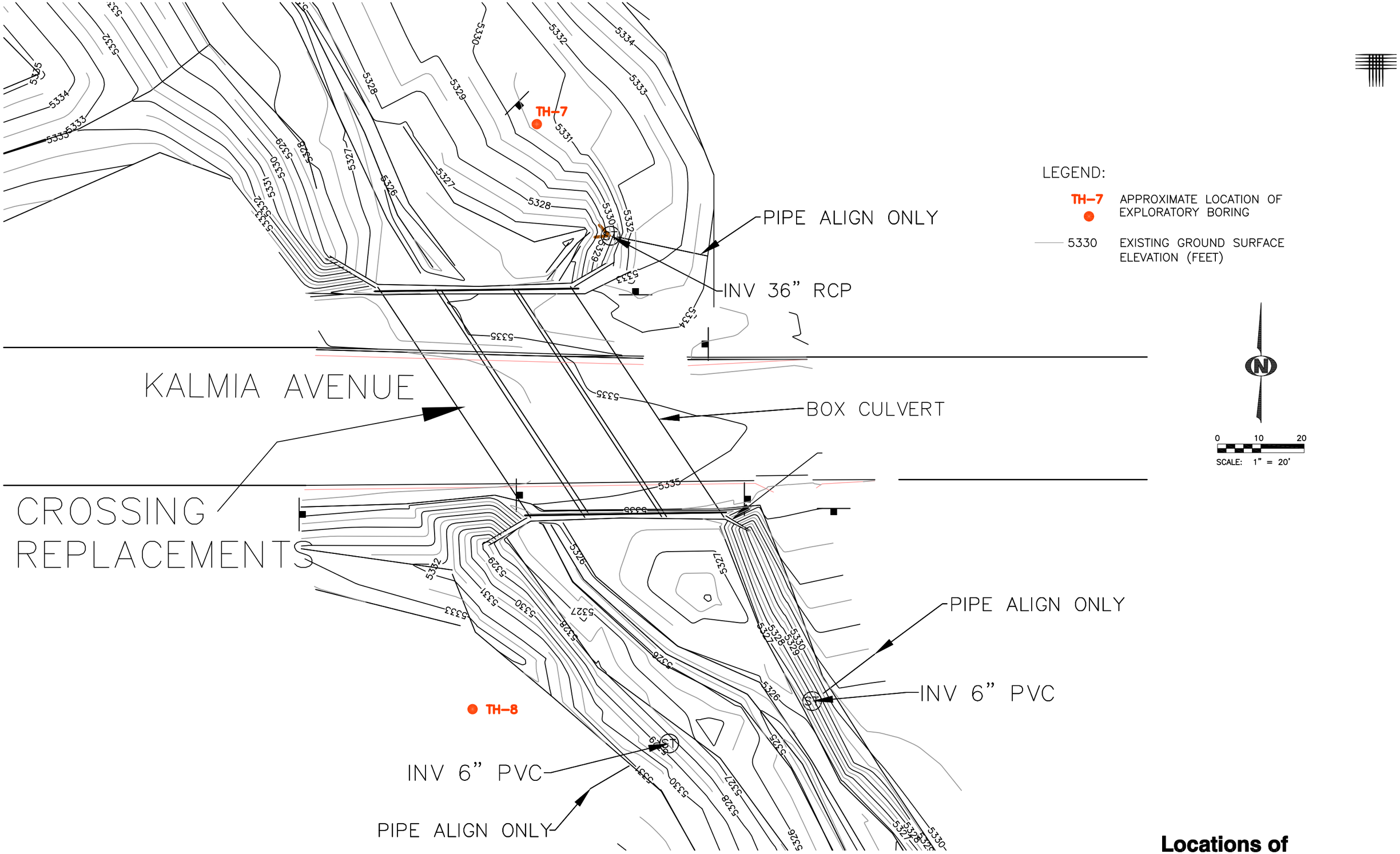
Locations of Exploratory Borings

Fig. 5



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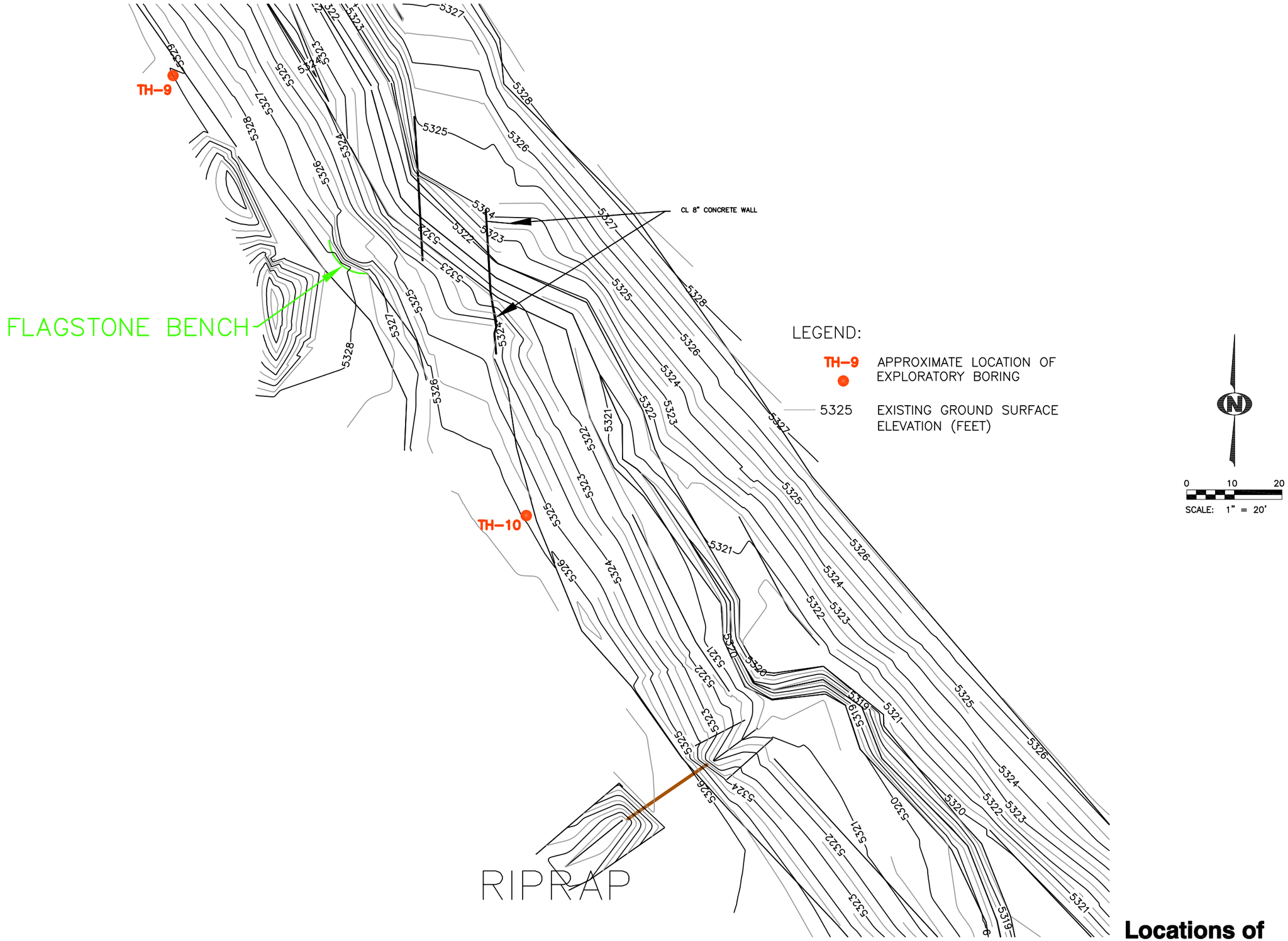
Locations of Exploratory Borings

Fig. 6



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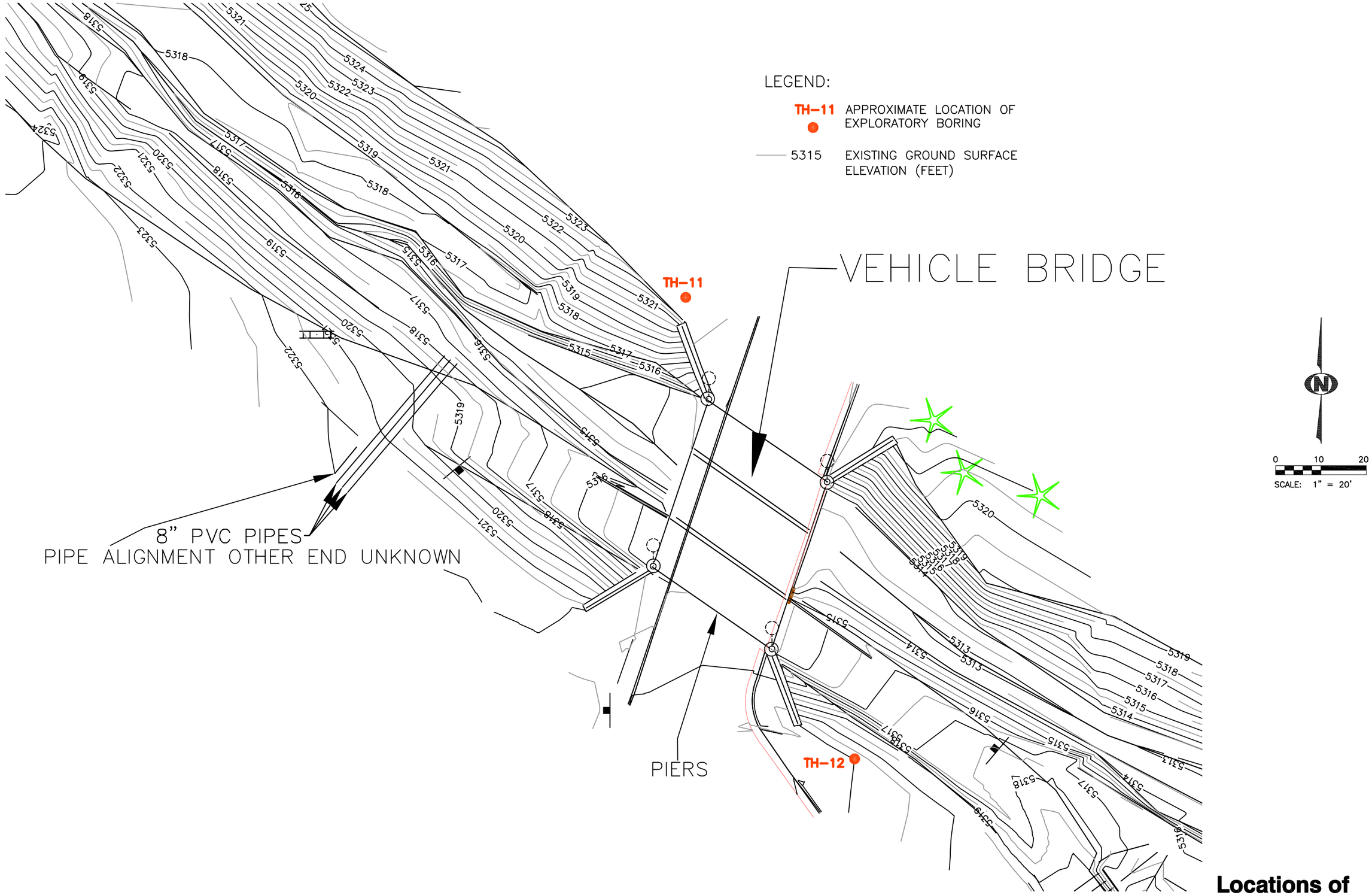
Locations of Exploratory Borings

Fig. 7



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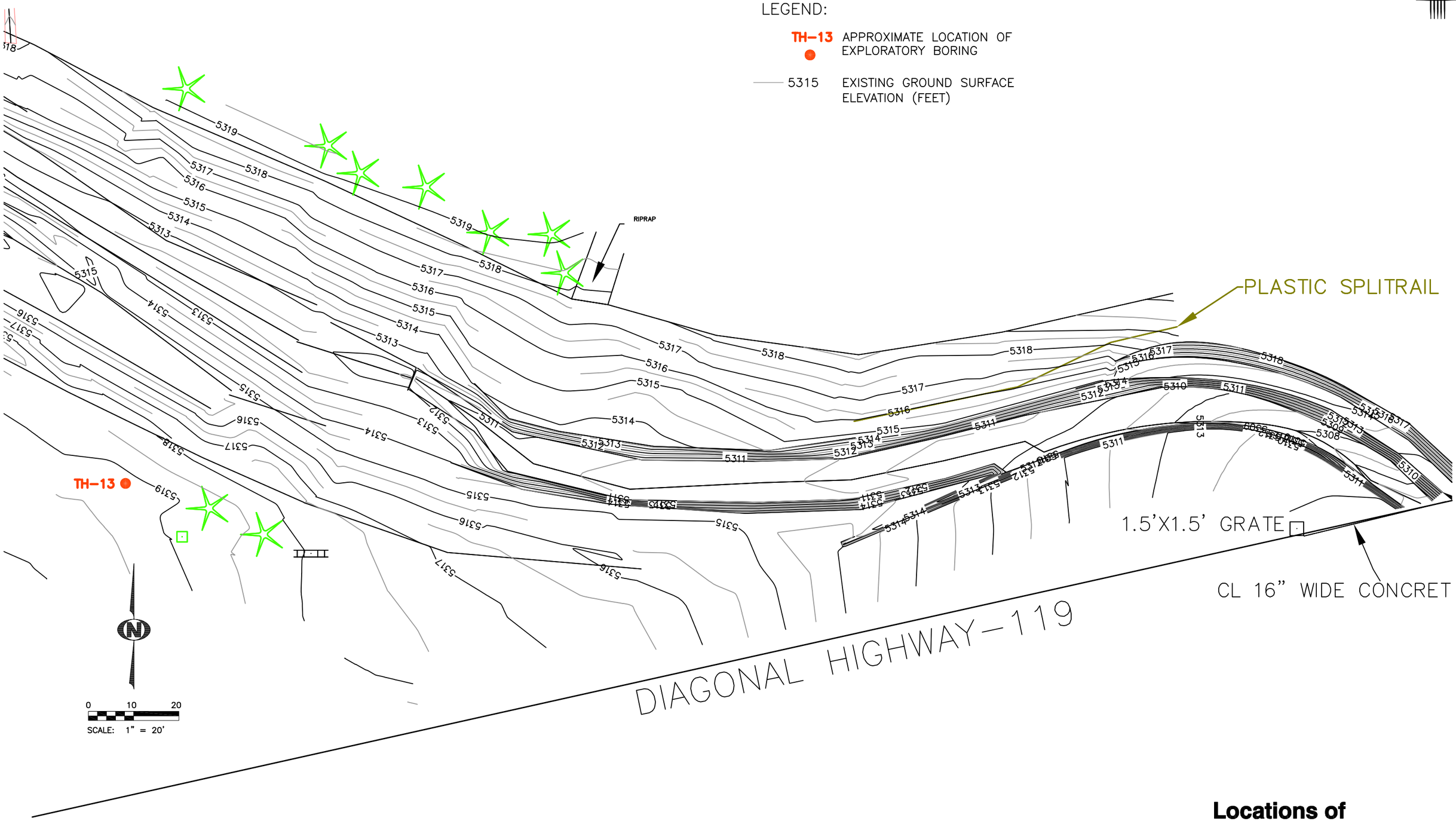
Locations of Exploratory Borings

Fig. 8



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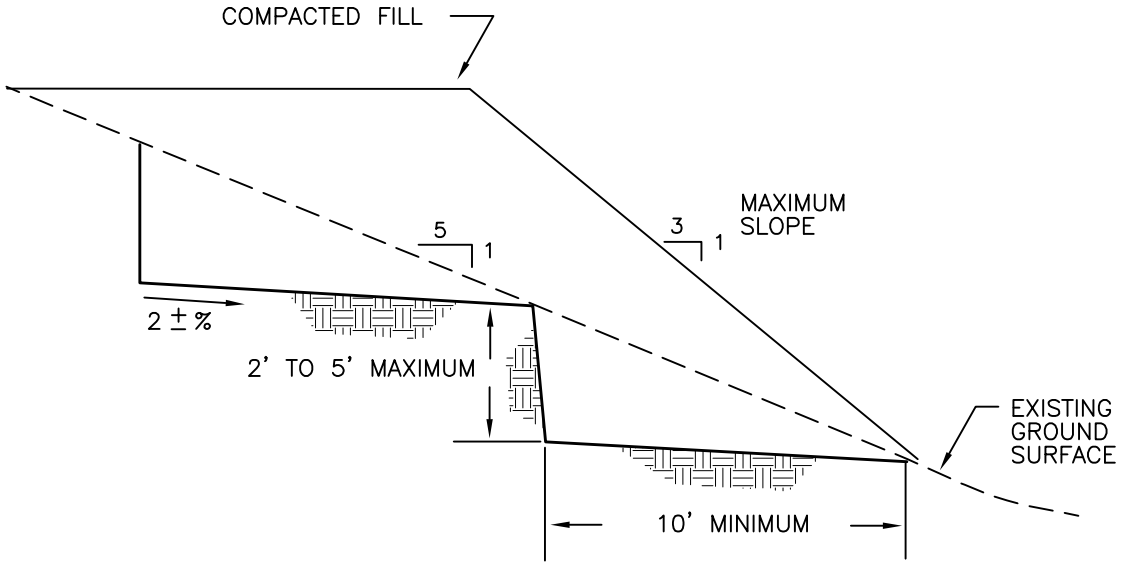
Locations of Exploratory Borings

Fig. 9

60-BENCHED-FILL_01



NOTES:

1) NATURAL SLOPES OF 20 PERCENT OR STEEPER ARE TO BE BENCHED PRIOR TO FILL PLACEMENT.

2) SLOPE BENCHES TO OUTSLOPE AT 2± PERCENT.

Benched Fill Detail

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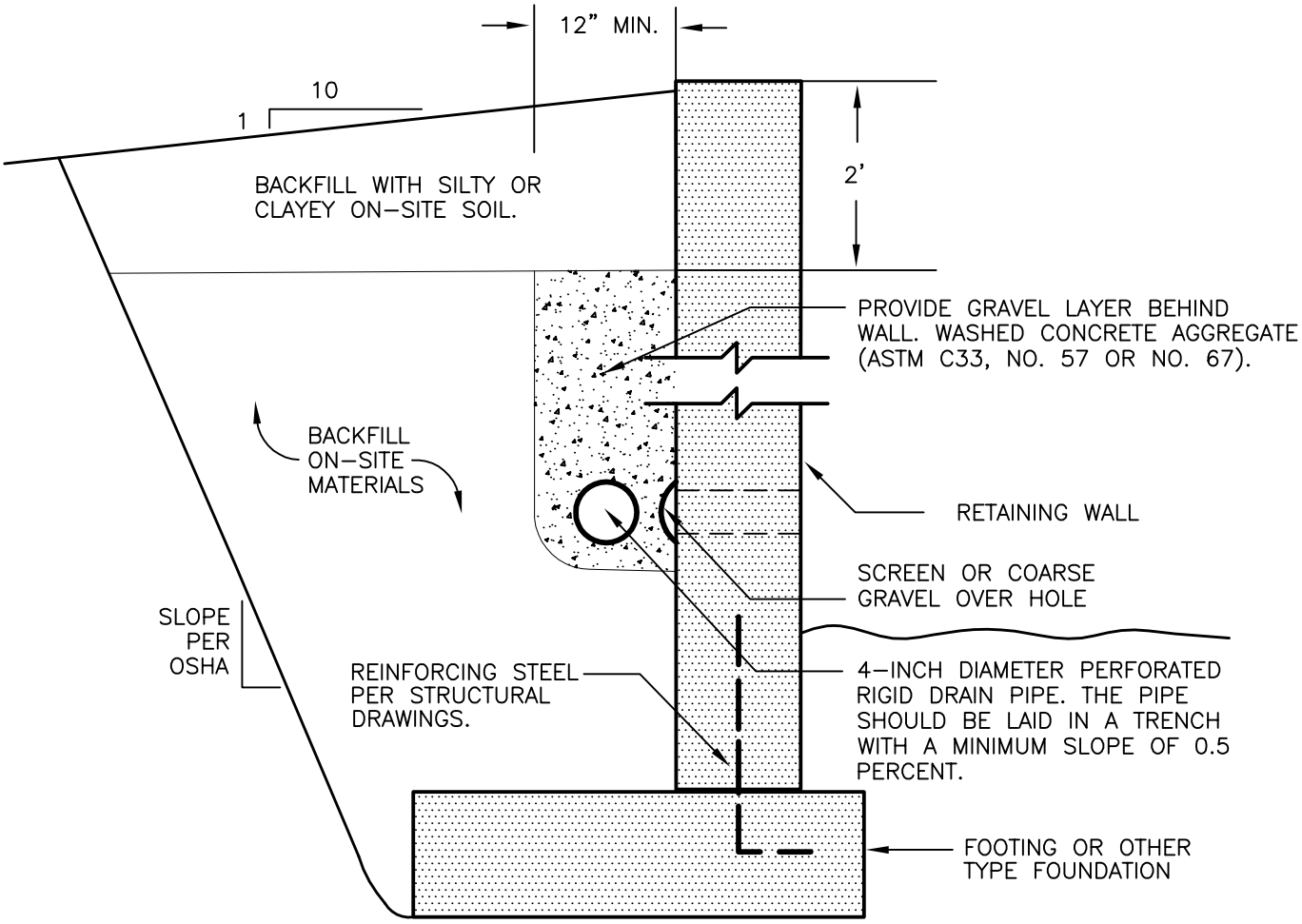
Fig. 10

35-RETAINING-WALL_01



NOTE:
DRAIN PIPE TO GRAVITY OUTLET OR WEEP HOLES MAY BE USED.

Typical Earth Retaining Wall Drain

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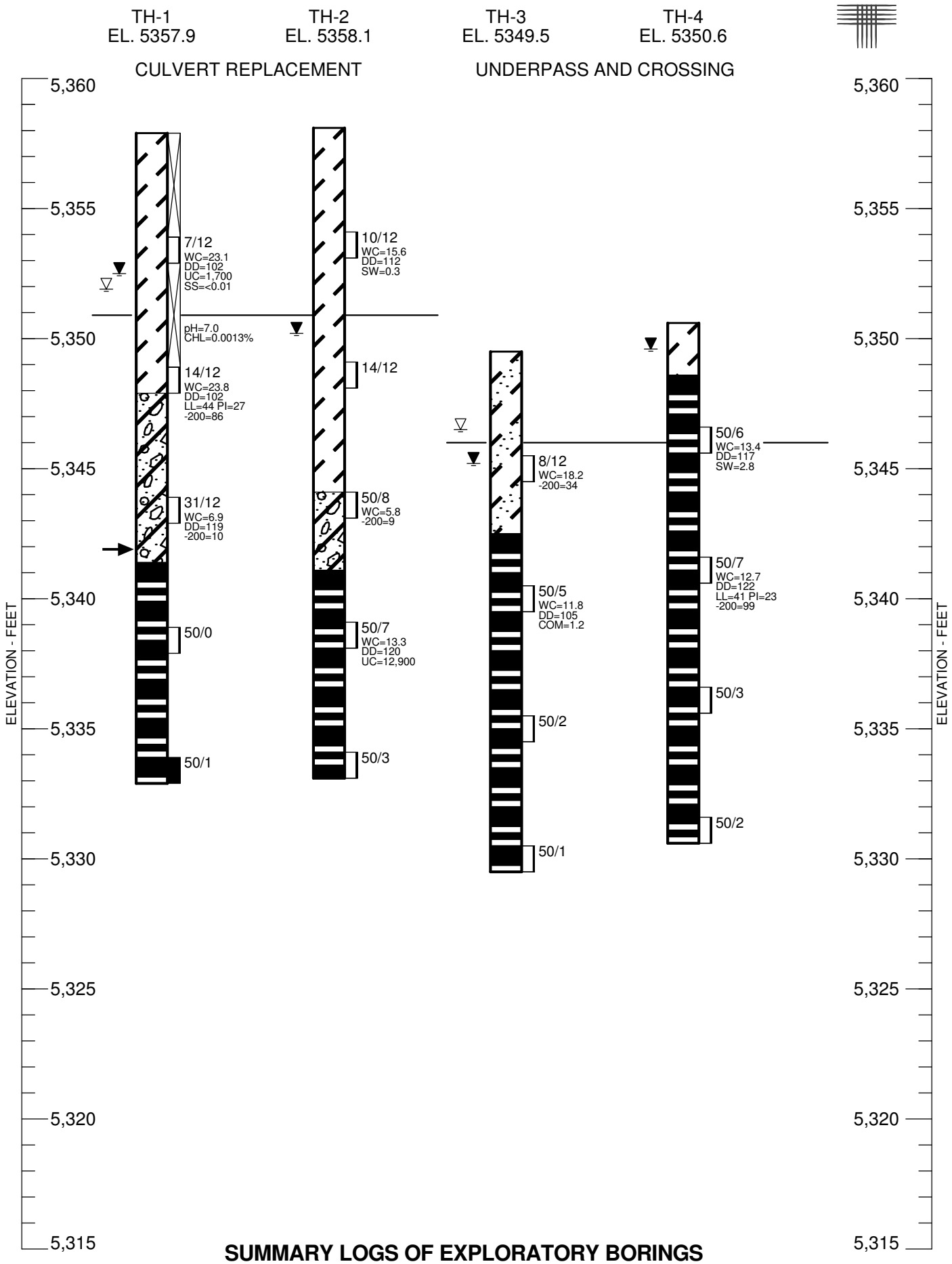
Fig. 11

APPENDIX A

SUMMARY LOGS OF EXPLORATORY BORINGS



SUMMARY LOGS OF EXPLORATORY BORINGS

MULLER ENGINEERING COMPANY, INC.
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN46,599-125

FIG. A- 1

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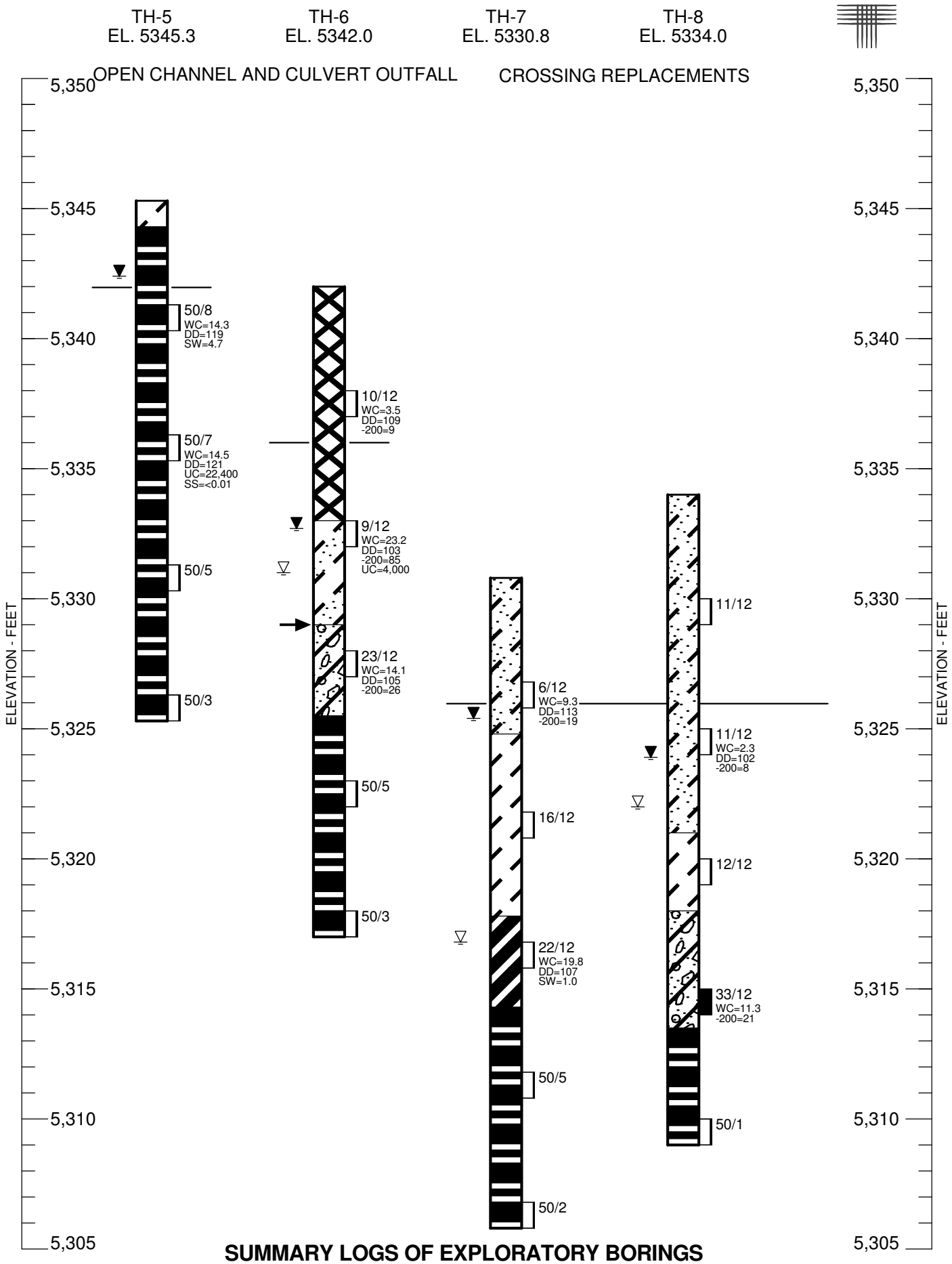

SUMMARY LOGS OF EXPLORATORY BORINGS

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PROJECT NO. DN46,599-125

FIG. A- 2

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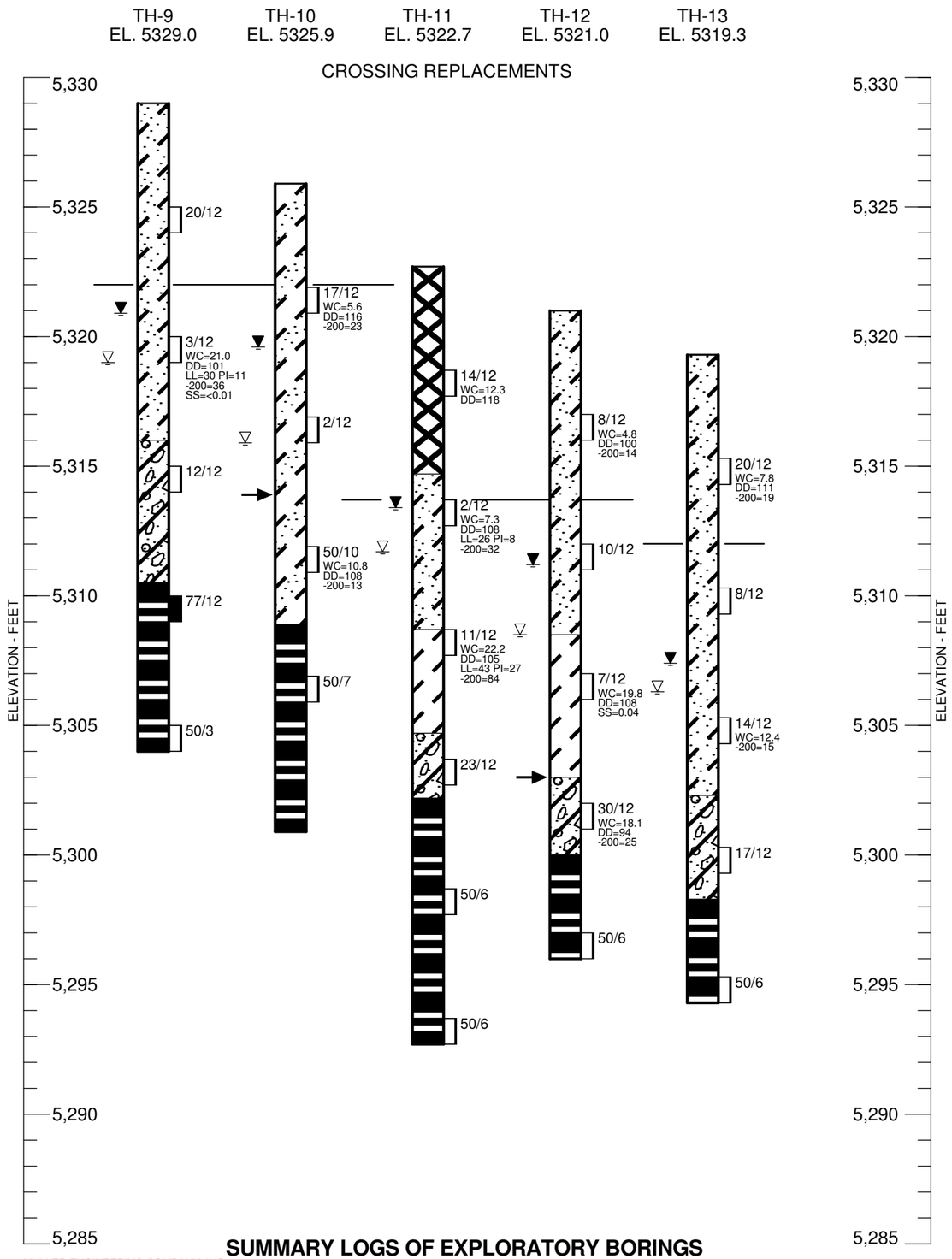

SUMMARY LOGS OF EXPLORATORY BORINGS

MULLER ENGINEERING COMPANY, INC.
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN46,599-125

LEGEND:

- FILL, CLAY AND SAND, GRAVELLY, STIFF OR MEDIUM DENSE, SLIGHTLY MOIST TO VERY MOIST, BROWN, REDDISH-BROWN, DARK BROWN, WHITE.
- CLAY SANDY TO VERY SANDY, GRAVELLY, SOME ORGANICS, MEDIUM STIFF TO VERY STIFF, MOIST TO VERY MOIST, BROWN, DARK BROWN, GRAY, REDDISH-BROWN, RUST,WHITE (CL).
- SAND, SLIGHTLY SILTY TO CLAYEY, GRAVELLY, LOOSE TO MEDIUM DENSE, SLIGHTLY MOIST TO WET, BROWN, GRAY (SP-SM, SW-SM, SM, SC).
- INTERLAYERED CLAY/SAND, GRAVELLY, SOFT TO VERY STIFF OR LOOSE TO DENSE, SLIGHTLY MOIST TO WET, BROWN, GRAY, DARK BROWN (SM, SC, CL).
- SAND AND GRAVEL, SLIGHTLY SILTY TO CLAYEY, MEDIUM DENSE TO DENSE, SLIGHLTY MOIST TO WET, BROWN, GRAY (GP-GM, GW-GM, GM, GC, SP-SM, SW-SM, SM, SC).
- WEATHERED CLAYSTONE, MOIST, BROWN, GRAY.
- BEDROCK, CLAYSTONE, HARD TO VERY HARD, SLIGHTLY MOIST TO MOIST, GRAY, BROWN, RUST.
- DRIVE SAMPLE. THE SYMBOL 7/12 INDICATES 7 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.
- DRIVE SAMPLE. THE SYMBOL 50/1 INDICATES 50 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.0-INCH O.D. SAMPLER 1 INCHES.
- WATER LEVEL MEASURED AT TIME OF DRILLING.
- WATER LEVEL MEASURED AFTER DRILLING ON MAY 16, 2013.
- INDICATES DEPTH WHERE HOLE CAVED.
- INDICATES APPROXIMATE BOTTOM OF CREEK OR INVERT ELEVATION ESTIMATED FROM PLANS.

NOTES:

1. THE BORINGS WERE DRILLED ON MAY 2 AND MAY 16, 2013 USING 4-INCH DIAMETER, CONTINUOUS-FLIGHT AUGER AND TRUCK-MOUNTED DRILL RIGS.
2. BORING LOCATIONS WERE DETERMINED BY A REPRESENTATIVE OF OUR FIRM REFERENCING PLANS PROVIDED AND SITE FEATURES. BORING LOCATIONS WERE SURVEYED AFTER DRILLING AND ELEVATIONS PROVIDED BY LUND PARTNERSHIP.
3. WC - INDICATES MOISTURE CONTENT (%).
   DD - INDICATES DRY DENSITY (pcf).
   SW - INDICATES SWELL WHEN WETTED UNDER APPLIED PRESSURE (%).
   LL - INDICATES LIQUID LIMIT.
   PI - INDICATES PLASTICITY INDEX.
   -200 - INDICATES PASSING NO. 200 SIEVE (%).
   SS - INDICATES WATER-SOLUBLE SULFATE CONCENTRATION (%).
   UC - INDICATES UNCONFINED COMPRESSIVE STRENGTH (psf).
4. THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS AND CONCLUSIONS CONTAINED IN THIS REPORT.

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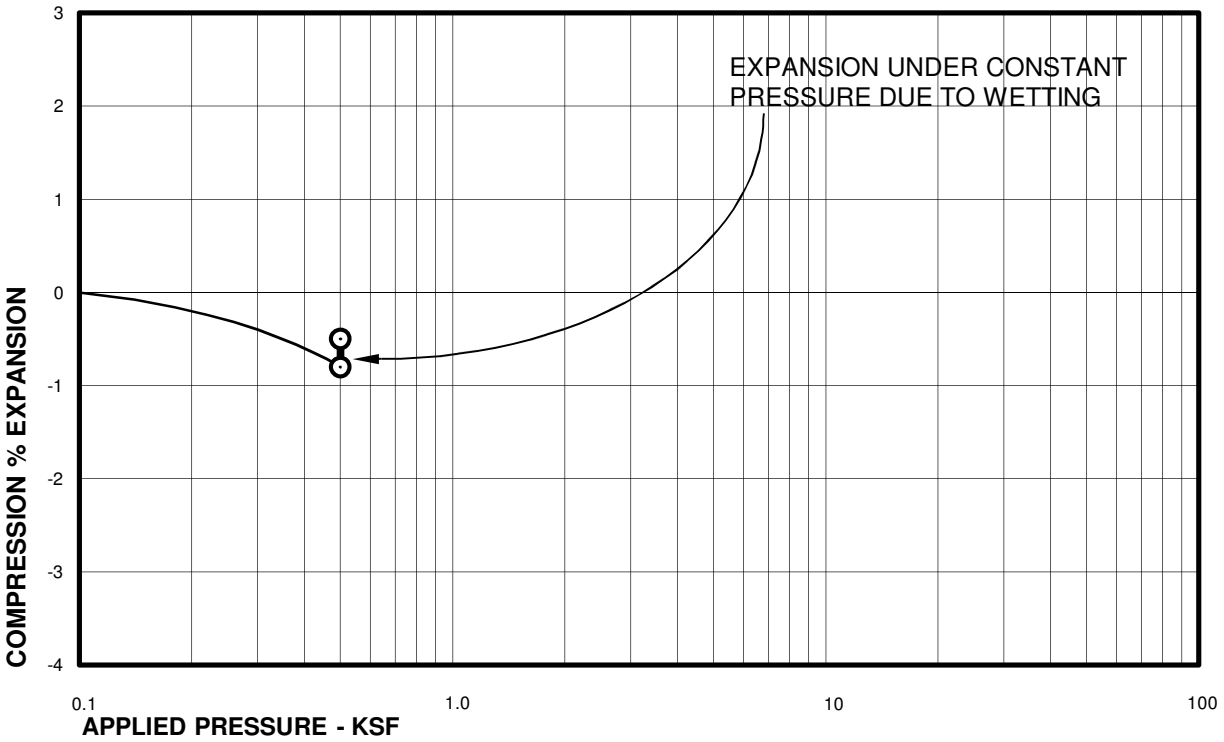
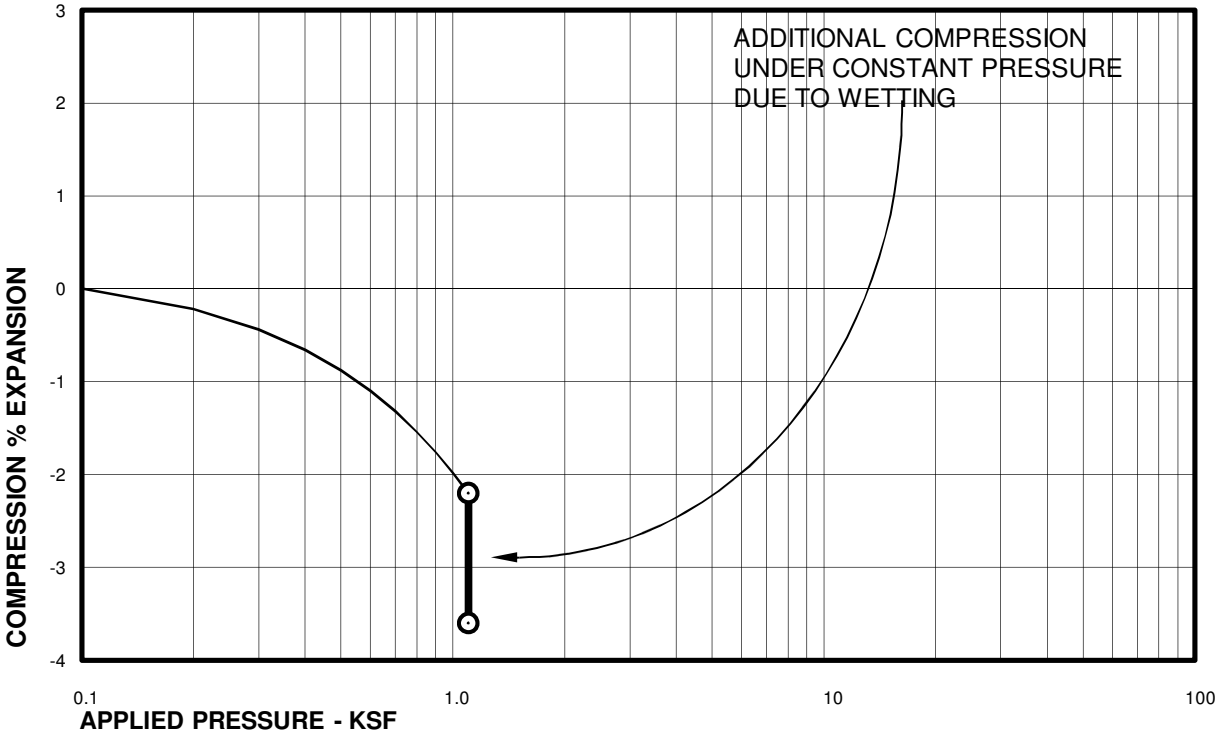
APPENDIX B
LABORATORY TEST RESULTS



Sample of CLAY, SANDY (CL)
From TH-2 AT 4 FEET

DRY UNIT WEIGHT= 112 PCF
MOISTURE CONTENT= 15.6 %



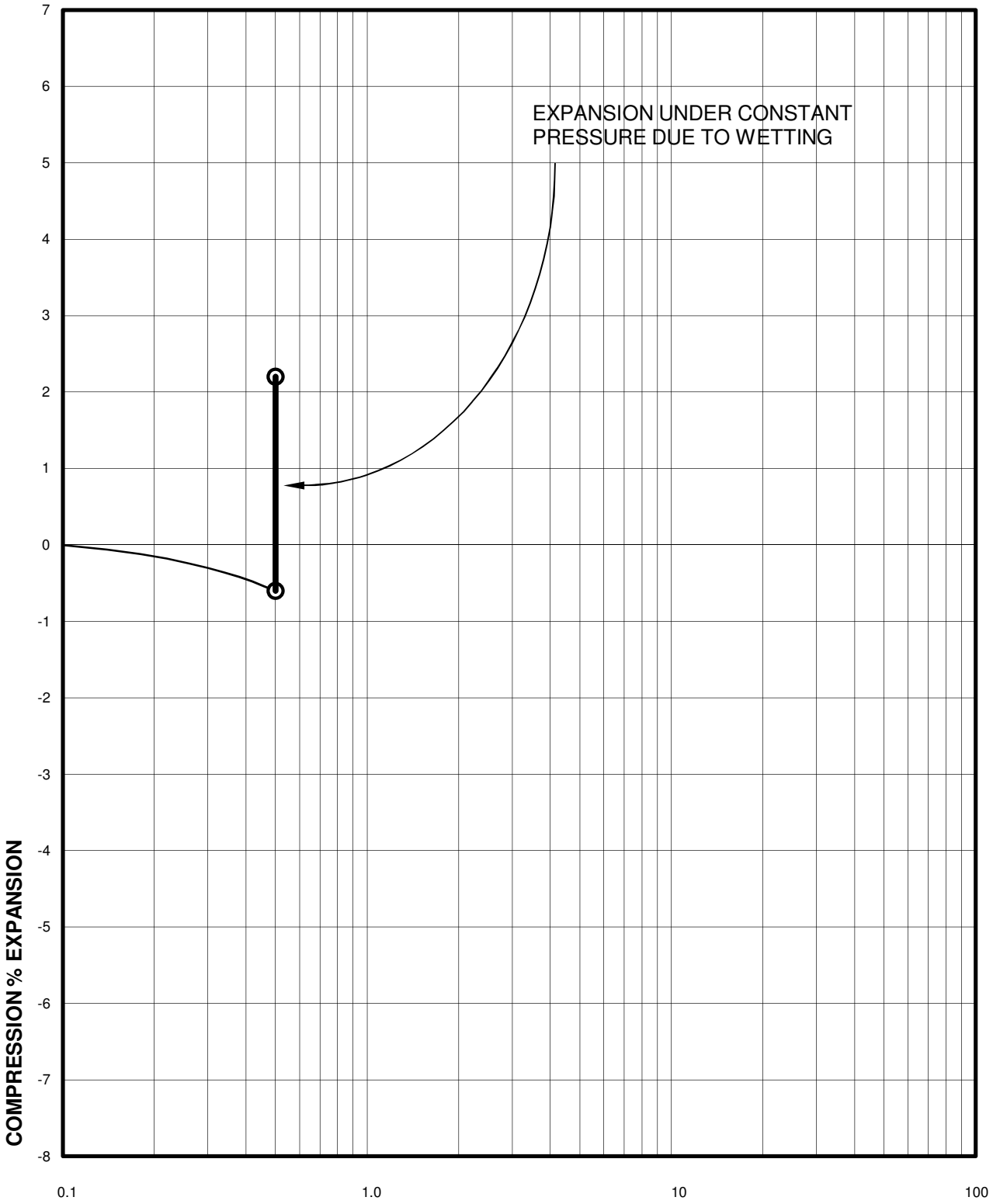
Sample of CLAYSTONE
From TH-3 AT 9 FEET

DRY UNIT WEIGHT= 105 PCF
MOISTURE CONTENT= 11.8 %

Swell Consolidation Test Results

FIG. B-1

MULLER ENGINEERING COMPANY, INC
WONDERLAND CREEK IMPROVEMENT
PROJECT NO. DN46,599-125
S:\PROJECTS\46500\DN46599.000\125\2. Reports\R1\DN46599-125-R1-X1(SWELL).xls



Sample of CLAYSTONE

From TH-4 AT 4 FEET

DRY UNIT WEIGHT= 117 PCF

MOISTURE CONTENT= 13.4 %

MULLER ENGINEERING COMPANY, INC
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN46,599-125
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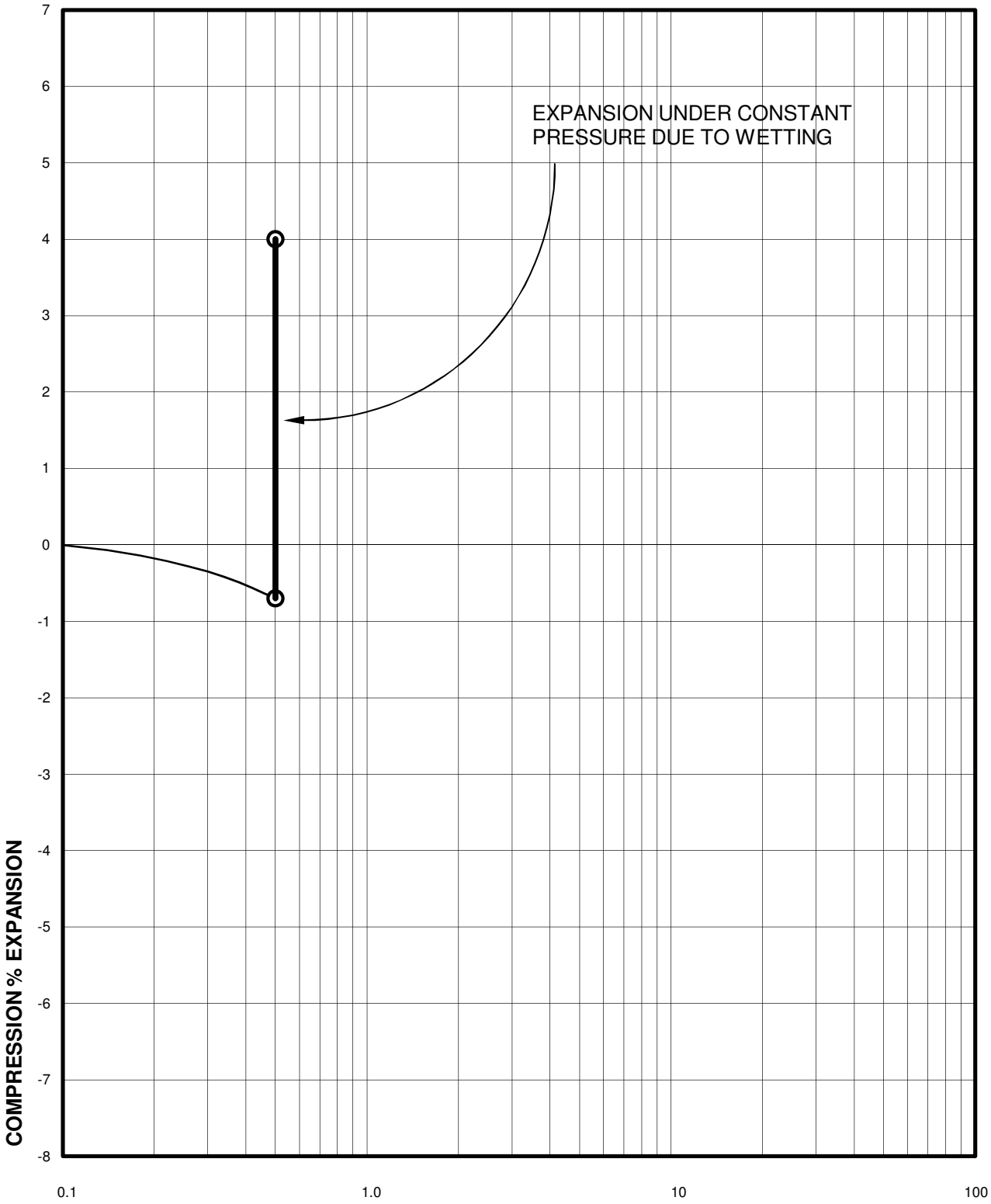
Swell Consolidation Test Results

FIG. B-2



Sample of CLAYSTONE

From TH-5 AT 4 FEET

DRY UNIT WEIGHT= 119 PCF

MOISTURE CONTENT= 14.3 %

MULLER ENGINEERING COMPANY, INC
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN46,599-125
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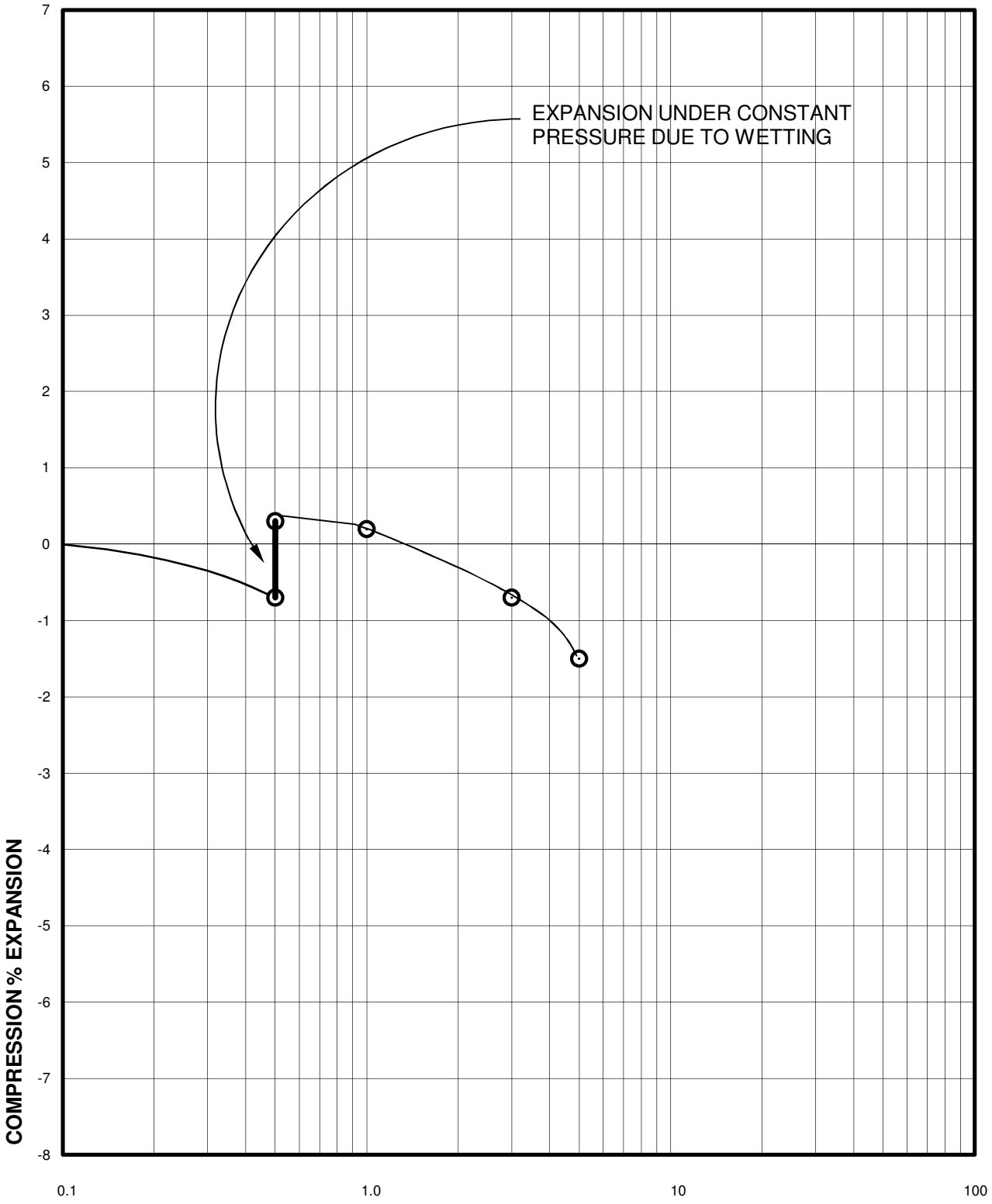
Swell Consolidation Test Results

FIG. B-3



Sample of WEATHERED CLAYSTONE

From TH-7 AT 14 FEET

DRY UNIT WEIGHT= 107 PCF

MOISTURE CONTENT= 19.8 %

MULLER ENGINEERING COMPANY, INC
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN46,599-125
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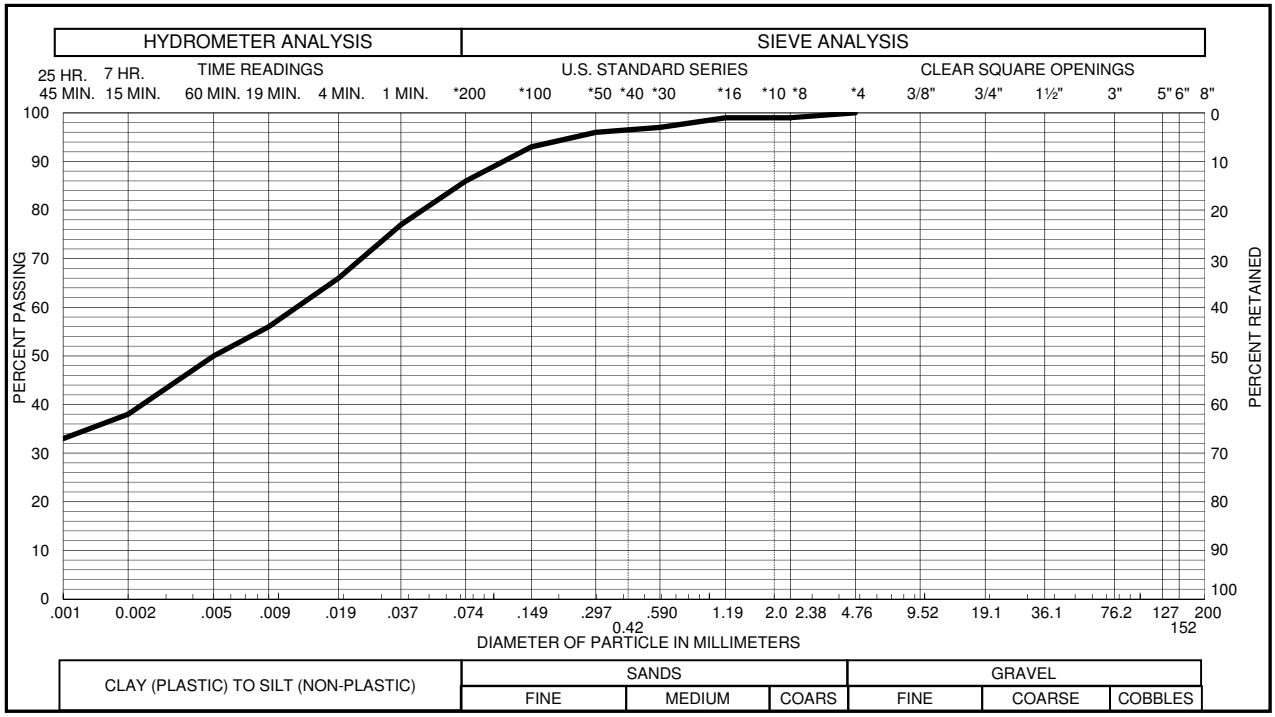
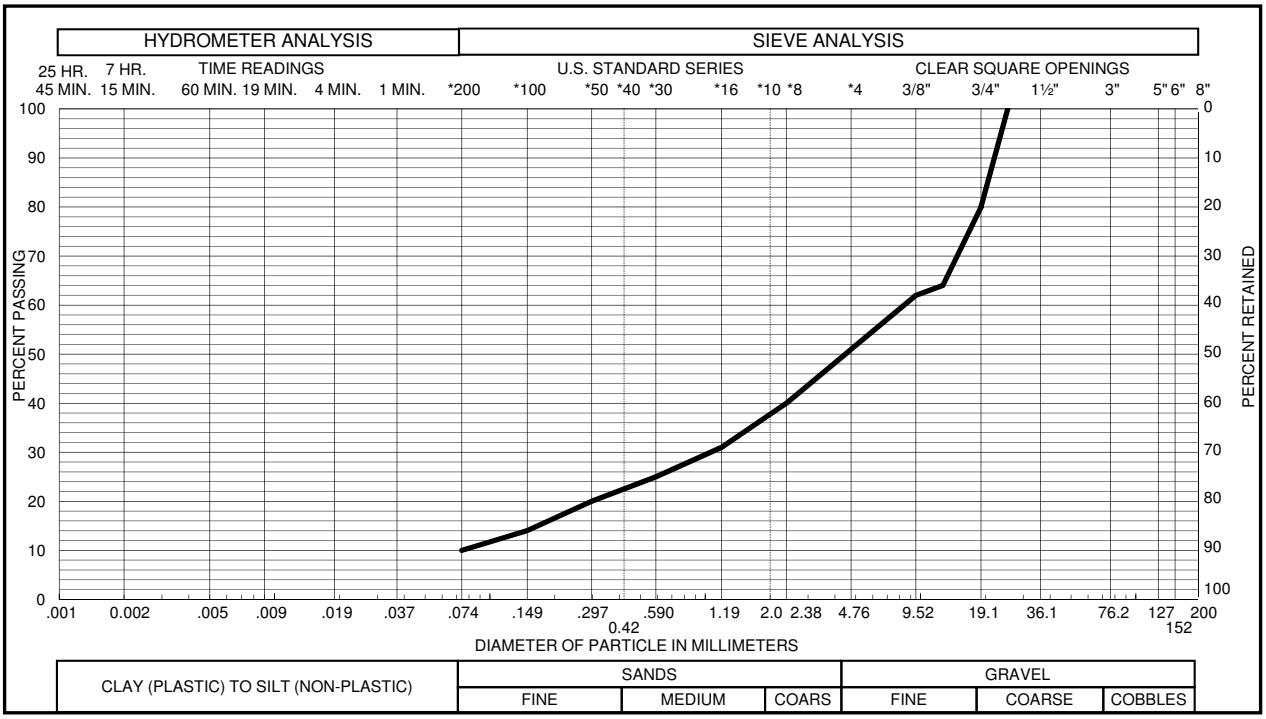
Swell Consolidation Test Results

FIG. B-4



Sample of CLAY, SANDY (CL)
From TH - 1 AT 9 FEET

GRAVEL 0 % SAND 14 %
SILT & CLAY 86 % LIQUID LIMIT 44
PLASTICITY INDEX 27



Sample of GRAVEL, SANDY, SLIGHTLY SILTY (GW-GM)
From TH - 1 AT 14 FEET

GRAVEL 49 % SAND 41 %
SILT & CLAY 10 % LIQUID LIMIT
PLASTICITY INDEX

MULLER ENGINEERING, COMPANY, INC.
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN46,599-125
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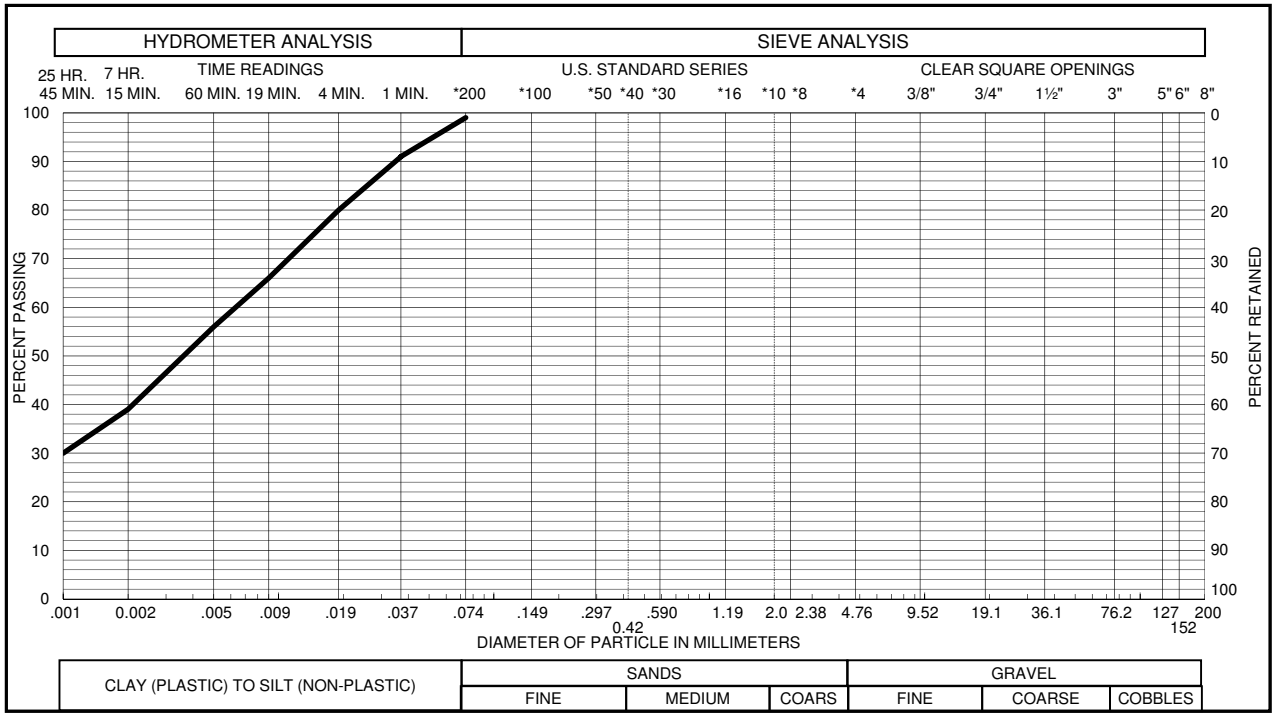
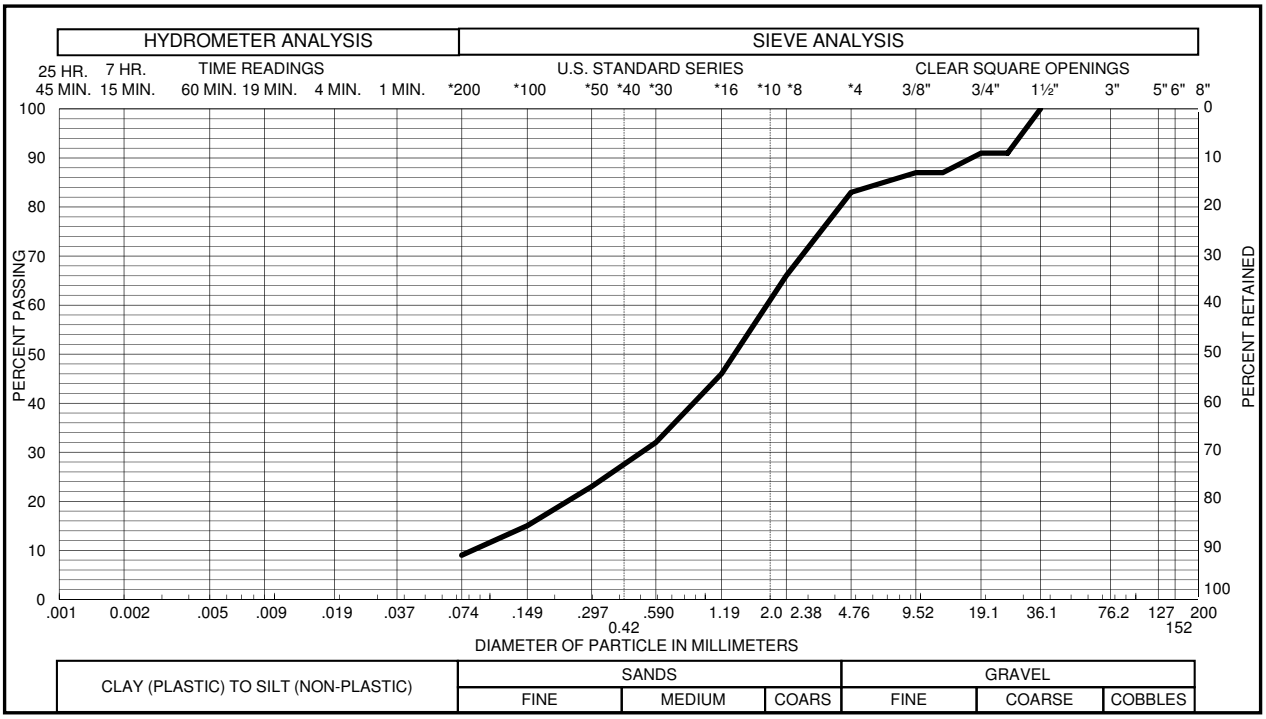
Gradation Test Results

FIG. B-5



Sample of CLAYSTONE
From TH - 4 AT 9 FEET

GRAVEL 0 % SAND 1 %
SILT & CLAY 99 % LIQUID LIMIT 41
PLASTICITY INDEX 23



Sample of FILL, SAND, SLIGHTLY SILTY
From TH - 6 AT 4 FEET

GRAVEL 17 % SAND 74 %
SILT & CLAY 9 % LIQUID LIMIT
PLASTICITY INDEX

MULLER ENGINEERING, COMPANY, INC.
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN46,599-125
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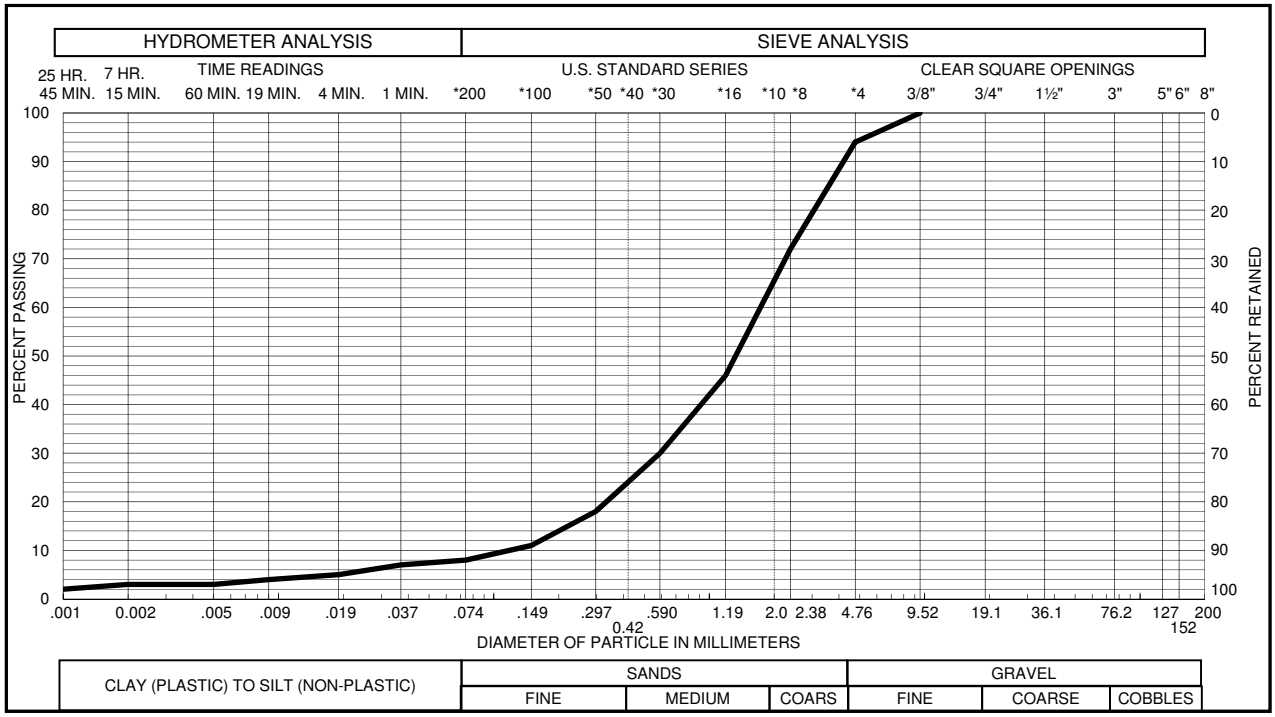
Gradation Test Results

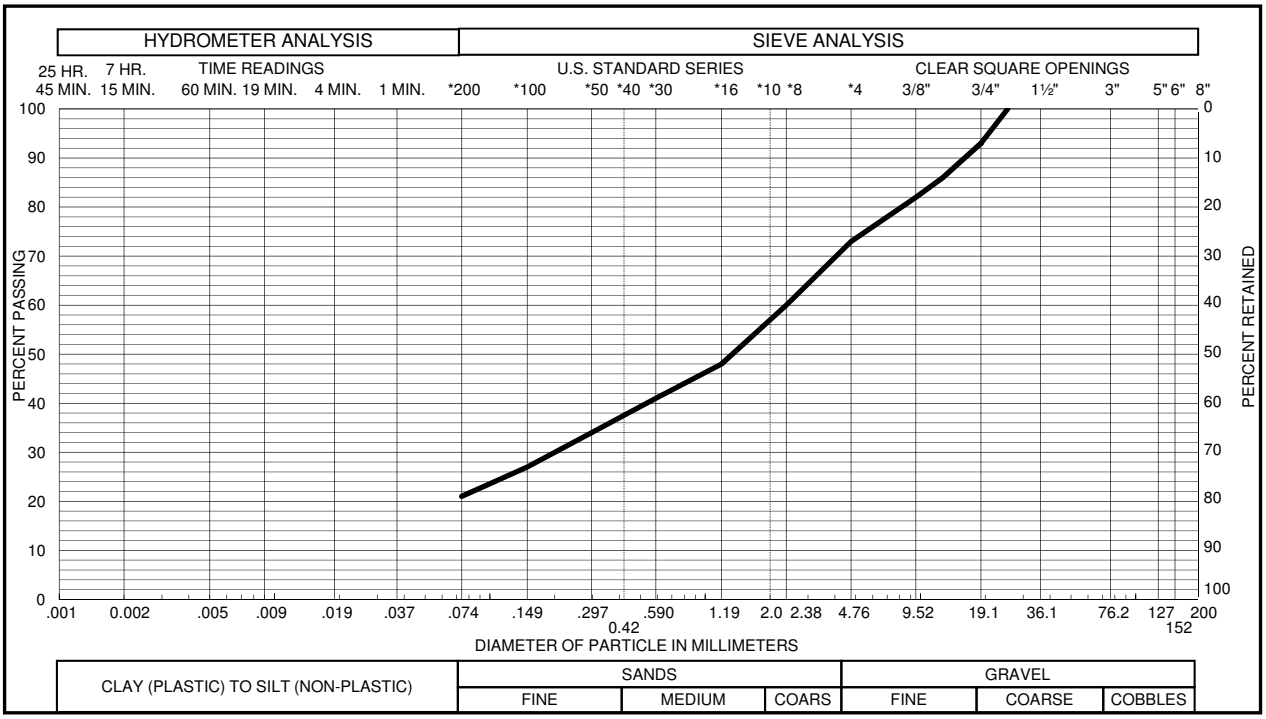
FIG. B-6



Sample of SAND, SLIGHTLY GRAVELLY, SLIGHTLY SILTY (SW-SM) GRAVEL 6 % SAND 86 %

From TH - 8 AT 9 FEET SILT & CLAY 8 % LIQUID LIMIT

PLASTICITY INDEX



Sample of SAND, GRAVELLY, SILTY (SM) GRAVEL 27 % SAND 52 %

From TH - 8 AT 19 FEET SILT & CLAY 21 % LIQUID LIMIT

PLASTICITY INDEX

MULLER ENGINEERING, COMPANY, INC.
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN46,599-125
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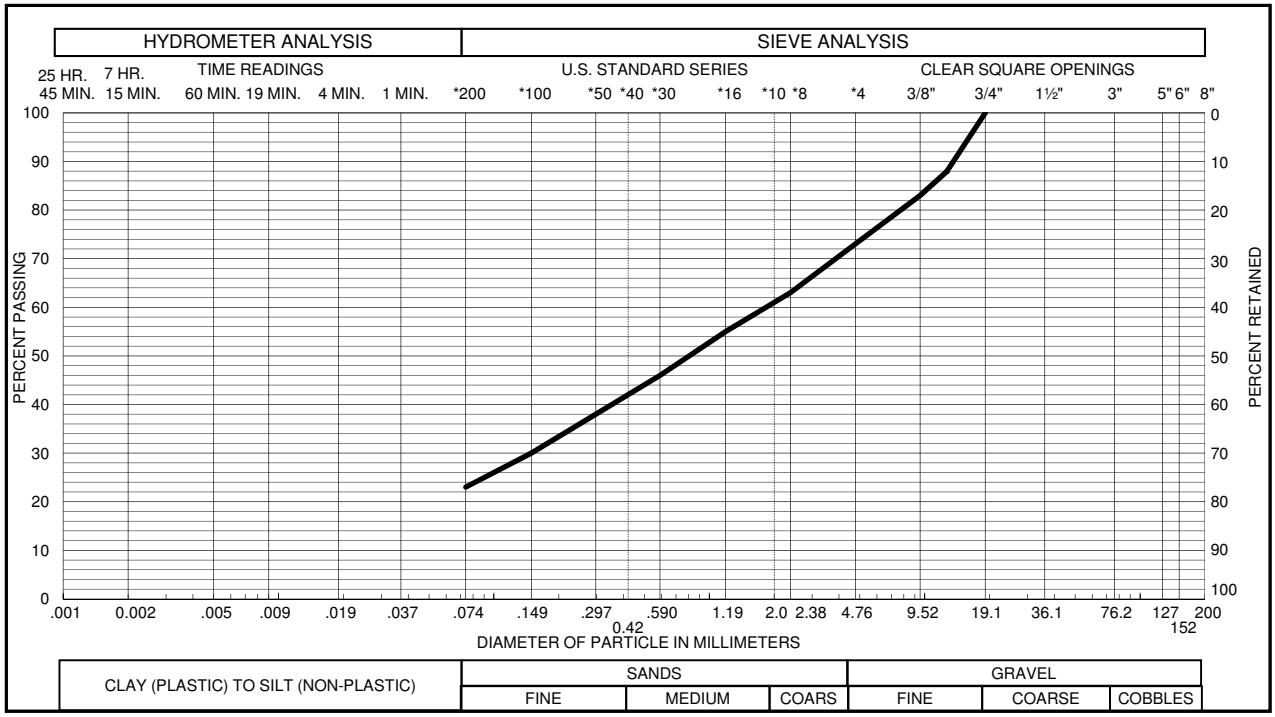
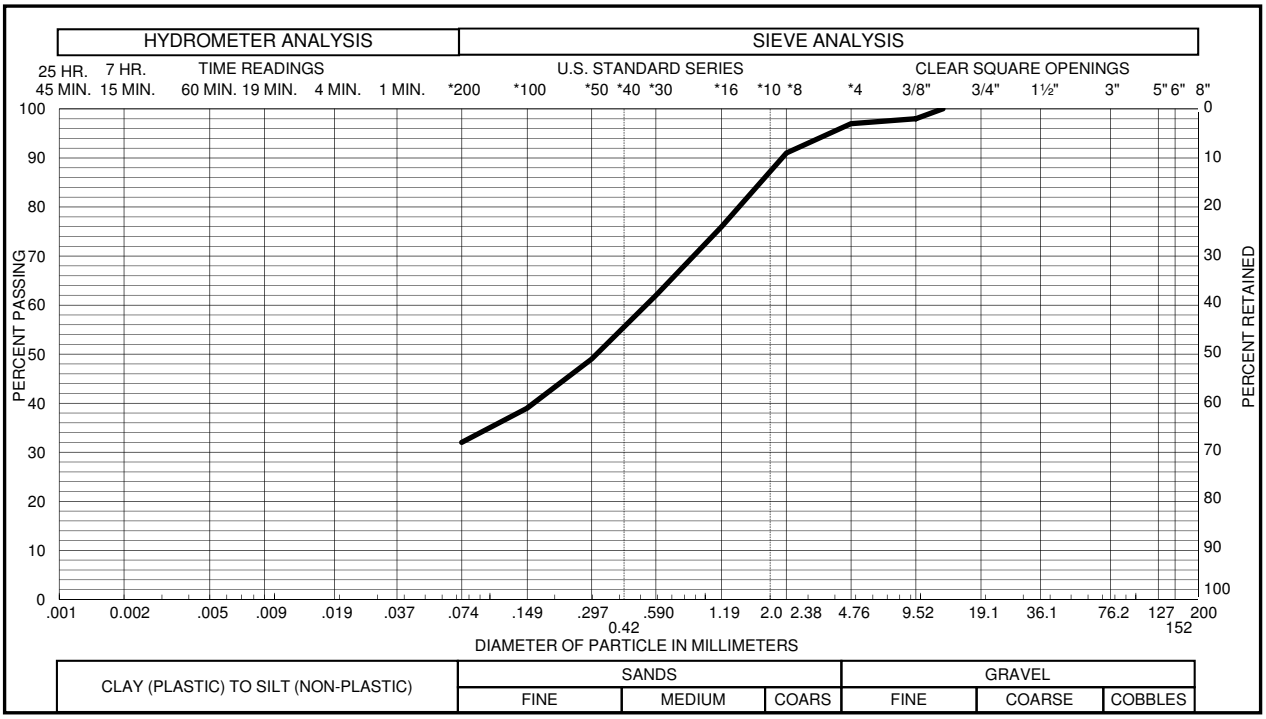
Gradation Test Results FIG. B-7



Sample of SAND, GRAVELLY, SILTY (SM)
From TH - 10 AT 4 FEET

GRAVEL 27 % SAND 50 %
SILT & CLAY 23 % LIQUID LIMIT
PLASTICITY INDEX



Sample of SAND, SILTY, SLIGHTLY GRAVELLY (SM)
From TH - 11 AT 9 FEET

GRAVEL 3 % SAND 65 %
SILT & CLAY 32 % LIQUID LIMIT 26
PLASTICITY INDEX 8

MULLER ENGINEERING, COMPANY, INC.
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN46,599-125
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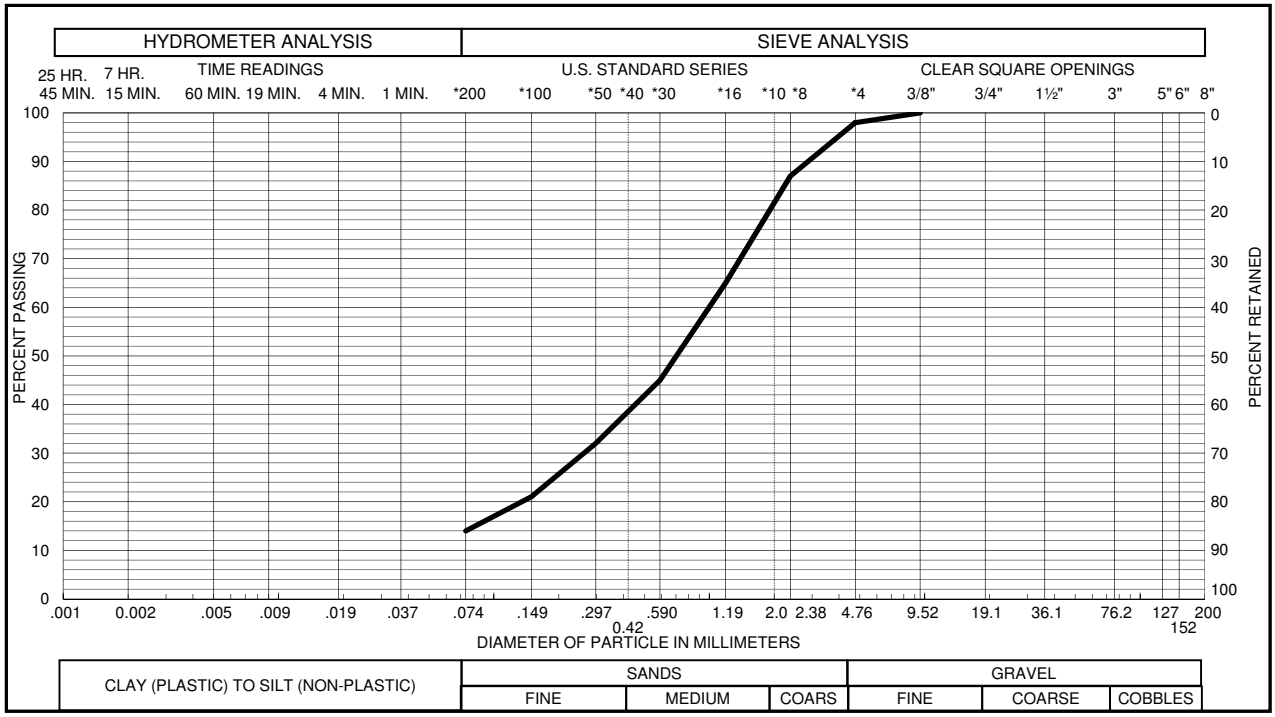
Gradation Test Results

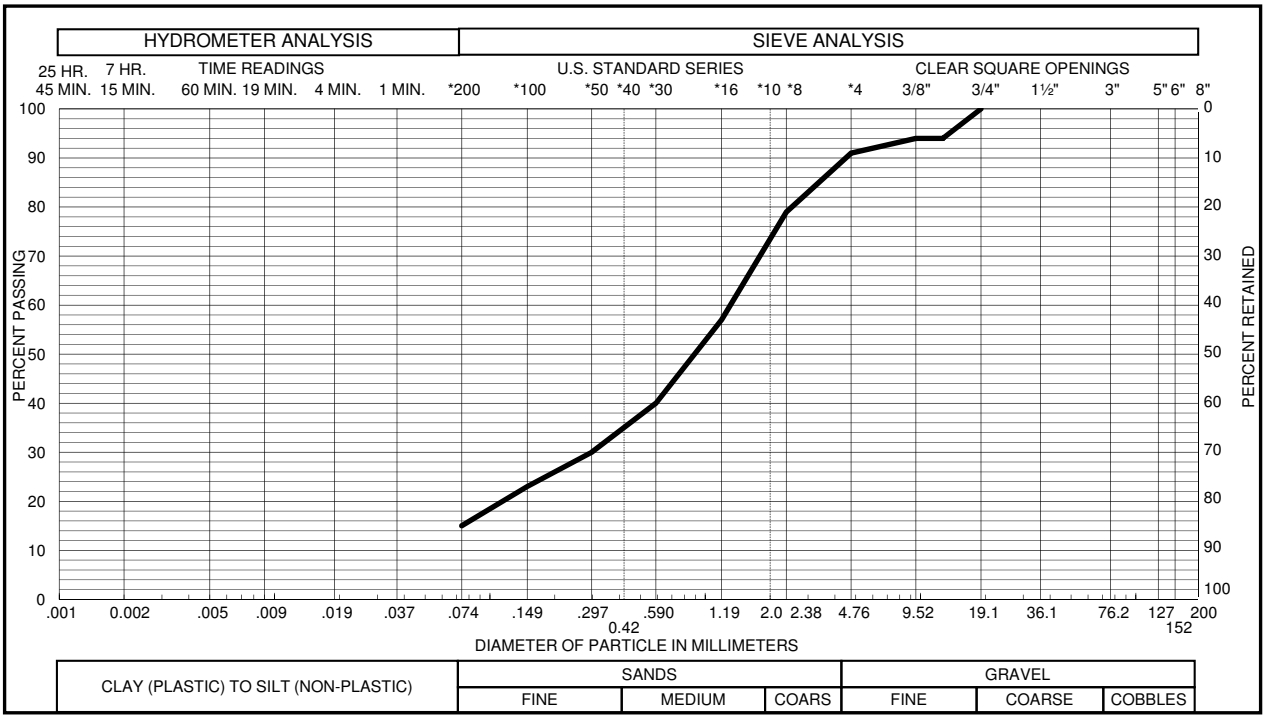
FIG. B-8



Sample of SAND, SILTY, SLIGHTLY GRAVELLY (SM) GRAVEL 2 % SAND 84 %

From TH - 12 AT 4 FEET SILT & CLAY 14 % LIQUID LIMIT

PLASTICITY INDEX



Sample of SAND, SILTY, SLIGHTLY GRAVELLY (SM) GRAVEL 9 % SAND 76 %

From TH - 13 AT 14 FEET SILT & CLAY 15 % LIQUID LIMIT

PLASTICITY INDEX

MULLER ENGINEERING, COMPANY, INC.
WONDERLAND CREEK IMPROVEMENTS
PROJECT NO. DN46,599-125
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Gradation Test Results FIG. B-9

TABLE B - I

SUMMARY OF LABORATORY TEST RESULTS

BORING	DEPTH (ft)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL TEST DATA: SWELL (%)	SWELL TEST DATA: COMPRESSION (%)	SWELL TEST DATA: APPLIED PRESSURE (psf)	SWELL TEST DATA: SWELL PRESSURE (psf)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	UNCONFINED COMPRESSIVE STRENGTH (psf)	SOLUBLE SULFATE CONTENT (%)	PASSING NO. 200 SIEVE (%)	SOIL TYPE
TH-1	4	23	102							1,700	<0.01		CLAY, SANDY (CL)
TH-1	9	24	102					44	27			86	CLAY, SANDY (CL)
TH-1	14	7	119									10	GRAVEL, SANDY, SLIGHTLY SILTY (GW-GM)
TH-2	4	16	112	0.3		500							CLAY, SANDY (CL)
TH-2	14	6										9	GRAVEL, SANDY, SLIGHTLY SILTY (GW-GM)
TH-2	19	13	120							12,900			CLAYSTONE
TH-3	4	18										34	SAND, CLAYEY (SC)
TH-3	9	12	105		1.2	1,100							CLAYSTONE
TH-4	4	13	117	2.8		500							CLAYSTONE
TH-4	9	13	122					41	23			99	CLAYSTONE
TH-5	4	14	119	4.7		500							CLAYSTONE
TH-5	9	15	121							22,400	<0.01		CLAYSTONE
TH-6	4	4	109									9	FILL, SAND, SLIGHTLY SILTY
TH-6	9	23	103							4,000		85	CLAY, SANDY (CL)
TH-6	14	14	105									26	GRAVEL,CLAYEY (GC)
TH-7	4	9	113									19	SAND, SILTY (SM)
TH-7	14	20	107	1.0		500	3,000						CLAYSTONE
TH-8	9	2	102									8	SAND, GRAVELLY, SLIGHTLY SILTY (SW-SM)
TH-8	19	11										21	SAND, SILTY, GRAVELLY (SM)
TH-9	9	21	101					30	11		<0.01	36	SAND, CLAYEY (SC)
TH-10	4	6	116									23	SAND, SILTY, GRAVELLY (SM)
TH-10	14	11	108									13	SAND, SILTY (SM)
TH-11	4	12	118										FILL, CLAY, SANDY
TH-11	9	7	108					26	8			32	SAND, SILTY, SLIGHTLY GRAVELLY (SM)
TH-11	14	22	105					43	27			84	CLAY, SANDY (CL)
TH-12	4	5	100									14	SAND, SILTY, SLIGHTLY GRAVELLY (SM)
TH-12	14	20	108								0.04		CLAY, SANDY (CL)
TH-12	19	18	94									25	GRAVEL,CLAYEY (GC)
TH-13	4	8	111									19	SAND, SILTY (SM)
TH-13	14	12										15	SAND, SILTY, SLIGHTLY GRAVELLY (SM)

CONSTRUCTION AND MAINTENANCE AGREEMENT FOR WONDERLAND CREEK BRIDGE

This Agreement made and entered into in duplicate as of the 23rd day of June, 2015 by and between the **BNSF RAILWAY COMPANY**, a Delaware Corporation, hereinafter called "Railroad" or "BNSF", and **THE CITY OF BOULDER, COLORADO**, hereinafter called "City".

WHEREAS, the Railroad owns and operates a line of railroad in and through the City of Boulder;

WHEREAS, the City proposes to construct and maintain a drainageway and related work to allow passage of Wonderland Creek and the Boulder and White Rock Ditch (formally known as Beasley Ditch) and hereinafter referred to as "BWRD", and construct and maintain a multi-use, non-motorized pedestrian/bike trail for recreational use by the public without charge (hereinafter "the Project") under the Railroad's track at Line Segment 476, Mile Post 31.85, located on the Powder River Division, Front Range Subdivision (hereinafter "the Premises"), in the City of Boulder, Boulder County, Colorado, as shown on **Exhibit A-1**, attached hereto and made a part hereof;

WHEREAS, in connection with the Project, it will be necessary for the City to perform certain work on, under and in proximity to the Railroad right-of-way and tracks;

WHEREAS, BNSF will be constructing a 76'0" railroad bridge structure ("Wonderland Creek Bridge") for pedestrians and bicycles to cross under the BNSF tracks and for passage of Wonderland Creek and BWRD;

WHEREAS, the `City will be constructing the pedestrian/bike trail and drainageway underneath the BNSF structure, the approaches to the Wonderland Creek Bridge, grading for the drainageway, relocating the BWRD as shown on **Exhibit A-2** , and related improvements;

WHEREAS, the City is willing to undertake the Project with its Contractor at the sole expense of the City, and Railroad is willing to consent to the construction of the Improvements upon the terms and conditions herein stated and not otherwise; and

WHEREAS, the parties desire to set forth in this instrument an agreement relating to the construction, ownership, operation, use, maintenance, repair and replacement of the Wonderland Creek Bridge and the relocation, operation, use, maintenance and repair of the BWRD, upon the terms and conditions herein stated and payment of any Railroad charges made necessary in connection therewith;

NOW, THEREFORE, in consideration of the premises and the mutual dependent promises hereinafter contained, the parties agree as follows:

ARTICLE I – DEFINITIONS

The term "Wonderland Creek Bridge" as used in this Agreement, refers to the 76'0" railroad bridge that will span the pedestrian/bike trail, Wonderland Creek drainageway, and BWRD that will pass under the BNSF tracks along with all associated improvements and appurtenances as shown on the plans attached hereto and incorporated herein as **Exhibit B** (the "Plans") in the general detail and location on the Property as described in **Exhibit A-1**.

The term "Boulder and White Rock Ditch" hereinafter called "BWRD," as used in this Agreement, refers to an existing irrigation ditch that flows into Wonderland Creek on the BNSF right-of-way, that will be relocated as a part of the Project along with all associated improvements and appurtenances as shown on the plans attached hereto and incorporated herein as **Exhibit A-2.**

ARTICLE II – EXHIBITS

The Exhibits listed below are attached hereto and made a part of this Contract:

Exhibit A-1	Map showing location of Wonderland Creek Bridge
Exhibit A-2	Design Plans for BWRD relocation
Exhibit B	Construction Plans for the Wonderland Creek Bridge
Exhibit C	Contractor's Requirements
Exhibit C-1	Contractor's Agreement
Exhibit D	Easement Agreement for Recreational Trail Pedestrian/Bike Path and BWRD
Exhibit D-1	Temporary Easement Agreement for construction of Recreational Trail Pedestrian/Bike Path and relocation of BWRD .
Exhibit E	Estimate for Railroad work
Exhibit F	Limited Assignment of RE-2

ARTICLE III – RAILROAD OBLIGATIONS

In consideration of covenants and conditions to be fulfilled by the City as hereinafter set forth, Railroad agrees:

1. By separate agreement in the form of **Exhibit D** and **Exhibit D-1** and for

the consideration of the sum of $103,000.00 plus an administrative fee of $2000, BNSF shall grant to the City, its agents and contractors:

a. **Exhibit D:** A non-exclusive perpetual Easement upon the Premises as shown on **Exhibit A to Exhibit D (RE-2)** for the construction, use, and maintenance of the Recreational Pedestrian/Bike Trail and Wonderland Creek ("Easement Purpose – RE-2"). Said Trail Easement is granted pursuant to the Colorado Recreational Liability Act, C.R.S. § 33-41-101, et. seq., with the intent that Railroad be entitled to the protection and benefits thereof;

b. **Exhibit D**: A non-exclusive perpetual Easement upon the Premises as shown on **Exhibit A to Exhibit D (RE-2A)** for the construction, permanent placement, access, use and maintenance of the relocated segment of the BWRD ("Easement Purpose – RE-2A);

c. **Exhibit D-1: Two** non-exclusive Temporary Easements upon the Premises as shown on **Exhibit A to Exhibit D-1** for the construction of the Recreational Pedestrian/Bike Trail, TE-2A, and Wonderland Creek and the BWRD relocation, TE-2, (Easement Purpose – TE-2 and TE-2A).

2. Railroad will construct for the City a 76'0" railroad bridge for pedestrians and bicyclists to cross under the BNSF tracks and for the waterway of Wonderland Creek to pass under the tracks. Railroad will provide flaggers for the portion of the Project to be constructed by the City and an onsite inspector/representative. Such Railroad work shall be performed by Railroad employees at the sole cost and expense of the City. The Railroad's estimate for such work is attached as **Exhibit E**.

3. Railroad will present insofar as possible a final detailed and itemized statement for work performed by Railroad at expense of the City within one hundred twenty (120) days after completion thereof. The Railroad may present periodic itemized progress bills to the City for work as completed. Final payment will be made in the amount of the difference between the sum of the monthly payments made and the itemized audited statement for the total amount of the work performed by the Railroad upon completion of the work. In the event of overpayment, Railroad shall refund to the City such excess.

ARTICLE IV – CITY'S OBLIGATIONS

In consideration of the covenants and conditions to be fulfilled by Railroad as herein set forth, the City agrees:

1. To furnish all plans, specifications, engineering supervision, labor, materials, supplies, and equipment necessary to construct the Pedestrian/Bike Trail, Wonderland Creek drainageway and BWRD relocation. Plans and specifications for work to be done on, over, under or adjacent to Railroad's right of way and tracks shall be submitted to Railroad's Manager of Public Projects Bentley Tomlin in Kansas City,

Kansas for review and comments or approval prior to construction. Approval by Railroad shall not be construed or deemed to be a ratification or an adoption by Railroad of said plans and specifications. The Railroad shall not be liable or responsible in any manner for the structural design, details or construction of the Pedestrian/Bike Trail, the Wonderland Creek drainageway, or BWRD relocation. The final plans and specifications as approved by the parties are attached hereto as **Exhibit B** and incorporated herein by reference. All construction and work done by the City shall be in accordance with the approved plans and specifications.

2. Pay the consideration stated in **Exhibit D and D-1**for the easements and a $2000 administrative fee before the commencement of the work on the Wonderland Creek drainageway, Pedestrian/Bike Trail, or the BWRD relocation.

3. Advertise the project, solicit bids and enter into a construction contract for the Pedestrian/Bike Trail, Wonderland Creek drainageway, and BWRD relocation in accordance with the terms of this Agreement.

4. Construct or cause to be constructed in a manner acceptable to the Railroad the pedestrian/bike trail, Wonderland Creek drainageway, and BWRD relocation under the Wonderland Creek Bridge, the approaches thereto and the other improvements shown on the Plans ("City's Work") in accordance with **Exhibit B** and **Exhibits C and C-1** attached hereto and incorporated herein by reference.

5. Arrange for relocation of any utility facilities that may be affected by this Pedestrian/Bike Trail, the Wonderland Creek drainageway, and BWRD. Except for relocation activities addressed in this paragraph, construction shall not interfere with any fiber optic lines or other use of the Premises by the BNSF or its permittees. Before the City's contractor begins any excavation, the contractor shall telephone BNSF at 1-800-533-2891 (a 24-hour number) to determine if fiber optic cable is buried anywhere on the affected BNSF premises and confer with BNSF with regard to any other overhead or underground utilities or services which may be on or near the site of the work. If any utilities are impacted by the work, the City's contractor, at its expense, shall telephone the telecommunications and utility companies involved, arrange for a cable locator, and make arrangements for relocation or other protection of the fiber optic cable or other utility prior to beginning any work on the Premises. Any such location or relocation shall be at the sole cost and expense of the City.

6. To furnish or cause to be furnished all labor, materials, tools and equipment and to perform the City's Work, in accordance with **Exhibit B** or such plans and specifications as approved by the PUC.

7. Prior to commencement of any work on Railroad's property, the City shall require its contractor to sign and return to Railroad **Exhibit "C-1"** and comply with all terms in **Exhibit "C"** and all work on said project to be performed in a manner that will not endanger the safety of the Railroad or interfere with the operation thereof other than as described in Article III, Paragraph 3 above. If, in the opinion of the Railroad, the

operation of the City's contractor is endangering the safety of the Railroad's operation, Railroad may immediately order the termination of further work on Railroad's premises, until the dangerous condition has been corrected, without liability on the Railroad's part.

8. To reimburse the Railroad within forty five (45) days after receipt of properly computed and compiled statements for costs incurred for work done by the Railroad in accordance with the provisions of this Agreement. Notwithstanding the foregoing, the City shall not have any liability for or obligation to pay for any work done by Railroad unless statement therefore is presented to and received by the City before the expiration of one year after the day of completion of all work done by the Railroad in accordance with the provisions of this Agreement.

9. City agrees to reimburse BNSF for work of an emergency nature caused by City or City's contractor in connection with the Project which BNSF deems is reasonably necessary for the immediate restoration of railroad operations, or for the protection of persons or BNSF property. Such work may be performed by BNSF without prior approval of City and City agrees to fully reimburse BNSF for all such emergency work.

10. In the event that City shall fail to pay any monies due to Railroad within forty five (45) days after receipt of the invoice, then City shall pay interest at the rate of one percent (1%) per month of the outstanding balance of monies owed subject to the requirements and restrictions of the Prompt Payment ordinance.

11. Upon completion of construction of the Pedestrian/Bike Trail, Wonderland Creek drainageway, and BWRD relocation, the City will own and maintain and repair at its sole cost and expense the Pedestrian/Bike Trail, Wonderland Creek drainageway, including but not limited to graffiti removal, snow removal, fence repair and sign repair/replacement. The City will maintain and repair but not own the BWRD at its sole cost and expense. BNSF will have no maintenance responsibilities with respect to the Pedestrian/Bike Trail, Wonderland Creek drainageway, and BWRD whatsoever. The City will have no maintenance responsibilities with respect to BNSF's tracks and track infrastructure. Prior to any maintenance work or repair of the bike trail, drainageway, or BWRD (other than routine maintenance, which is defined as trail or ditch work that does not place men, machinery or heavy equipment or any portion thereof within 25 feet of the centerline of the track and above the deck of the bridge) that requires the City or its contractors to be on, over or within the Railroad right of way or the Premises other than on the pedestrian/bike trail or the BWRD or at any time when the City desires to enter upon the Premises outside the pedestrian/bike trail or BWRD with any vehicle or equipment for any purpose whatsoever other than routine maintenance, five (5) days advance notice must be given to Railroad's Roadmaster, currently Hayley Brown, telephone number (303) 480-6251. Said notice shall inform Railroad's Roadmaster of the date(s) of the proposed maintenance, repair or desired vehicular or equipment access, the nature of the maintenance, repair or access to be performed and the manner in which the maintenance, repair and access shall be performed. This notice requirement shall not apply in the case of an emergency, which is defined as a situation

presenting an immediate threat to the public health or safety, or in the case of the BWRD, a situation which impacts the ability of the Ditch Company to deliver water when delivery of such water is being required by the laws of the State of Colorado, In the event of such an emergency, the city shall contact the Railroad's Roadmaster as soon as practicable. Upon receipt of such notice, Railroad's Roadmaster will determine and inform the City whether a flagman need be present and whether the City need implement any special protective or safety measures. If any flagmen or other special protective or safety measures are required or performed by the Railroad, such services will be provided at the City's expense. No maintenance or repairs performed by the City shall cause any interference with the constant, continuous and uninterrupted use of the trains, property and facilities of Railroad or those using Railroad's facilities with its permission. The City agrees that any contractor retained to perform maintenance or repair on, over or within the Railroad's right of way or the Property, other than routine maintenance, will have in place for the duration of such maintenance the insurance required in **Exhibit C-1** and comply with all terms of **Exhibit C-1 and C**. If the City or the Ditch Company, as the City's agent, undertakes such maintenance or repair, other than routine maintenance, with its own forces or equipment, the City will at all times comply with the requirements of **Exhibit C and C-1**.

ARTICLE V – CONSTRUCTION ACTIVITIES

1. All work herein provided for, to be done by the City's contractor (the "Contractor") on, above or adjacent to the Premises and/or Railroad's right-of-way and tracks, shall be performed in a manner reasonably satisfactory to the Railroad and shall be performed at such time and in such manner as not to interfere with the movement of trains or traffic upon the tracks of Railroad.. The Contractor or its subcontractors as part of any contract for work to be performed on or about the Railroad's right-of-way shall be totally responsible for all damage to the Railroad as a result of work on the Pedestrian/Bike Trail, Wonderland Creek drainageway, and BWRD, which shall include but not be limited to interference with the normal movement of trains. Should the Contractor's operations result in damage to Railroad property or train delays, the Contractor shall reimburse the Railroad for such damage or delays within thirty (30) days of receipt of a bill from Railroad for such damages.

2. The City shall cause its Contractor to prosecute and complete work according to the Contractor's own manner and methods and with and by the Contractor's own means and employees, free from any supervision, inspection, or control whatsoever by Railroad, except as may be necessary to enable Railroad to determine whether work performed complies with the requirements of this Agreement and conforms to the Plans. It is the intent of the parties hereto that the City's Contractor shall be and remain an independent contractor and that nothing herein contained shall be construed as inconsistent with that status.

3. The City shall cause its Contractor to comply with all applicable requirements and regulations of every Federal, State, Local or other governmental authority with respect to the performance of work for the safety of the employees engaged therein and of the public and shall take all necessary precautions for the safety of

contractor, subcontractors and the employees and tools of both while engaged in said work. In addition, the City shall cause its Contractor to comply with the Railroad's Contractor Requirements set forth in **Exhibit C**.

4. Railroad's engineer or designee may advise the City's Contractor or Contractor's site supervisor that an agent, servant, or employee of the Contractor or of a subcontractor is working in an unsafe manner or may potentially work in an unsafe manner, in which event, Contractor's work site supervisor shall cause said agent, servant or employee to leave the work site and Railroad's property. The City shall cause its Contractor to assume all responsibility for the safe work methods and practices of its agents, servants, and employees.

5. If the City's Contractor prosecutes the Pedestrian/Bike Trail and/or Wonderland Creek drainageway or BWRD relocation contrary to the Plans or if such Contractor shall prosecute said work in a manner deemed hazardous by the Railroad or if the insurance required in **Exhibit C-1** shall be cancelled during the progress of the work, Railroad shall have the right to stop said work until the acts or omissions of such Contractor have been fully rectified to the satisfaction of the Railroad or until additional insurance has been obtained and proof thereof delivered to and accepted by Railroad. Such work stoppage shall not give rise to or impose upon Railroad any liability.

6. The City agrees that it will not permit any contractor to enter upon or perform any work contemplated by this Agreement upon or within 25 feet of the centerline of the Railroad's track and above the deck of the bridge (other than routine maintenance) unless and until contractor shall have executed and delivered to Railroad the Agreement between BNSF and the Contractor in the form attached hereto as **Exhibit C-1** and obtained Railroad's approval of all railroad required insurance.

7. All of the limitations and obligations imposed upon the City's Contractor by the City and all rights reserved to Railroad by this Agreement shall apply with equal force and effect to any subcontractor(s) performing any work for the City's Contractor upon Railroad property. The City shall provide that its Contractor shall be primarily liable and responsible to Railroad for all acts or omissions of any of the contractor's subcontractors employed upon Railroad property. Nothing herein shall be construed to preclude Railroad from proceeding against the City's Contractor and subcontractors individually or collectively. Only those subcontractors whose operations are covered by the insurance provisions of **Exhibit C-1** hereof will be authorized to work upon Railroad property.

8. The City shall cause its Contractor to provide a lockable master battery disconnect switch on all operated or leased mobile equipment stored or parked at or adjacent to the Premises during construction. The Contractor must verify that the master battery disconnect switch is left in the off or disconnect position and padlocked, when equipment is left unattended. No equipment shall be left unattended within 25 feet of track centerline unless approval is obtained from the Responsible Railroad Project Representative. Under no circumstances is equipment to be left unattended within 8'-6"

of track centerline or any other position where it could be struck by a train or on-track equipment. To protect against unauthorized access and/or use, unattended equipment needs to be shut off and left in gear, with brakes set. Remove keys and lock cabs, where so equipped. Buckets and blades need to be lowered to the ground. Where equipment has an enclosed cab, the installation of a lockable hasp on cab access doors is strongly encouraged.

ARTICLE VI – LIABILITY

1. As between the parties hereto, each party hereto shall be responsible for its own negligence and that of its agents, servants, and employees in the performance of this Agreement, consistent with the provisions of the Colorado Governmental Immunity Act, Section 24-10-101 *et seq.*, C.R.S. (the "Act").

2. City shall and will and does hereby agree, insofar as permitted by law and without waiving any defenses it has under the Colorado Governmental Immunity Act to any third party claim, to assume responsibility for any and all claims, liabilities, losses, damages, costs, expenses, judgments, or attorney's fees for or on account of personal injuries to or death of persons or damage to or loss or destruction of property, directly or indirectly caused by, due to arising out of, or in connection with, the construction, maintenance, operation, use, removal or existence of the Pedestrian/Bike Trail and the Wonderland Creek drainageway, including the BWRD, excepting injuries or damages which are not caused by use of the Pedestrian/Bike Trail or the BWRD, such as derailments caused by defects in the Railroad tracks or equipment.

ARTICLE VII – NOTICE PROVISIONS

1. For the purposes of this Agreement, the individuals named below are hereby designated representatives of the respective parties. Any party may, at any time, designate in writing new or substitute representatives.

For the City
Kurt Bauer, P.E. C.F.M.
Engineering Project Manager
City of Boulder
Public Works Department - Utilities Division
P.O. Box 791
Boulder, CO 80306
303-441-4232
BauerK@bouldercolorado.gov

with copies to:

Thomas A Carr
City Attorney's Office
City of Boulder

P. O. Box 791
Boulder, Colorado 80306
(303) 441-3020

For BNSF
Bentley Tomlin
BNSF Railway Company
4515 Kansas Ave
Kansas City, Kansas 66106
(913) 551-4964

ARTICLE VIII - TERMINATION

The City and Railroad mutually agree:

1. In the event the City shall for any reason abandon the construction of the Pedestrian/Bike Trail and Wonderland Creek drainageway before completion, the Railroad shall have the right to terminate this Agreement and the Easement, and the City agrees to pay BNSF to remove the Pedestrian/Bike Trail and Wonderland Creek drainageway and restore the Premises to the condition existing prior to commencement of work at the City's expense. All such work shall be performed in accordance with the terms of this Agreement and **Exhibits C and C-1** attached hereto. Prior to exercising such right, BNSF shall notify the City in writing of its intent to exercise its rights herein giving the City thirty days to cure the cause of the termination.

2. Railroad may terminate this Agreement for any reasons stated herein, which must amount to a material breach of the terms of this Agreement or persistent failure to comply with the terms hereof. Except as noted elsewhere herein, Railroad shall provide thirty days written notice of its intent to terminate this Agreement to provide the City with an opportunity to cure. If the default or breach is the failure to maintain the insurance required in **Exhibit C-1** or any unsafe condition or construction practice by the City or its contractor, then Railroad shall have the right to stop the work until proof of such insurance is provided and the unsafe condition or construction practice removed. In the event the breach or default is not cured within thirty days, Railroad at its sole option may terminate this Agreement. City may terminate this Agreement upon thirty days written notice to Railroad for any material breach or persistent failure to comply with the terms hereof.

3. If this Agreement is terminated by either party for the reasons set forth herein, the Pedestrian/Bike Trail shall be permanently sealed shut and the paved trail located on Railroad property shall be removed by the City and the land under the trail restored to its original condition and the drainageway filled to its original embankment condition at the sole cost and expense of City and pursuant to the terms hereof including **Exhibits C and C-1**.

ARTICLE IX - MISCELLANEOUS

1. It is understood and agreed by the parties hereto that if any part, term or provision of this Agreement is held by a court of competent jurisdiction to be illegal or in conflict with any law of the State of Colorado or the United States of America, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term or provision held to be invalid.

2. In no event shall any waiver by the Railroad of the breach by the City of any covenant, stipulation, term or condition of this Agreement impair the right of the Railroad to avail itself of any subsequent breach thereof. In no event shall any waiver by the City of the breach by the Railroad of any covenant, stipulation, term or condition of this Agreement impair the right of the City to avail itself of any subsequent breach thereof.

3. This Agreement is intended as the complete integration of all understandings between the parties, their successors and assigns. No prior or contemporaneous addition, deletion, or other amendment hereto shall have any force or effect whatsoever, unless embodied herein in writing. No subsequent notation, renewal, addition, deletion, or other amendment hereto shall have any force or effect unless embodied in a written amendatory or other contract executed by the parties and signed by the signatories of this Agreement. This Agreement and any amendments shall be binding upon the parties, their successors and assigns.

4. Each party represents and warrants that it has taken all actions that are necessary or that are required by its procedures, bylaws or applicable law to legally authorize the undersigned signatories to execute this Agreement on behalf of each party and to bind each party to its terms.

5. Appropriation and Funding: Notwithstanding any other term, condition or covenant of this Agreement, it is expressly understood and agreed that any payment obligation of the City under this Agreement, for all or any part of any payment obligations set out herein, whether direct or contingent, shall extend only to payment of monies duly and lawfully appropriated for the purpose of this Agreement by their respective governing bodies. The City has budgeted and appropriated funds to cover the estimated cost of the Project for the year in which this Agreement has been executed by the City. Railroad acknowledges that (i) the City does not by this Agreement irrevocably pledge present cash reserves in this or future fiscal years, and (ii) this Agreement is not intended to create a multiple-fiscal year direct or indirect debt or financial obligation of the City.

6. Status of Parties: It is understood and agreed by and between the parties that the status of the parties shall be that of independent contractors and it is not intended, nor shall it be construed, that any agent or employee of one party is an agent or employee of the other for any purpose whatsoever.

7. Examination of Records: Upon reasonable advance request and during regular business hours, the Railroad agrees that any duly authorized representative of the City including the City Auditor, shall, until the expiration of three (3) years after the payment by the City to the Railroad under this Agreement, have access to and the right to examine any books, documents, papers and records of the Railroad, which are directly pertinent to transactions related to this Agreement.

8. Subject to Local Laws; Venue: Each and every term, provision or condition herein is subject to and shall be construed in accordance with the provisions of Colorado law, and the ordinances, regulations, Executive Orders, and/or fiscal rules, enacted and/or promulgated pursuant thereto, excepting those laws and ordinances which have been preempted by federal law. Venue for any action arising hereunder shall be in the District Court, Boulder County, Colorado or the United States District Court for the District of Colorado.

9. Assignment and Subcontracting: Except for the proposed assignment of **RE-2A** to the Ditch Company in substantially the form attached as Exhibit F, which assignment is approved by the Railroad, the City and Railroad shall not assign this Agreement, or any part hereof, without the prior written consent of the other parties hereto and it is agreed that any transfer or assignment, or attempted transfer or assignment of this Agreement, or any of the rights hereby granted, whether voluntary, by operation of law, or otherwise, without said written consent, shall be absolutely void.

10. Conflict of Interest: The parties agree that no official, officer or employee of the City shall have any personal or beneficial interest whatsoever in the services or property described herein and the Railroad further agrees not to hire or contract for services of any official, officer or employee of the City.

11. Counterparts of this Agreement: This Agreement will be executed in two (2) counterparts, each of which shall be deemed to be an original of this Agreement.

12. Nothing contained in this Agreement shall be deemed or construed by the City and Railroad or by any third party to create the relationship of principal and agent or of any partnership or of joint venture between the City and Railroad.

13. Noting contained in this Agreement is intended or shall be construed to confer upon or give any person other than the parties thereto and their successors and assigns, any rights, benefits or remedies under or by reason of the Agreement.

14. In connection with the performance of work under this Agreement, the parties agree not to refuse to hire, discharge, promote or demote, or to discriminate in matters of compensation against any person otherwise qualified, solely because of race, color, religion, national origin, gender, age, military status, sexual orientation, marital status, or physical or mental disability; and the parties further agree to insert the foregoing provision in all approved subcontracts hereunder.

IN WITNESS WHEREOF, the parties hereto have duly executed this Agreement in duplicate the day and year first above written.

BNSF RAILWAY COMPANY

By: Steve Anderson

Title: VP Engineering

STATE OF Kansas)
) ss.
COUNTY OF Wyandotte)

The foregoing instrument was acknowledged before me this 23rd day of June, 2015 by Steve Anderson as VP ENG. of BNSF Railway Company, a Delaware corporation.

WITNESS my hand and official seal.

Notary Public

My Commission

Expires: 10-21-2016

GARY W. DODGE
NOTARY
PUBLIC
STATE OF KANSAS

MY COMMISSION EXPIRES:
10-21-2016

CITY OF BOULDER

BY: _____
City Manager

ATTEST:

_____
Acting City Clerk on behalf of the
Director of Finance and Record

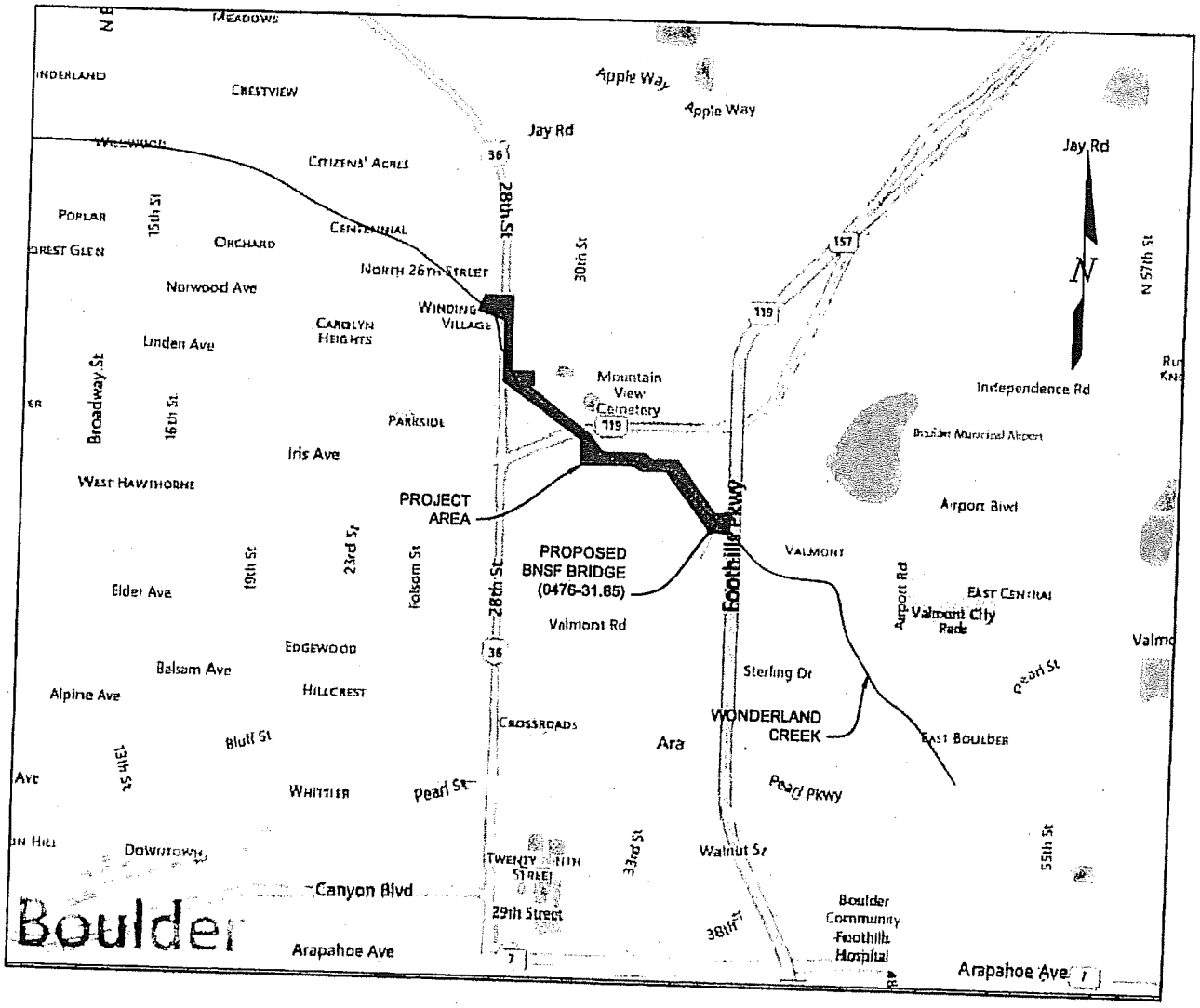
APPROVED AS TO FORM:

_____
City Attorney Office 6-8-15

EXHIBIT A-1

LOCATION OF THE PREMISES AND PROJECT

WONDERLAND CREEK GREENWAYS IMPROVEMENT PROJECT
WINDING TRAIL DRIVE TO FOOTHILLS PARKWAY



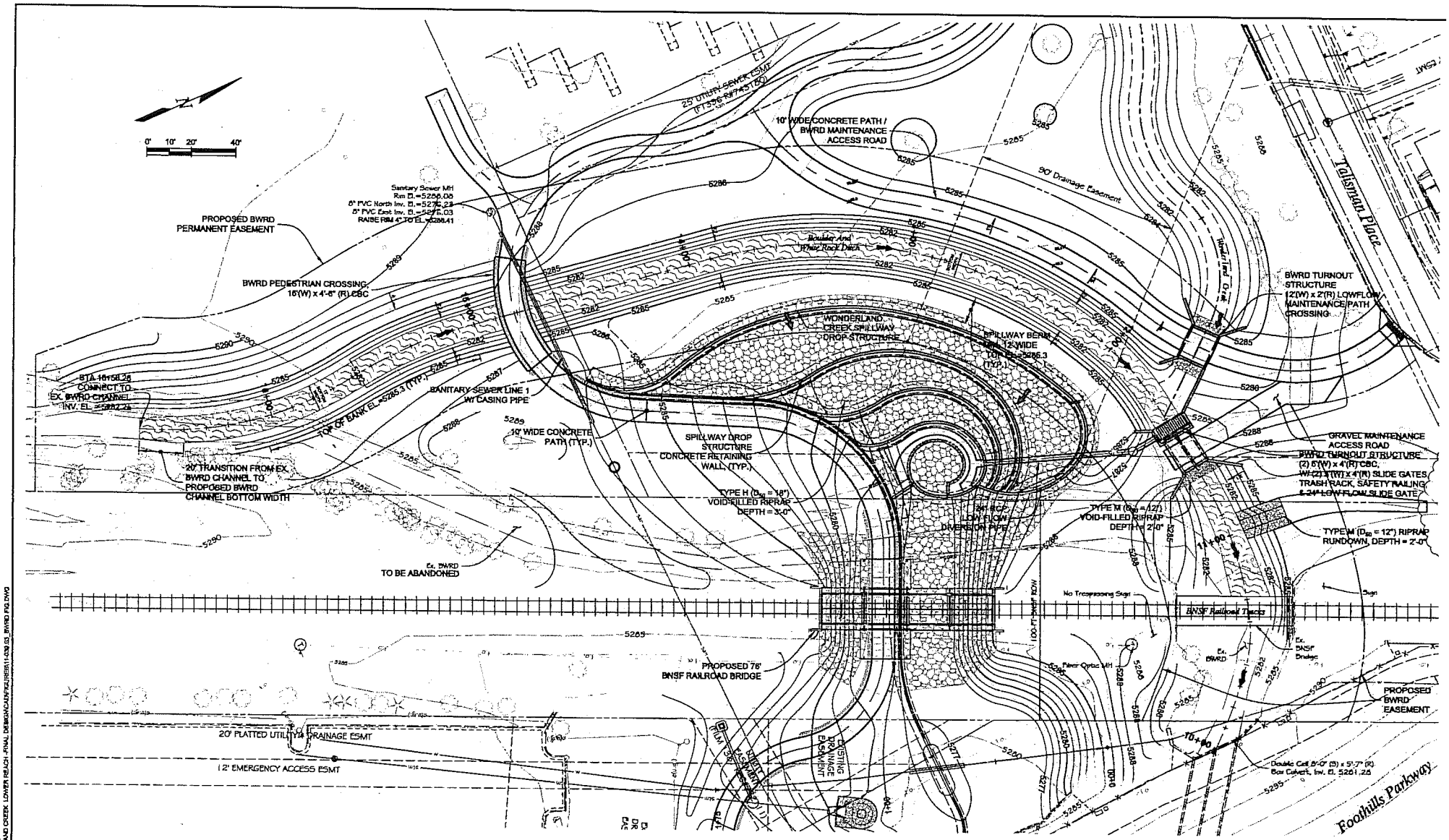
PROJECT VICINITY MAP
NOT TO SCALE

EXHIBIT A

Colorado PUC E-Filings System

EXHIBIT A-2

DESIGN PLANS FOR BWRD RELOCATION



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Last Modification Date: 4/15/15	Initials: JHK	
Full Path: P:\11-039.03\CAD		
Drawing File Name: 11-039.03_BWRD FIG.dwg		
AutoCAD 2014	Scale: AS SHOWN	

MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
777 S. WADSWORTH BLVD. 4-180
LAKEWOOD, COLORADO 80226
(303) 988-9329
MEC PROJECT NO. 11039.03

F.O.R. SUBMITTAL

Sheet Revisions		
Date:	Comments	Init.

As Constructed
No Revisions:
Revised:
Void:

Region 4 RDM
CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT
BOULDER AND WHITEROCK DITCH IMPROVEMENTS

Designer:	JW3	Structure Numbers	
Detailer:	JHK		
Sheet Subset:	BWRD	Subset Sheets:	BWRD-1

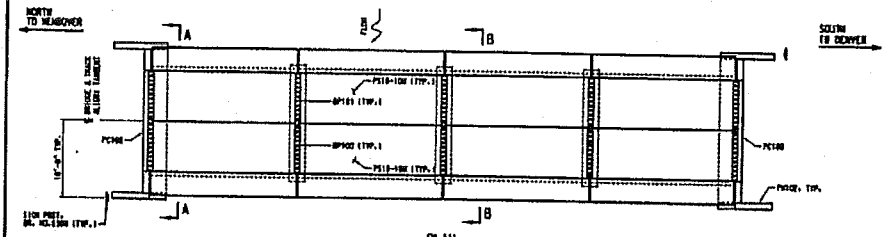
Project No./Code
STM 110-081
18405
Sheet Number: 1

PLOTTED: 4/29/2015 3:30:03 PM
NAME: P:\11-039.03\WONDERLAND CREEK, LOWER REACH -FINAL DESIGN\CAD\FIG\FIG11-039.03_BWRD FIG.DWG

EXHIBIT B

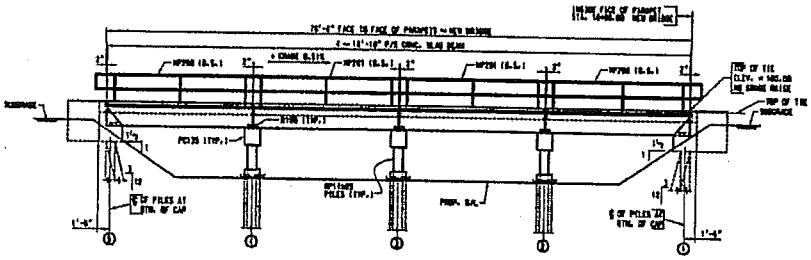
PLANS AND SPECIFICATIONS DATED XX/XX/14

EXHIBIT B

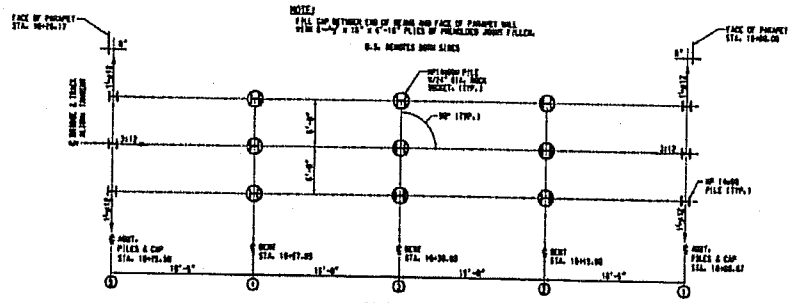


PLAN

SEE SHEET 2 FOR SECTIONS A-A & B-B.



ELEVATION



PILE PLAN

NOTE:
FILL CAP BETWEEN END OF BEAM AND FACE OF PARAPET WALL WITH 6 ~ 3' X 18' X 6'-10" PILES OF PREFROZED JOINT FILLER.

B-B. DENOTES BORE SIZES

ATTENTION !

INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UNDERGROUND OR ABOVE GROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE.

THE SUPERVISOR OF STRUCTURES OR THE FOREMAN IN CHARGE SHALL VERIFY THE LOCATION OF UNDERGROUND AND OVERHEAD UTILITIES BEFORE BEGINNING CONSTRUCTION, AND PER THE BNSF ENGINEERING INSTRUCTIONS CHAPTER 9.

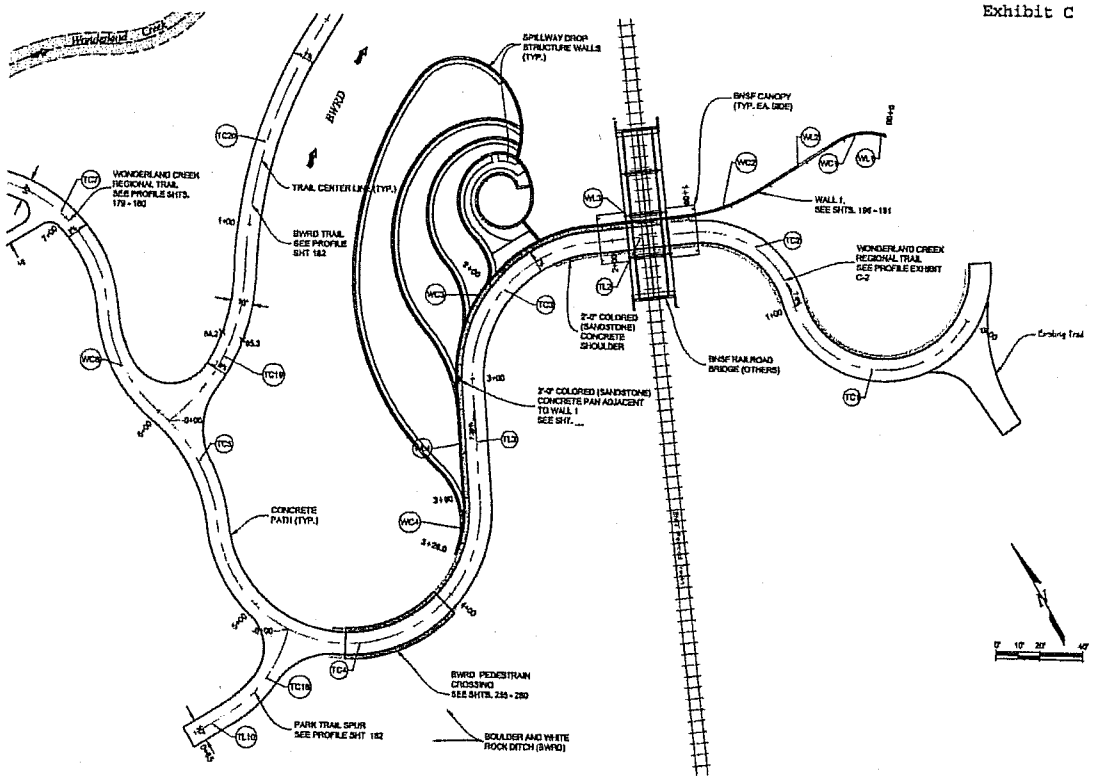
ESTIMATED LIFTING WEIGHTS

PIECE MARKS	
PC12-10W	41,600 LBS.
PC10W	23,800 LBS.
PC12S	16,100 LBS.
PW12E	3,800 LBS.

DESIGN BCS	BNSF RAILWAY	BRANCH TO NEWBOWER
DRAWN MM	BRIDGE ENGINEERING KANSAS CITY, KS	BRIDGE NUMBER 31.05
CHECKED	APPROVED:	OVER BUNTMAN, NEAR BOULDER, CO
DATE: AUGUST 2010	ASST. DIRECTOR STRUCTURES DESIGN	GENERAL PLAN ~ REBUILD BRIDGE
NOTES		PLAN NO: 0475-31.05-001
L.NO. SCS: 0475		SHEET: 1 OF 2

Colorado PUC E-Filings System

Exhibit C



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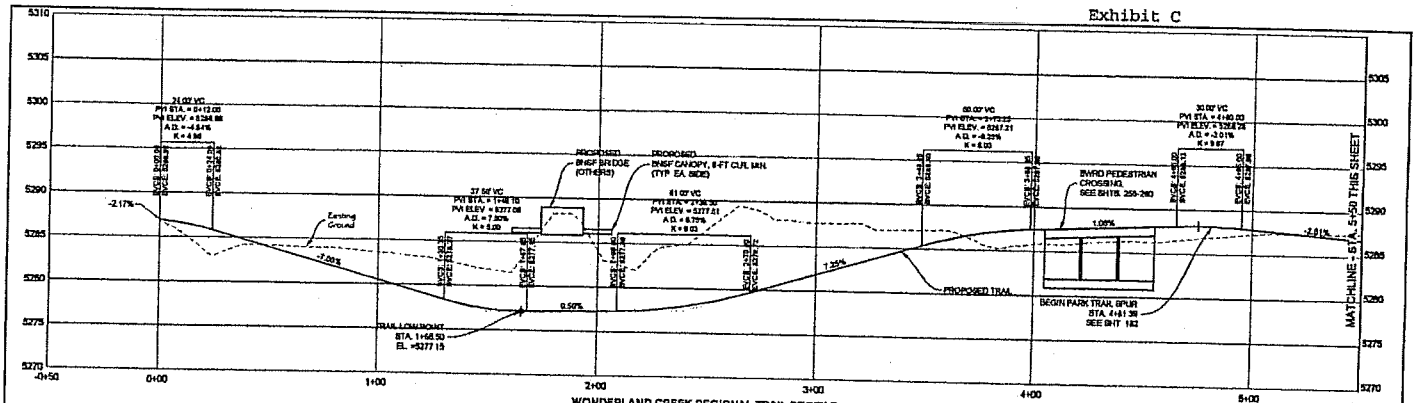
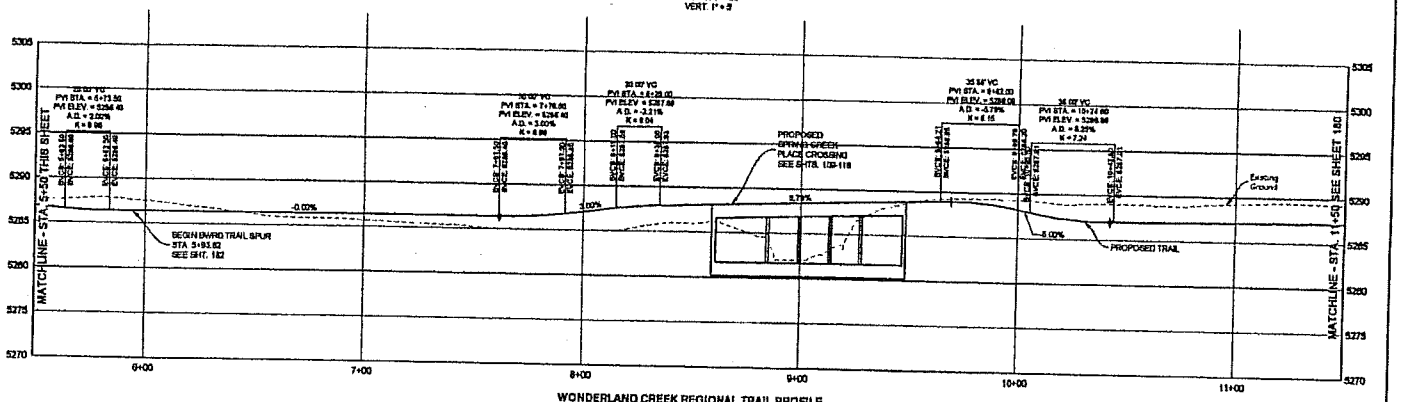
Last Modification Date:	Initials:	CONSULTING ENGINEERS 777 S. WADSWORTH BLVD. & 88th LAKEWOOD, COLORADO 80226 (303) 292-0928		Date:	Comments	No Revisions:	Region 4 ROM / CDOT / CITY OF BOULDER	EXHIBIT C: WONDERLAND CREEK TRAIL UNDERPASS PLAN AND PROFILE		STM 110-081
Full Path:						Revised:		Designer:	Structure Numbers:	18405
Drawing File Name:						Void:		Detailer:		
Scale: AS SHOWN		MC: PROJECT NO. 11408.03						Sheet Subset:	Subset Sheets: EXHIBIT C	Sheet Number: C-1

Exhibit C



WONDERLAND CREEK REGIONAL TRAIL PROFILE

SCALE: HORIZ. 1" = 20'
VERT. 1" = 2'



WONDERLAND CREEK REGIONAL TRAIL PROFILE

SCALE: HORIZ. 1" = 20'
VERT. 1" = 2'

Computer File Information											
Creation Date:	Initials:	MULLER ENGINEERING CO., INC.	NOT FOR CONST.	Sheet Revisions			As Constructed		WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT		Project No./Code
Last Modification Date:	Initials:	CONSULTING ENGINEERS		Date:	Comments	Int.	No Revisions:	Region 4 RDM	EXHIBIT C: WONDERLAND CREEK TRAIL UNDERPASS PLAN AND PROFILE		STM 110-081
Full Path:							Revised:	CITY OF BOULDER	Designer:	Structure Numbers	18405
Drawing File Name:							Void:		Detailer:		
Scale: AS SHOWN		MEI PROJECT NO. 11036.03							Sheet Subset:	Subset Sheets: EXHIBIT C	Sheet Number: C-2

EXHIBIT C

CONTRACTOR REQUIREMENTS

EXHIBIT "C"

CONTRACTOR REQUIREMENTS

1.01 General:

- **1.01.01** The Contractor must cooperate with **BNSF RAILWAY COMPANY**, hereinafter referred to as "**Railway**" where work is over or under on or adjacent to Railway property and/or right-of-way, hereafter referred to as "Railway Property", during the construction of the Wonderland Creek bike/pedestrian underpass project.

- **1.01.02** The Contractor must execute and deliver to the Railway duplicate copies of the Exhibit "C-1" Agreement, in the form attached hereto, obligating the Contractor to provide and maintain in full force and effect the insurance called for under Section 3 of said Exhibit "C-1". Questions regarding procurement of the Railroad Protective Liability Insurance should be directed to Rosa Martinez at Marsh, USA, 214-303-8519.

- **1.01.03** The Contractor must plan, schedule and conduct all work activities so as not to interfere with the movement of any trains on Railway Property.

- **1.01.04** The Contractor's right to enter Railway's Property is subject to the absolute right of Railway to cause the Contractor's work on Railway's Property to cease if, in the opinion of Railway, Contractor's activities create a hazard to Railway's Property, employees, and/or operations. Railway will have the right to stop construction work on the Project if any of the following events take place: (i) Contractor (or any of its subcontractors) performs the Project work in a manner contrary to the plans and specifications approved by Railway; (ii) Contractor (or any of its subcontractors), in Railway's opinion, prosecutes the Project work in a manner which is hazardous to Railway property, facilities or the safe and expeditious movement of railroad traffic; (iii) the insurance described in the attached Exhibit C-1 is canceled during the course of the Project; or (iv) Contractor fails to pay Railway for the Temporary Construction License or the Easement. The work stoppage will continue until all necessary actions are taken by Contractor or its subcontractor to rectify the situation to the satisfaction of Railway's Division Engineer or until additional insurance has been delivered to and accepted by Railway. In the event of a breach of (i) this Agreement, (ii) the Temporary Construction License, or (iii) the Easement, Railway may immediately terminate the Temporary Construction License or the Easement. Any such work stoppage under this provision will not give rise to any liability on the part of Railway. Railway's right to stop the work is in addition to any other rights Railway may have including, but not limited to, actions or suits for damages or lost profits. In the event that Railway desires to stop construction work

on the Project, Railway agrees to immediately notify the following individual in writing:

_____
_____
_____
_____

- **1.01.05** The Contractor is responsible for determining and complying with all Federal, State and Local Governmental laws and regulations, including, but not limited to environmental laws and regulations (including but not limited to the Resource Conservation and Recovery Act, as amended; the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, CERCLA), and health and safety laws and regulations. The Contractor hereby indemnifies, defends and holds harmless Railway for, from and against all fines or penalties imposed or assessed by Federal, State and Local Governmental Agencies against the Railway which arise out of Contractor's work under this Agreement.

- **1.01.06** The Contractor must notify City of Boulder at (303) _____and Railway's Manager Public Projects, telephone number (913) 551-4964 at least thirty (30) calendar days before commencing any work on Railway Property. Contractor's notification to Railway must refer to Railway's file _____.

- **1.01.07** For any bridge demolition and/or falsework above any tracks or any excavations located with any part of the excavations located within, whichever is greater, twenty-five (25) feet of the nearest track or intersecting a slope from the plane of the top of rail on a 2 horizontal to 1 vertical slope beginning at eleven (11) feet from centerline of the nearest track, both measured perpendicular to center line of track, the Contractor must furnish the Railway five sets of working drawings showing details of construction affecting Railway Property and tracks. The working drawing must include the proposed method of installation and removal of falsework, shoring or cribbing, not included in the contract plans and two sets of structural calculations of any falsework, shoring or cribbing. For all excavation and shoring submittal plans, the current "BNSF-UPRR Guidelines for Temporary Shoring" must be used for determining the design loading conditions to be used in shoring design, and all calculations and submittals must be in accordance with the current "BNSF-UPRR Guidelines for Temporary Shoring". All submittal drawings and calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. All calculations must take into consideration railway surcharge loading and must be designed to meet American Railway Engineering and Maintenance-of-Way Association (previously known as American Railway Engineering Association) Coopers E-80 live loading standard. All drawings and calculations must be stamped by a registered professional engineer licensed to

practice in the state the project is located. The Contractor must not begin work until notified by the Railway that plans have been approved. The Contractor will be required to use lifting devices such as, cranes and/or winches to place or to remove any falsework over Railway's tracks. In no case will the Contractor be relieved of responsibility for results obtained by the implementation of said approved plans.

- **1.01.08** Subject to the movement of Railway's trains, Railway will cooperate with the Contractor such that the work may be handled and performed in an efficient manner. The Contractor will have no claim whatsoever for any type of damages or for extra or additional compensation in the event his work is delayed by the Railway.

1.02 Contractor Safety Orientation

- **1.02.01 No employee of the Contractor, its subcontractors, agents or invitees may enter Railway Property without first having completed Railway's Engineering Contractor Safety Orientation, found on the web site www.contractororientation.com. The Contractor must ensure that each of its employees, subcontractors, agents or invitees completes Railway's Engineering Contractor Safety Orientation through internet sessions before any work is performed on the Project. Additionally, the Contractor must ensure that each and every one of its employees, subcontractors, agents or invitees possesses a card certifying completion of the Railway Contractor Safety Orientation before entering Railway Property. The Contractor is responsible for the cost of the Railway Contractor Safety Orientation. The Contractor must renew the Railway Contractor Safety Orientation annually. Further clarification can be found on the web site or from the Railway's Representative.**

1.03 Railway Requirements

- **1.03.01** The Contractor must take protective measures as are necessary to keep railway facilities, including track ballast, free of sand, debris, and other foreign objects and materials resulting from his operations. Any damage to railway facilities resulting from Contractor's operations will be repaired or replaced by Railway and the cost of such repairs or replacement must be paid for by the Agency.

- **1.03.02** The Contractor must notify the Railway's Division Engineer Mark Carpenter at (303) 480-6393 and provide blasting plans to the Railway for review seven (7) calendar days prior to conducting any blasting operations adjacent to or on Railway's Property.

- **1.03.03** The Contractor must abide by the following temporary clearances during construction:

  - 15'-0" Horizontally from centerline of nearest track
  - 21'-6" Vertically above top of rail
  - 27'-0" Vertically above top of rail for electric wires carrying less than 750 volts
  - 28'-0" Vertically above top of rail for electric wires carrying 750 volts to 15,000 volts
  - 30'-0" Vertically above top of rail for electric wires carrying 15,000 volts to 20,000 volts
  - 34'-0" Vertically above top of rail for electric wires carrying more than 20,000 volts

- **1.03.04** Upon completion of construction, the following clearances shall be maintained:
  - 25' Horizontally from centerline of nearest track
  - 23' 6" Vertically above top of rail

- **1.03.05** Any infringement within State statutory clearances due to the Contractor's operations must be submitted to the Railway and to the City of Boulder and must not be undertaken until approved in writing by the Railway, and until the City of Boulder has obtained any necessary authorization from the State Regulatory Authority for the infringement. No extra compensation will be allowed in the event the Contractor's work is delayed pending Railway approval, and/or the State Regulatory Authority's approval.

- **1.03.06** In the case of impaired vertical clearance above top of rail, Railway will have the option of installing tell-tales or other protective devices Railway deems necessary for protection of Railway operations. The cost of tell-tales or protective devices will be borne by the Agency.

- **1.03.07** The details of construction affecting the Railway's Property and tracks not included in the contract plans must be submitted to the Railway by City of Boulder for approval before work is undertaken and this work must not be undertaken until approved by the Railway.

- **1.03.08** At other than public road crossings, the Contractor must not move any equipment or materials across Railway's tracks until permission has been obtained from the Railway. The Contractor must obtain a "Temporary Construction Crossing Agreement" from the Railway prior to moving his equipment or materials across the Railways tracks. The temporary crossing must be gated and locked at all times when not required for use by the Contractor. The temporary crossing for use of the Contractor will be constructed and, at the completion of the project, removed at the

expense of the Contractor.

- **1.03.09** Discharge, release or spill on the Railway Property of any hazardous substances, oil, petroleum, constituents, pollutants, contaminants, or any hazardous waste is prohibited and Contractor must immediately notify the Railway's Resource Operations Center at 1(800) 832-5452, of any discharge, release or spills in excess of a reportable quantity. Contractor must not allow Railway Property to become a treatment, storage or transfer facility as those terms are defined in the Resource Conservation and Recovery Act or any state analogue.

- **1.03.10** The Contractor upon completion of the work covered by this contract, must promptly remove from the Railway's Property all of Contractor's tools, equipment, implements and other materials, whether brought upon said property by said Contractor or any Subcontractor, employee or agent of Contractor or of any Subcontractor, and must cause Railway's Property to be left in a condition acceptable to the Railway's representative.

1.04 Contractor Roadway Worker on Track Safety Program and Safety Action Plan:

- **1.04.01** Each Contractor that will perform work within 25 feet of the centerline of a track must develop and implement a Roadway Worker Protection/On Track Safety Program and work with Railway Project Representative to develop an on track safety strategy as described in the guidelines listed in the on track safety portion of the Safety Orientation. This Program must provide Roadway Worker protection/on track training for all employees of the Contractor, its subcontractors, agents or invitees. This training is reinforced at the job site through job safety briefings. Additionally, each Contractor must develop and implement the Safety Action Plan, as provided for on the web site **www.contractororientation.com**, which will be made available to Railway prior to commencement of any work on Railway Property. During the performance of work, the Contractor must audit its work activities. The Contractor must designate an on-site Project Supervisor who will serve as the contact person for the Railway and who will maintain a copy of the Safety Action Plan, safety audits, and Material Safety Datasheets (MSDS), at the job site.

- **1.04.02** Contractor shall have a background investigation performed on all of its employees, subcontractors and agents who will be performing any services for Railroad under this Agreement which are determined by Railroad in its sole discretion **a)** to be on Railroad's property, or **b)** that require access to Railroad Critical Infrastructure, Railroad Critical Information Systems, Railroad's Employees, Hazardous Materials on Railroad's property or is being transported by or otherwise in the custody of Railroad, or Freight in Transit involving Railroad.

The required background screening shall at a minimum meet the rail industry background screening criteria defined by the e-RAILSAFE Program as outlined at http://www.e-railsafe.com, in addition to any other applicable regulatory requirements.

Contractor shall obtain written consent from all its employees, subcontractors or agents screened in compliance with the e-RAILSAFE Program to participate in the Program on their behalf and to release completed background information to Railroad's designee. Contractor shall be subject to periodic audit to ensure compliance.

Contractor subject to the e-RAILSAFE Program hereunder shall not permit any of its employees, subcontractors or agents to perform services hereunder who are not first approved under e-RAILSAFE Program standards. Railroad shall have the right to deny entry onto its premises or access as described in this section above to any of Contractor's employees, subcontractors or agents who do not display the authorized identification badge issued by a background screening service meeting the standards set forth in the e-RAILSAFE Program, or who in Railroad's opinion, which may not be unreasonable, may pose a threat to the safety or security of Railroad's operations, assets or personnel.

Contractors shall be responsible for ensuring that its employees, subcontractors and agents are United States citizens or legally working in the United States under a lawful and appropriate work VISA or other work authorization.

1.05 Railway Flagger Services:

- **1.05.01** The Contractor must give Railway's **Roadmaster** (telephone _____) a minimum of thirty (30) calendar days advance notice when flagging services will be required so that the Roadmaster can make appropriate arrangements (i.e., bulletin the flagger's position). If flagging services are scheduled in advance by the Contractor and it is subsequently determined by the parties hereto that such services are no longer necessary, the Contractor must give the Roadmaster five (5) working days advance notice so that appropriate arrangements can be made to abolish the position pursuant to union requirements.

- **1.05.02** Unless determined otherwise by Railway's Project Representative, Railway flagger will be required and furnished when Contractor's work activities are located over, under and/or within twenty-five (25) feet measured horizontally from centerline of the nearest track and when cranes or similar equipment positioned beyond 25-feet from the track centerline could foul the track in the event of tip over or other catastrophic occurrence, but not limited thereto for the following conditions:

- **1.05.02a** When, upon inspection by Railway's Representative, other conditions warrant.

- **1.05.02b** When any excavation is performed below the bottom of tie elevation, if, in the opinion of Railway's representative, track or other Railway facilities may be subject to movement or settlement.

- **1.05.02c** When work in any way interferes with the safe operation of trains at timetable speeds.

- **1.05.02d** When any hazard is presented to Railway track, communications, signal, electrical, or other facilities either due to persons, material, equipment or blasting in the vicinity.

- **1.05.02e** Special permission must be obtained from the Railway before moving heavy or cumbersome objects or equipment which might result in making the track impassable.

- **1.05.03** Flagging services will be performed by qualified Railway flaggers.

  - **1.05.03a** Flagging crew generally consists of one employee. However, additional personnel may be required to protect Railway Property and operations, if deemed necessary by the Railways Representative.

  - **1.05.03b** Each time a flagger is called, the minimum period for billing will be the eight (8) hour basic day.

  - **1.05.03c** The cost of flagger services provided by the Railway will be borne by City of Boulder. The estimated cost for one (1) flagger is approximately between $800.00-$1,600.00 for an eight (8) hour basic day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, vehicle, transportation, meals, lodging, radio, equipment, supervision and other costs incidental to performing flagging services. Negotiations for Railway labor or collective bargaining agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. **THE FLAGGING RATE IN EFFECT AT THE TIME OF PERFORMANCE BY THE CONTRACTOR HEREUNDER WILL BE USED TO CALCULATE THE ACTUAL COSTS OF FLAGGING PURSUANT TO THIS PARAGRAPH.**

- **1.05.03d** The average train traffic on this route is _____ freight trains per 24-hour period at a timetable speed _____ MPH and _____ passenger trains at a timetable speed of _____ MPH.

1.06 Contractor General Safety Requirements

- **1.06.01** Work in the proximity of railway track(s) is potentially hazardous where movement of trains and equipment can occur at any time and in any direction. All work performed by contractors within 25 feet of any track must be in compliance with FRA Roadway Worker Protection Regulations.

- **1.06.02** Before beginning any task on Railway Property, a thorough job safety briefing must be conducted with all personnel involved with the task and repeated when the personnel or task changes. If the task is within 25 feet of any track, the job briefing must include the Railway's flagger, as applicable, and include the procedures the Contractor will use to protect its employees, subcontractors, agents or invitees from moving any equipment adjacent to or across any Railway track(s).

- **1.06.03** Workers must not work within 25 feet of the centerline of any track without an on track safety strategy approved by the Railway's Project Representative. When authority is provided, every contractor employee must know: (1) who the Railway flagger is, and how to contact the flagger, (2) limits of the authority, (3) the method of communication to stop and resume work, and (4) location of the designated places of safety. Persons or equipment entering flag/work limits that were not previously job briefed, must notify the flagger immediately, and be given a job briefing when working within 25 feet of the center line of track.

- **1.06.04** When Contractor employees are required to work on the Railway Property after normal working hours or on weekends, the Railway's representative in charge of the project must be notified. A minimum of two employees must be present at all times.

- **1.06.05** Any employees, agents or invitees of Contractor or its subcontractors under suspicion of being under the influence of drugs or alcohol, or in the possession of same, will be removed from the Railway's Property and subsequently released to the custody of a representative of Contractor management. Future access to the Railway's Property by that employee will be denied.

- **1.06.06** Any damage to Railway Property, or any hazard noticed on passing trains must be reported immediately to the Railway's representative in charge of the project. Any vehicle or machine which may come in contact with track, signal equipment, or structure (bridge) and could result in a train derailment must be reported immediately to the Railway representative in charge of the project and to

the Railway's Resource Operations Center at 1(800) 832-5452. Local emergency numbers are to be obtained from the Railway representative in charge of the project prior to the start of any work and must be posted at the job site.

- **1.06.07** For safety reasons, all persons are prohibited from having pocket knives, firearms or other deadly weapons in their possession while working on Railway's Property.

- **1.06.08** All personnel protective equipment (PPE) used on Railway Property must meet applicable OSHA and ANSI specifications. Current Railway personnel protective equipment requirements are listed on the web site, **www.contractororientation.com**, however, a partial list of the requirements include: a) safety glasses with permanently affixed side shields (no yellow lenses); b) hard hats; c) safety shoe with: hardened toes, above-the-ankle lace-up and a defined heel; and d) high visibility retro-reflective work wear. The Railway's representative in charge of the project is to be contacted regarding local specifications for meeting requirements relating to hi-visibility work wear. Hearing protection, fall protection, gloves, and respirators must be worn as required by State and Federal regulations. **(NOTE – Should there be a discrepancy between the information contained on the web site and the information in this paragraph, the web site will govern.)**

- **1.06.09 THE CONTRACTOR MUST NOT PILE OR STORE ANY MATERIALS, MACHINERY OR EQUIPMENT CLOSER THAN 25'-0" TO THE CENTER LINE OF THE NEAREST RAILWAY TRACK. MATERIALS, MACHINERY OR EQUIPMENT MUST NOT BE STORED OR LEFT WITHIN 250 FEET OF ANY HIGHWAY/RAIL AT-GRADE CROSSINGS OR TEMPORARY CONSTRUCTION CROSSING, WHERE STORAGE OF THE SAME WILL OBSTRUCT THE VIEW OF A TRAIN APPROACHING THE CROSSING. PRIOR TO BEGINNING WORK, THE CONTRACTOR MUST ESTABLISH A STORAGE AREA WITH CONCURRENCE OF THE RAILWAY'S REPRESENTATIVE.**

- **1.06.10** Machines or vehicles must not be left unattended with the engine running. Parked machines or equipment must be in gear with brakes set and if equipped with blade, pan or bucket, they must be lowered to the ground. All machinery and equipment left unattended on Railway's Property must be left inoperable and secured against movement. (See internet Engineering Contractor Safety Orientation program for more detailed specifications)

- **1.06.11** Workers must not create and leave any conditions at the work site that would interfere with water drainage. Any work performed over water must meet all Federal, State and Local regulations.

- **1.06.12** All power line wires must be considered dangerous and of high voltage

unless informed to the contrary by proper authority. For all power lines the minimum clearance between the lines and any part of the equipment or load must be; 200 KV or below - 15 feet; 200 to 350 KV - 20 feet; 350 to 500 KV - 25 feet; 500 to 750 KV - 35 feet; and 750 to 1000 KV - 45 feet. If capacity of the line is not known, a minimum clearance of 45 feet must be maintained. A person must be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for an operator to maintain the desired clearance by visual means.

1.07 Excavation:

- **1.07.01** Before excavating, the Contractor must determine whether any underground pipe lines, electric wires, or cables, including fiber optic cable systems are present and located within the Project work area. The Contractor must determine whether excavation on Railway's Property could cause damage to buried cables resulting in delay to Railway traffic and disruption of service to users. Delays and disruptions to service may cause business interruptions involving loss of revenue and profits. Before commencing excavation, the Contractor must contact **BNSF's Field Engineering Representative (_____).** All underground and overhead wires will be considered HIGH VOLTAGE and dangerous until verified with the company having ownership of the line. **It is the Contractor's responsibility to notify any other companies that have underground utilities in the area and arrange for the location of all underground utilities before excavating.**

- **1.07.02** The Contractor must cease all work and notify the Railway immediately before continuing excavation in the area if obstructions are encountered which do not appear on drawings. If the obstruction is a utility and the owner of the utility can be identified, then the Contractor must also notify the owner immediately. If there is any doubt about the location of underground cables or lines of any kind, no work must be performed until the exact location has been determined. There will be no exceptions to these instructions.

- **1.07.03** All excavations must be conducted in compliance with applicable OSHA regulations and, regardless of depth, must be shored where there is any danger to tracks, structures or personnel.

- **1.07.04** Any excavations, holes or trenches on the Railway's Property must be covered, guarded and/or protected when not being worked on. When leaving work site areas at night and over weekends, the areas must be secured and left in a condition that will ensure that Railway employees and other personnel who may be working or passing through the area are protected from all hazards. All excavations must be back filled as soon as possible.

BNSF RAILWAY

1.08 Hazardous Waste, Substances and Material Reporting:

- **1.08.01** If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Railway's Property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor must immediately: (a) notify the Railway's Resource Operations Center at 1(800) 832-5452, of such discovery: (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties: and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.

1.09 Personal Injury Reporting

- **1.09.01** The Railway is required to report certain injuries as a part of compliance with Federal Railroad Administration (FRA) reporting requirements. Any personal injury sustained by an employee of the Contractor, subcontractor or Contractor's invitees while on the Railway's Property must be reported immediately (by phone mail if unable to contact in person) to the Railway's representative in charge of the project. The Non-Employee Personal Injury Data Collection Form contained herein is to be completed and sent by Fax to the Railway at 1(817) 352-7595 and to the Railway's Project Representative no later than the close of shift on the date of the injury.

BNSF RAILWAY

NON-EMPLOYEE PERSONAL INJURY DATA COLLECTION

(If injuries are in connection with rail equipment accident/incident, highway rail grade crossing accident or automobile accident, ensure that appropriate information is obtained, forms completed and that data entry personnel are aware that injuries relate to that specific event.)

Injured Person Type:

- ☐ Passenger on train (C)
- ☐ Non-employee (N) *(i.e., emp of another railroad, or, non-BNSF emp involved in vehicle accident, including company vehicles)*
- ☐ Contractor/safety sensitive (F)
- ☐ Contractor/non-safety sensitive (G)
- ☐ Volunteer/safety sensitive (H)
- ☐ Volunteer/other non-safety sensitive (I)
- ☐ Non-trespasser (D) - to include highway users involved in highway rail grade crossing accidents who did not go around or through gates
- ☐ Trespasser (E) - to include highway users involved in highway rail grade crossing accidents who went around or through gates
- ☐ Non-trespasser (J) - Off railroad property

If train involved, Train ID: _____

Transmit attached information to Accident/Incident Reporting Center by:
Fax 1-817-352-7595 or by Phone 1-800-697-6736 **or email to: Accident-Reporting.Center@BNSF.com**

Officer Providing Information:

_____ _____ _____
(Name) (Employee No.) (Phone #)

REPORT PREPARED TO COMPLY WITH FEDERAL ACCIDENT REPORTING REQUIREMENTS AND PROTECTED FROM DISCLOSURE PURSUANT TO 49 U.S.C. 20903 AND 83 U.S.C. 490

BNSF RAILWAY

NON-EMPLOYEE PERSONAL INJURY DATA COLLECTION

INFORMATION REQUIRED TO BE COLLECTED PURSUANT TO FEDERAL REGULATION. IT SHOULD BE USED FOR COMPLIANCE WITH FEDERAL REGULATIONS ONLY AND IT IS NOT INTENDED TO PRESUME ACCEPTANCE OF RESPONSIBILITY OR LIABILITY.

1. Accident City/St: _____ 2. Date: _____ Time: _____

County: _____ 3. Temperature: _____ 4. Weather: _____
(if non BNSF location)

Mile Post / Line Segment: _____

5. Driver's License No (and state) or other ID: _____ **SSN (required):** _____

6. Name (last, first, mi): _____

7. Address: _____ City: _____ St: _____ Zip: _____

8. Date of Birth: _____ and/or Age: _____ Gender: _____
(if available)

Phone Number: _____ Employer: _____

9. Injury: _____ 10. Body Part: _____
(i.e., Laceration, etc.) (i.e., Hand, etc.)

11. Description of Accident (To include location, action, result, etc.): _____

12. Treatment:

- ☐ First Aid Only
- ☐ Required Medical Treatment _____
- ☐ Other Medical Treatment _____

13. Dr. Name: _____ Date: _____

14. Dr. Address:

Street: _____ City: _____ St: _____ Zip: _____

15. Hospital Name: _____

16. Hospital Address:

Street: _____ City: _____ St: _____ Zip: _____

17. Diagnosis: _____

REPORT PREPARED TO COMPLY WITH FEDERAL ACCIDENT REPORTING REQUIREMENTS

EXHIBIT C-1

AGREEMENT BETWEEN BNSF AND CONTRACTOR

BNSF RAILWAY

EXHIBIT "C-1"

Agreement Between
BNSF RAILWAY COMPANY
and the
CONTRACTOR

Railway File: _____

Agency Project: **Wonderland Creek bike/pedestrian underpass**

<%Contractor.LegalName%> [Insert contractor's legal name here](hereinafter called "Contractor"), has entered into an agreement (hereinafter called "Agreement") dated _____, 2015 with City of Boulder for the performance of certain work in connection with the following project: Wonderland Creek bike/pedestrian underpass. Performance of such work will necessarily require Contractor to enter **BNSF RAILWAY COMPANY** (hereinafter called "Railway") right of way and property (hereinafter called "Railway Property"). The Agreement provides that no work will be commenced within Railway Property until the Contractor employed in connection with said work for City of Boulder (i) executes and delivers to Railway an Agreement in the form hereof, and (ii) provides insurance of the coverage and limits specified in such Agreement and Section 3 herein. If this Agreement is executed by a party who is not the Owner, General Partner, President or Vice President of Contractor, Contractor must furnish evidence to Railway certifying that the signatory is empowered to execute this Agreement on behalf of Contractor.

Accordingly, in consideration of Railway granting permission to Contractor to enter upon Railway Property and as an inducement for such entry, Contractor, effective on the date of the Agreement, has agreed and does hereby agree with Railway as follows:

1) RELEASE OF LIABILITY AND INDEMNITY

Contractor hereby waives, releases, indemnifies, defends and holds harmless Railway for all judgments, awards, claims, demands, and expenses (including attorneys' fees), for injury or death to all persons, including Railway's and Contractor's officers and employees, and for loss and damage to property belonging to any person, arising in any manner from Contractor's or any of Contractor's subcontractors' acts or omissions or any work performed on or about Railway's property or right-of-way. **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DESTRUCTION, DAMAGE, DEATH, OR INJURY WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF RAILWAY, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, EXCEPT TO THE EXTENT THAT SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE INTENSIONAL MISCONDUCT OR GROSS NEGLIGENCE OF RAILWAY.**

THE INDEMNIFICATION OBLIGATION ASSUMED BY CONTRACTOR INCLUDES ANY CLAIMS, SUITS OR JUDGMENTS BROUGHT AGAINST RAILWAY UNDER THE FEDERAL EMPLOYEE'S LIABILITY ACT, INCLUDING CLAIMS FOR STRICT LIABILITY UNDER THE SAFETY APPLIANCE ACT OR THE LOCOMOTIVE INSPECTION ACT, WHENEVER SO CLAIMED.

Contractor further agrees, at its expense, in the name and on behalf of Railway, that it will adjust and settle all claims made against Railway, and will, at Railway's discretion, appear and defend any suits or actions of law or in equity brought against Railway on any claim or cause of action arising or growing out of or in any manner connected with any liability assumed by Contractor under this Agreement for which Railway is liable or is alleged to be liable. Railway will give notice to Contractor, in writing, of the receipt or dependency of such claims and thereupon Contractor must proceed to adjust and handle to a conclusion such claims, and in the event of a suit being brought against Railway, Railway may forward summons and complaint or other process in connection therewith to Contractor, and Contractor, at Railway's discretion, must defend, adjust, or settle such suits and protect, indemnify, and save harmless Railway from and against all damages, judgments, decrees, attorney's fees, costs, and expenses growing out of or resulting from or incident to any such claims or suits.

In addition to any other provision of this Agreement, in the event that all or any portion of this Article shall be deemed to be inapplicable for any reason, including without limitation as a result of a decision of an applicable court, legislative enactment or regulatory order, the parties agree that this Article shall be interpreted as requiring Contractor to indemnify Railway to the fullest extent permitted by applicable law. **THROUGH THIS AGREEMENT THE PARTIES EXPRESSLY INTEND FOR CONTRACTOR TO INDEMNIFY RAILWAY FOR RAILWAY'S ACTS OF NEGLIGENCE.**

It is mutually understood and agreed that the assumption of liabilities and indemnification provided for in this Agreement survive any termination of this Agreement.

2) TERM

This Agreement is effective from the date of the Agreement until (i) the completion of the project set forth herein, and (ii) full and complete payment to Railway of any and all sums or other amounts owing and due hereunder.

3) INSURANCE

Contractor shall, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:

A. Commercial General Liability insurance. This insurance shall contain broad form contractual liability with a combined single limit of a minimum of $5,000,000 each

occurrence and an aggregate limit of at least $10,000,000 but in no event less than the amount otherwise carried by the Contractor. Coverage must be purchased on a post 2004 ISO occurrence form or equivalent and include coverage for, but not limit to the following:

- Bodily Injury and Property Damage
- Personal Injury and Advertising Injury
- Fire legal liability
- Products and completed operations

This policy shall also contain the following endorsements, which shall be indicated on the certificate of insurance:

- The definition of insured contract shall be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- Waver of subrogation in favor of and acceptable to Railway.
- Additional insured endorsement in favor of and acceptable to Railway.
- Separation of insureds.
- The policy shall be primary and non-contributing with respect to any insurance carried by Railway.

It is agreed that the workers' compensation and employers' liability related exclusions in the Commercial General Liability insurance policy(s) required herein are intended to apply to employees of the policy holder and shall not apply to ***Railway*** employees.

No other endorsements limiting coverage as respects obligations under this_Agreement may be included on the policy with regard to the work being performed under this agreement.

B. Business Automobile Insurance. This insurance shall contain a combined single limit of at least $1,000,000 per occurrence, and include coverage for, but not limited to the following:

- Bodily injury and property damage
- Any and all vehicles owned, used or hired

The policy shall also contain the following endorsements or language, which shall be indicated on the certificate of insurance:

- Waiver of subrogation in favor of and acceptable to Railway.
- Additional insured endorsement in favor of and acceptable to Railway.
- Separation of insureds.
- The policy shall be primary and non-contributing with respect to any insurance carried by Railway.

C. Workers Compensation and Employers Liability insurance including coverage for, but not limited to:

- Contractor's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
- Employers' Liability (Part B) with limits of at least $500,000 each accident, $500,000 by disease policy limit, $500,000 by disease each employee.

This policy shall also contain the following endorsements or language, which shall be indicated on the certificate of insurance:

- Waiver of subrogation in favor of and acceptable to Railway.

D. Railroad Protective Liability insurance naming only the ***Railway*** as the Insured with coverage of at least $5,000,000 per occurrence and $10,000,000 in the aggregate. The policy Must be issued on a standard ISO form CG 00 35 12 04 and include the following:

- Endorsed to include the Pollution Exclusion Amendment
- Endorsed to include the Limited Seepage and Pollution Endorsement.
- Endorsed to remove any exclusion for punitive damages.
- No other endorsements restricting coverage may be added.
- The original policy must be provided to the ***Railway*** prior to performing any work or services under this Agreement
- Definition of "Physical Damage to Property" shall be endorsed to read: "means direct and accidental loss of or damage to all property owned by any named insured and all property in any named insured' care, custody, and control arising out of the acts or omissions of the contractor named on the Declarations.

In lieu of providing a Railroad Protective Liability Policy, Licensee may participate (if available) in Railway's Blanket Railroad Protective Liability Insurance Policy.

Other Requirements:

Where allowable by law, all policies (applying to coverage listed above) shall contain no exclusion for punitive damages.

Contractor agrees to waive its right of recovery against ***Railway*** for all claims and suits against ***Railway***. In addition, its insurers, through the terms of the policy or policy endorsement, waive their right of subrogation against ***Railway*** for all claims and suits. Contractor further waives its right of recovery, and its insurers also waive their right of subrogation against ***Railway*** for loss of its owned or leased property or property under Contractor's care, custody or control.

Allocated Loss Expense shall be in addition to all policy limits for coverages referenced above.

Contractor is not allowed to self-insure without the prior written consent of ***Railway.*** If granted by ***Railway***, any self-insured retention or other financial responsibility for claims shall be covered directly by Contractor in lieu of insurance. Any and all ***Railway*** liabilities that would otherwise, in accordance with the provisions of this Agreement, be covered by Contractor's insurance will be covered as if Contractor elected not to include a deductible, self-insured retention or other financial responsibility for claims.

Prior to commencing services, Contractor shall furnish to ***Railway*** an acceptable certificate(s) of insurance from an authorized representative evidencing the required coverage(s), endorsements, and amendments. The certificate should be directed to the following address:

BNSF Railway Company
c/o CertFocus
P.O. Box 140528
Kansas City, MO 64114
Toll Free: 877-576-2378
Fax number: 817-840-7487
Email: BNSF@certfocus.com
www.certfocus.com

Contractor shall notify ***Railway*** in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration.

Any insurance policy shall be written by a reputable insurance company acceptable to ***Railway*** or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provided.

If coverage is purchased on a "claims made" basis, Contractor hereby agrees to maintain coverage in force for a minimum of three years after expiration, cancellation or termination of this Agreement. Annually Contractor agrees to provide evidence of such coverage as required hereunder.

Contractor represents that this Agreement has been thoroughly reviewed by Contractor's insurance agent(s)/broker(s), who have been instructed by Contractor to procure the insurance coverage required by this Agreement.

Not more frequently than once every five years, ***Railway*** may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by Contractor, Contractor shall require

that the subcontractor shall provide and maintain insurance coverage(s) as set forth herein, naming ***Railway*** as an additional insured, and shall require that the subcontractor shall release, defend and indemnify ***Railway*** to the same extent and under the same terms and conditions as Contractor is required to release, defend and indemnify ***Railway*** herein.

Failure to provide evidence as required by this section shall entitle, but not require, ***Railway*** to terminate this Agreement immediately. Acceptance of a certificate that does not comply with this section shall not operate as a waiver of Contractor's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by Contractor shall not be deemed to release or diminish the liability of Contractor including, without limitation, liability under the indemnity provisions of this Agreement. Damages recoverable by ***Railway*** shall not be limited by the amount of the required insurance coverage.

In the event of a claim or lawsuit involving ***Railway*** arising out of this agreement, Contractor will make available any required policy covering such claim or lawsuit.

These insurance provisions are intended to be a separate and distinct obligation on the part of the Contractor. Therefore, these provisions shall be enforceable and Contractor shall be bound thereby regardless of whether or not indemnity provisions are determined to be enforceable in the jurisdiction in which the work covered hereunder is performed.

For purposes of this section, ***Railway*** shall mean "Burlington Northern Santa Fe LLC", "BNSF Railway Company" and the subsidiaries, successors, assigns and affiliates of each.

4) SALES AND OTHER TAXES

In the event applicable sales taxes of a state or political subdivision of a state of the United States are levied or assessed in connection with and directly related to any amounts invoiced by Contractor to Railway ("Sales Taxes"), Railway shall be responsible for paying only the Sales Taxes that Contractor separately states on the invoice or other billing documents provided to Railway; *provided, however,* that (i) nothing herein shall preclude Railway from claiming whatever Sales Tax exemptions are applicable to amounts Contractor bills Railway, (ii) Contractor shall be responsible for all sales, use, excise, consumption, services and other taxes which may accrue on all services, materials, equipment, supplies or fixtures that Contractor and its subcontractors use or consume in the performance of this Agreement, (iii) Contractor shall be responsible for Sales Taxes (together with any penalties, fines or interest thereon) that Contractor fails to separately state on the invoice or other billing documents provided to Railway or fails to collect at the time of payment by Railway of invoiced amounts (except where Railway claims a Sales Tax exemption), and (iv) Contractor shall be responsible for Sales Taxes (together with any penalties, fines or interest thereon) if Contractor fails to issue separate invoices for each state in which Contractor delivers goods, provides services or, if applicable, transfers intangible rights to Railway.

Upon request, Contractor shall provide Railway satisfactory evidence that all taxes (together with any penalties, fines or interest thereon) that Contractor is responsible to pay under this Agreement have been paid. If a written claim is made against Contractor for Sales Taxes with respect to which Railway may be liable for under this Agreement, Contractor shall promptly notify Railway of such claim and provide Railway copies of all correspondence received from the taxing authority. Railway shall have the right to contest, protest, or claim a refund, in Railway's own name, any Sales Taxes paid by Railway to Contractor or for which Railway might otherwise be responsible for under this Agreement; provided, however, that if Railway is not permitted by law to contest any such Sales Tax in its own name, Contractor shall, if requested by Railway at Railway's sole cost and expense, contest in Contractor's own name the validity, applicability or amount of such Sales Tax and allow Railway to control and conduct such contest.

Railway retains the right to withhold from payments made under this Agreement amounts required to be withheld under tax laws of any jurisdiction. If Contractor is claiming a withholding exemption or a reduction in the withholding rate of any jurisdiction on any payments under this Agreement, before any payments are made (and in each succeeding period or year as required by law), Contractor agrees to furnish to Railway a properly completed exemption form prescribed by such jurisdiction. Contractor shall be responsible for any taxes, interest or penalties assessed against Railway with respect to withholding taxes that Railway does not withhold from payments to Contractor.

5) EXHIBIT "C" CONTRACTOR REQUIREMENTS

The Contractor must observe and comply with all provisions, obligations, requirements and limitations contained in the Agreement, and the Contractor Requirements set forth on Exhibit "C" attached to the Agreement and this Agreement, including, but not be limited to, payment of all costs incurred for any damages to Railway roadbed, tracks, and/or appurtenances thereto, resulting from use, occupancy, or presence of its employees, representatives, or agents or subcontractors on or about the construction site. Contractor shall execute a Temporary Construction Crossing Agreement or Private Crossing Agreement (http://www.bnsf.com/communities/faqs/permits-real-estate/), for any temporary crossing requested to aid in the construction of this Project, if approved by BNSF.

6) TRAIN DELAY

Contractor is responsible for and hereby indemnifies and holds harmless Railway (including its affiliated railway companies, and its tenants) for, from and against all damages arising from any unscheduled delay to a freight or passenger train which affects Railway's ability to fully utilize its equipment and to meet customer service and contract obligations. Contractor will be billed, as further provided below, for the economic losses arising from loss of use of equipment, contractual loss of incentive pay and bonuses and contractual penalties resulting from train delays, whether caused by Contractor, or subcontractors, or by the Railway

performing work under this Agreement. Railway agrees that it will not perform any act to unnecessarily cause train delay.

For loss of use of equipment, Contractor will be billed the current freight train hour rate per train as determined from Railway's records. Any disruption to train traffic may cause delays to multiple trains at the same time for the same period.

Additionally, the parties acknowledge that passenger, U.S. mail trains and certain other grain, intermodal, coal and freight trains operate under incentive/penalty contracts between Railway and its customer(s). Under these arrangements, if Railway does not meet its contract service commitments, Railway may suffer loss of performance or incentive pay and/or be subject to penalty payments. Contractor is responsible for any train performance and incentive penalties or other contractual economic losses actually incurred by Railway which are attributable to a train delay caused by Contractor or its subcontractors.

The contractual relationship between Railway and its customers is proprietary and confidential. In the event of a train delay covered by this Agreement, Railway will share information relevant to any train delay to the extent consistent with Railway confidentiality obligations. The rate then in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of train delay pursuant to this agreement.

Contractor and its subcontractors must give Railway's Roadmaster (_____) _____ (__) weeks advance notice of the times and dates for proposed work windows. Railway and Contractor will establish mutually agreeable work windows for the project. Railway has the right at any time to revise or change the work windows due to train operations or service obligations. Railway will not be responsible for any additional costs or expenses resulting from a change in work windows. Additional costs or expenses resulting from a change in work windows shall be accounted for in Contractor's expenses for the project.

Contractor and subcontractors must plan, schedule, coordinate and conduct all Contractor's work so as to not cause any delays to any trains.

IN WITNESS WHEREOF, each of the parties hereto has caused this Agreement to be executed by its duly authorized officer the day and year first above written.

<%Contractor.LegalName%>

By: _____

Printed Name: _____

Title: _____

BNSF Railway Company

By: _____

Name: _____
Manager Public Projects

Accepted and effective this _____day of 20__.

Contact Person: _____

Address: _____

City: _____

State: _____ Zip: _____

Fax: _____

Phone: _____

E-mail: _____

EXHIBIT D
EASEMENT AGREEMENT FOR RECREATIONAL TRAIL PEDESTRIAN/BIKE PATH, WONDERLAND CREEK DRAINAGEWAY AND BWRD

EASEMENT AGREEMENT
FOR CONSTRUCTION OF RECREATIONAL TRAIL/PEDESTRIAN BIKE PATH AND DRAINAGEWAY
(C&M Agreement)

THIS EASEMENT AGREEMENT FOR CONSTRUCTION OF RECREATIONAL TRAIL/PEDESTRIAN BIKE PATH AND DRAINAGEWAY ("**Easement Agreement**") is made and entered into as of the 30th day of June 2015 ("**Effective Date**"), by and between **BNSF RAILWAY COMPANY**, a Delaware corporation ("**Grantor**"), and **CITY OF BOULDER, COLORADO**, a Colorado home rule municipality ("**Grantee**").

A. Grantor owns or controls certain real property situated at or near the vicinity of Boulder, County of Boulder, State of Colorado, at Mile Post 31.79, as described or depicted on **Exhibit "A"** attached hereto and made a part hereof (the "**Premises**").

B. Grantor and Grantee have entered into that certain Construction and Maintenance Agreement dated as of June 23, 2015 concerning improvements on or near the Premises (the "**C&M Agreement**").

C. Grantee has requested that Grantor grant to Grantee an easement over the Premises for the Easement Purpose (as defined below).

D. Grantor has agreed to grant Grantee such easement, subject to the terms and conditions set forth in this Easement and in the C&M Agreement incorporated herein as if fully set forth in this instrument which terms shall be in full force and effect for purposes of this Easement even if the C&M Agreement is, for whatever reason, no longer in effect.

NOW, THEREFORE, for and in consideration of the foregoing recitals which are incorporated herein, the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

Section 1 Granting of Easement.

1.1 Easement Purpose. The "**Easement Purpose**" shall be for the purposes set forth in the C&M Agreement. Any improvements to be constructed in connection with the Easement Purpose are referred to herein as "**Improvements**" and shall be constructed, located, configured and maintained by Grantee in strict accordance with the terms of this Easement Agreement and the C&M Agreement.

1.2 Grant. Grantor does hereby grant unto Grantee a non-exclusive easement ("**Easement**") over and under the Premises for the Easement Purpose and for no other purpose. The Easement is granted subject to any and all restrictions, covenants, easements, licenses, permits, leases and other encumbrances of whatsoever nature whether or not of record, if any, relating to the Premises and subject to all with all applicable federal, state and local laws, regulations, ordinances, restrictions, covenants and court or administrative decisions and orders, including Environmental Laws (defined below) and zoning laws (collectively, "**Laws**"). Grantor may not make any alterations or improvements or perform any maintenance or repair activities within the Premises except in accordance with the terms and conditions of the C&M Agreement.

1.3 Reservations by Grantor. Grantor excepts and reserves the right, to be exercised by Grantor and any other parties who may obtain written permission or authority from Grantor:

(a) to install, construct, maintain, renew, repair, replace, use, operate, change, modify and relocate any existing pipe, power, communication, cable, or utility lines and appurtenances and other facilities or structures of like character (collectively, "**Lines**") upon, over, under or across the Premises;

(b) to install, construct, maintain, renew, repair, replace, use, operate, change, modify and relocate any tracks or additional facilities or structures upon, over, under or across the Premises; and

(c) to use the Premises in any manner as the Grantor in its sole discretion deems appropriate, provided Grantor uses all commercially reasonable efforts to avoid material interference with the use of the Premises by Grantee for the Easement Purpose.

Section 2 **Term of Easement**. The term of the Easement, unless sooner terminated under provisions of this Easement Agreement, shall be perpetual.

Section 3 **No Warranty of Any Conditions of the Premises.** Grantee acknowledges that Grantor has made no representation whatsoever to Grantee concerning the state or condition of the Premises, or any personal property located thereon, or the nature or extent of Grantor's ownership interest in the Premises. Grantee has not relied on any statement or declaration of Grantor, oral or in writing, as an inducement to entering into this Easement Agreement, other than as set forth herein. GRANTOR HEREBY DISCLAIMS ANY REPRESENTATION OR WARRANTY, WHETHER EXPRESS OR IMPLIED, AS TO THE DESIGN OR CONDITION OF ANY PROPERTY PRESENT ON OR CONSTITUTING THE PREMISES, ITS MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, THE QUALITY OF THE MATERIAL OR WORKMANSHIP OF ANY SUCH PROPERTY, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES. GRANTOR SHALL NOT BE RESPONSIBLE TO GRANTEE OR ANY OF GRANTEE'S CONTRACTORS FOR ANY DAMAGES RELATING TO THE DESIGN, CONDITION, QUALITY, SAFETY, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY PROPERTY PRESENT ON OR CONSTITUTING THE PREMISES, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES. GRANTEE ACCEPTS ALL RIGHTS GRANTED UNDER THIS EASEMENT AGREEMENT IN THE PREMISES IN AN "AS IS, WHERE IS" AND "WITH ALL FAULTS" CONDITION, AND SUBJECT TO ALL LIMITATIONS ON GRANTOR'S RIGHTS, INTERESTS AND TITLE TO THE PREMISES. Grantee has inspected or will inspect the Premises, and enters upon Grantor's rail corridor and property with knowledge of its physical condition and the danger inherent in Grantor's rail operations on or near the Premises. Grantee acknowledges that this Easement Agreement does not contain any implied warranties that Grantee or Grantee's Contractors (as hereinafter defined) can successfully construct or operate the Improvements.

Section 4 **Nature of Grantor's Interest in the Premises.** GRANTOR DOES NOT WARRANT ITS TITLE TO THE PREMISES NOR UNDERTAKE TO DEFEND GRANTEE IN THE PEACEABLE POSSESSION OR USE THEREOF. NO COVENANT OF QUIET ENJOYMENT IS MADE. In case of the eviction of Grantee by anyone owning or claiming title to or any interest in the Premises, or by the abandonment by Grantor of the affected rail corridor, Grantor shall not be liable to refund Grantee any compensation paid hereunder.

Section 5 **Improvements.** Grantee shall take, in a timely manner, all actions necessary and proper to the lawful establishment, construction, operation, and maintenance of the Improvements, including such actions as may be necessary to obtain any required permits, approvals or authorizations from applicable governmental authorities. Any and all cuts and fills, excavations or embankments necessary in the construction, maintenance, or future alteration of the Improvements shall be made and maintained in such manner, form and extent as will provide adequate drainage of and from the adjoining lands and premises of the Grantor; and wherever any such fill or embankment shall or may obstruct the natural and pre-existing drainage from such lands and premises of the Grantor, the Grantee shall construct and maintain such culverts or drains as may be requisite to preserve such natural and pre-existing drainage, and shall also wherever necessary, construct extensions of existing drains, culverts or ditches through or along the premises of the Grantor, such extensions to be of adequate sectional dimensions to preserve the present flowage of drainage or other waters, and of materials and workmanship equally as good as those now existing. In the event any construction, repair, maintenance, work or other use of the Premises by Grantee will affect any Lines, fences, buildings, improvements or other facilities (collectively, "**Other Improvements**"), Grantee will be responsible at Grantee's sole risk to locate and make any adjustments necessary to such Other Improvements. Grantee must contact the owner(s) of the Other Improvements notifying them of any work that may damage these Other Improvements and/or interfere with their service and obtain the owner's written approval prior to so affecting the Other Improvements. Grantee must mark all Other Improvements on the Plans and Specifications and mark such Other Improvements in the field in order to verify their locations. Grantee must also use all reasonable methods when working on or near Grantor property to determine if any Other Improvements (fiber optic, cable, communication or otherwise) may exist. The Grantee agrees to keep the above-described premises free and clear from combustible materials and to cut and remove or cause to be cut and removed at its sole expense all weeds and vegetation on said premises, said

work of cutting and removal to be done at such times and with such frequency as to comply with Grantee and local laws and regulations and abate any and all hazard of fire.

Section 6 **Taxes and Recording Fees**. Grantee shall pay when due any taxes, assessments or other charges (collectively, "**Taxes**") levied or assessed upon the Improvements by any governmental or quasi-governmental body or any Taxes levied or assessed against Grantor or the Premises that are attributable to the Improvements. Grantee agrees to purchase, affix and cancel any and all documentary stamps in the amount prescribed by statute, and to pay any and all required transfer taxes, excise taxes and any and all fees incidental to recordation of the Memorandum of Easement. In the event of Grantee's failure to do so, if Grantor shall become obligated to do so, Grantee shall be liable for all costs, expenses and judgments to or against Grantor, including all of Grantor's legal fees and expenses.

Section 7 **Environmental.**

7.1 Compliance with Environmental Laws. Grantee shall strictly comply with all federal, state and local environmental Laws in its use of the Premises, including, but not limited to, the Resource Conservation and Recovery Act, as amended (RCRA), the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Toxic Substances Control Act (collectively referred to as the "**Environmental Laws**"). Grantee shall not maintain a "treatment," "storage," "transfer" or "disposal" facility, or "underground storage tank," as those terms are defined by Environmental Laws, on the Premises. Grantee shall not handle, transport, release or suffer the release of "hazardous waste" or "hazardous substances", as "hazardous waste" and "hazardous substances" may now or in the future be defined by any Environmental Laws.

7.2 Notice of Release. Grantee shall give Grantor immediate notice to Grantor's Resource Operations Center at (800) 832-5452 of any release of hazardous substances on or from the Premises, violation of Environmental Laws, or inspection or inquiry by governmental authorities charged with enforcing Environmental Laws with respect to Grantee's use of the Premises. Grantee shall use its best efforts to promptly respond to any release on or from the Premises. Grantee also shall give Grantor immediate notice of all measures undertaken on behalf of Grantee to investigate, remediate, respond to or otherwise cure such release or violation.

7.3 Remediation of Release. In the event that Grantor has notice from Grantee or otherwise of a release or violation of Environmental Laws which occurred or may occur during the term of this Easement Agreement and which is related to the use of the Premises by Grantee or its agents, Grantor may require Grantee, at Grantee's sole risk and expense, to take timely measures to investigate, remediate, respond to or otherwise cure such release or violation affecting the Premises. If during the construction or subsequent maintenance of the Improvements, soils or other materials considered to be environmentally contaminated are exposed, Grantee will remove and safely dispose of said contaminated soils. Determination of soils contamination and applicable disposal procedures thereof, will be made only by an agency having the capacity and authority to make such a determination.

7.4 Preventative Measures. Grantee shall promptly report to Grantor in writing any conditions or activities upon the Premises known to Grantee which create a risk of harm to persons, property or the environment and shall take whatever action is necessary to prevent injury to persons or property arising out of such conditions or activities that are related to the use of the Premises by Grantee or its agents; provided, however, that Grantee's reporting to Grantor shall not relieve Grantee of any obligation whatsoever imposed on it by this Easement Agreement. Grantee shall promptly respond to Grantor's request for information regarding said conditions or activities.

7.5 Evidence of Compliance. Grantee agrees periodically to furnish Grantor with proof satisfactory to Grantor that Grantee is in compliance with this **Section 7**. Should Grantee not comply fully with the above-stated obligations of this **Section 7**, notwithstanding anything contained in any other provision hereof, Grantor may, at its option, terminate this Easement Agreement by serving five (5) days' notice of termination upon Grantee. Upon termination, Grantee shall remove the Improvements and restore the Premises as provided in **Section 9**.

Section 8 **Default and Termination.**

8.1 Grantor's Performance Rights. If at any time Grantee, or Grantee's Contractors, fails to properly perform its obligations under this Easement Agreement, Grantor, in its sole discretion, may: (i) seek specific performance of the unperformed obligations, or (ii) at Grantee's sole cost, may arrange for the performance of such work as Grantor deems necessary for the safety of its rail operations, activities and property, or to avoid or remove any interference with the activities or property of Grantor, or anyone or anything present on the rail corridor or property with the authority or permission of Grantor. Grantee shall promptly reimburse Grantor for all costs of work performed on Grantee's behalf upon receipt of an invoice for such costs. Grantor's failure to perform any obligations of Grantee or Grantee's Contractors shall not alter the liability allocation set forth in this Easement Agreement.

8.2 Abandonment. Grantor may, at its option, terminate this Easement Agreement by serving five (5) days' notice in writing upon Grantee if Grantee should abandon or cease to use the Premises for the Easement Purpose. Any waiver by Grantor of any default or defaults shall not constitute a waiver of the right to terminate this Easement Agreement for any subsequent default or defaults, nor shall any such waiver in any way affect Grantor's ability to enforce any section of this Easement Agreement.

8.3 Effect of Termination or Expiration. Neither termination nor expiration will release Grantee from any liability or obligation under this Easement, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration, or, if later, the date the Premises are restored as required by **Section 9**.

8.4 Non-exclusive Remedies. The remedies set forth in this **Section 8** shall be in addition to, and not in limitation of, any other remedies that Grantor may have under the C&M Agreement, at law or in equity.

Section 9 **Surrender of Premises.**

9.1 Removal of Improvements and Restoration. Upon termination of this Easement Agreement, whether by abandonment of the Easement or by the exercise of Grantor's termination rights hereunder, Grantee shall, at its sole cost and expense, immediately perform the following:

(a) remove all or such portion of Grantee's Improvements and all appurtenances thereto from the Premises, as Grantor directs at Grantor's sole discretion;

(b) repair and restore any damage to the Premises arising from, growing out of, or connected with Grantee's use of the Premises;

(c) remedy any unsafe conditions on the Premises created or aggravated by Grantee; and

(d) leave the Premises in the condition which existed as of the Effective Date.

9.2 Limited License for Entry. If this Easement Agreement is terminated, Grantor may direct Grantee to undertake one or more of the actions set forth above, at Grantee's sole cost, in which case Grantee shall have a limited license to enter upon the Premises to the extent necessary to undertake the actions directed by Grantor. The terms of this limited license include all of Grantee's obligations under this Easement Agreement. Termination will not release Grantee from any liability or obligation under this Easement Agreement, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination, or, if later, the date when Grantee's Improvements are removed and the Premises are restored to the condition that existed as of the Effective Date. If Grantee fails to surrender the Premises to Grantor upon any termination of the Easement, all liabilities and obligations of Grantee hereunder shall continue in effect until the Premises are surrendered.

Section 10 **Liens**. Grantee shall promptly pay and discharge any and all liens arising out of any construction, alterations or repairs done, suffered or permitted to be done by Grantee on the Premises or attributable to Taxes that are the responsibility of Grantee pursuant to **Section 6**. Grantor is hereby authorized to post any notices or take any other action upon or with respect to the Premises that is or may be permitted by Law to prevent the attachment of any such liens to any portion of the Premises; provided, however, that failure of Grantor to take any such action shall not relieve Grantee of any obligation or liability under this **Section 10** or any other section of this Easement Agreement.

Section 11 **Tax Exchange**. Grantor may assign its rights (but not its obligations) under this Easement Agreement to Goldfinch Exchange Company LLC, an exchange intermediary, in order for Grantor to effect an exchange under Section 1031 of the Internal Revenue Code. In such event, Grantor shall provide Grantee with a Notice of Assignment, attached as Exhibit C, and Grantee shall execute an acknowledgement of receipt of such notice.

Section 12 **Notices**. Any notice required or permitted to be given hereunder by one party to the other shall be delivered in the manner set forth in the C&M Agreement. Notices to Grantor under this Easement shall be delivered to the following address: BNSF Railway Company, Real Estate Department, 2500 Lou Menk Drive, Ft. Worth, TX 76131, Attn: Permits, or such other address as Grantor may from time to time direct by notice to Grantee.

Section 13 **Recordation**. It is understood and agreed that this Easement Agreement shall not be in recordable form and shall not be placed on public record and any such recording shall be a breach of this Easement Agreement. Grantor and Grantee shall execute a Memorandum of Easement in the form attached hereto as **Exhibit "B"** (the "**Memorandum of Easement**") subject to changes required, if any, to conform such form to local recording requirements. The Memorandum of Easement shall be recorded in the real estate records in the county where the Premises are located. If a Memorandum of Easement is not executed by the parties and recorded as described above within 10 days of the Effective Date, Grantor shall have the right to terminate this Easement Agreement upon notice to Grantee.

Section 14 **Miscellaneous**.

14.1 All questions concerning the interpretation or application of provisions of this Easement Agreement shall be decided according to the substantive Laws of the State of Colorado without regard to conflicts of law provisions.

14.2 In the event that Grantee consists of two or more parties, all the covenants and agreements of Grantee herein contained shall be the joint and several covenants and agreements of such parties. This instrument and all of the terms, covenants and provisions hereof shall inure to the benefit of and be binding upon each of the parties hereto and their respective legal representatives, successors and assigns and shall run with and be binding upon the Premises.

14.3 If any action at law or in equity is necessary to enforce or interpret the terms of this Easement Agreement, the prevailing party or parties shall be entitled to reasonable attorneys' fees, costs and necessary disbursements in addition to any other relief to which such party or parties may be entitled.

14.4 If any provision of this Easement Agreement is held to be illegal, invalid or unenforceable under present or future Laws, such provision will be fully severable and this Easement Agreement will be construed and enforced as if such illegal, invalid or unenforceable provision is not a part hereof, and the remaining provisions hereof will remain in full force and effect. In lieu of any illegal, invalid or unenforceable provision herein, there will be added automatically as a part of this Easement Agreement a provision as similar in its terms to such illegal, invalid or unenforceable provision as may be possible and be legal, valid and enforceable.

14.5 This Easement Agreement is the full and complete agreement between Grantor and Grantee with respect to all matters relating to Grantee's use of the Premises, and supersedes any and all other

14.6 Time is of the essence for the performance of this Easement Agreement.

ADMINISTRATIVE FEE

15. Grantee acknowledges that a material consideration for this agreement, without which it would not be made, is the agreement between Grantee and Grantor, that the Grantee shall pay upon return of this Agreement signed by Grantee to Grantor's Broker a processing fee in the amount of **$2,000.00** over and above the agreed upon Acquisition Price. Said fee shall be made payable to BNSF Railway Company by a separate check.

Witness the execution of this Easement Agreement as of the date first set forth above.

GRANTOR:

BNSF RAILWAY COMPANY, a Delaware corporation

By: _____
Name: KURT GERINGER
Title: General Director Real Estate

GRANTEE:

CITY OF BOULDER, COLORADO,
a Colorado home rule municipality

By: _____
Jane S. Brautigam, City Manager

Attest:
_____
City Clerk

Approved as to form:
_____
Office of the City Attorney 4-17-15

EXHIBIT "A"

Premises

EXHIBIT "A"

Staubach Tracking T#:
B&W Proj. No.: 012196.003
MAP REFERENCE:
Sta. - s63290
R/W - N/A

Scale: 1"= 100'+/-

31.75 +93 20" C.I.P. Pipe Siph.-84'

31.81 +29 20" C.I.P. - 20'

Br 31.89 4 Sp Tr Pile Tr. B.D.-51'

31.93 +55 18" C.I.P. Siph.- 66'

31.97 +54 12" Conc. I. Pipe - 28'

Beasley Ditch

MP 31.79
ES 1671+15

TE-2A

RE-2

TE-2

PROPERTY LINE

Pd5

Pd6

PROPERTY LINE

RE-2A

1669+18.1 P.T.

47TH ST

To: Denver

To: Wendover

C&S RY
CO-01
01

To: City of Boulder

At: Boulder
Boulder County
Colorado

Legend:
Permanent Easement
Temporary Easement

MEASUREMENTS BASED ON PROVIDED SURVEYS
(S) MEASUREMENTS TAKEN OFF SURVEY
(M) MEASUREMENT

Powder River Division
Front Range Subdiv. - L.S. 0476-7
Val. Sec. 43013
C&S RY CO-01, Map 01
Sec. 20, T1N, R70W 6PM
November 5, 2014 Rev. 04/20/2015
M.P. 31.79 JNC

DRAWING NO. 3-62396Ar2

This map used by BNSF RAILWAY COMPANY in the ordinary course of business, but it is subject to audit and should be used only with the expressed understanding the BNSF make no representations whatsoever about the quality, accuracy, errors or omissions relating to this map.

EXHIBIT "A"

Staubach Tracking Tl#:
B&W Proj. No.: 012196.003
MAP REFERENCE:
Sta. - s63290
R/W - N/A

Scale: 1"= 100'+/-

31.75 + 93 20" C.I. Pipe Siph. 84'

31.81 + 29 20" C.I.P. - 20'

Br. 31.89 4 Sp Tr. Pile Tr. B.D. - 51'

31.93 + 55 18" C.I.P. Siph. - 66'

31.97 + 54 12" Conc. Pipe - 28'

Beasley Ditch

MP 31.85
ES 1673+38

RE-2A

RE-2

PROPERTY LINE

PROPERTY LINE

Pd5

Pd6

47TH ST

To: Denver

To: Wendover

C&S RY
CO-01
01

This map used by BNSF RAILWAY COMPANY in the ordinary course of business, but it is subject to audit and should be used only with the expressed understanding the BNSF make no representations whatsoever about the quality, accuracy, errors or omissions relating to this map.

To: City of Boulder

At: Boulder
Boulder County
Colorado

Legend:
Permanent Easement

MEASUREMENTS BASED ON PROVIDED SURVEYS
(S) MEASUREMENTS TAKEN OFF SURVEY
(M) MEASUREMENT

Powder River Division
Front Range Subdiv. - L.S. 0476-7
Val. Sec. 43013
C&S RY CO-01, Map 01
Sec. 20, T1N, R70W 6PM
November 5, 2014 Rev. 04/20/2015
M.P. 31.85 JNC

DRAWING NO. 3-62396Br2

EXHIBIT "A"

PROJECT NUMBER: STM M110-081
RAILROAD EASEMENT NUMBER: RE-2
PROJECT CODE: 18405
DATE: JULY 25, 2013
DESCRIPTION

A Railroad Easement No. RE-2 of the City of Boulder, State of Colorado Project No. STM M110-81 (PC 18405) containing 12,989 sq. ft. (0.298 acres) of land, more or less, being a portion of that property as described in the Deed recorded in Book 121, Page 40 of the Boulder County Records, located in the S.E. 1/4 of Section 20, Township 1 N., Range 70 W., of the 6th Principal Meridian, in the City and County of Boulder, Colorado, said tract or parcel being more particularly described as follows:

COMMENCING at the C-E 1/16th corner of Section 20, being a found illegible 2.5" diameter aluminum cap in water box, whence the C 1/4 corner of Section 20, being a found 2.5" diameter aluminum cap in survey box stamped in part "City of Boulder Control" bears S. 89°38'05" W., a distance of 1329.40 feet; Thence S. 49°28'05" E., a distance of 1,335.53 feet to a point on the existing easterly right-of-way line of the B.N.S.F. Railway Company property (May, 2013), said point being 50 feet measured perpendicular southeasterly from the centerline of the main track and being the **TRUE POINT OF BEGINNING**;

1. Thence along said easterly right-of-way line, S. 24°59'51" W., a distance of 130.46 feet;

2. Thence N. 65°13'33" W., a distance of 100.00 feet to the existing westerly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular northwesterly from the centerline of the main track;

3. Thence along said westerly right-of-way line, N. 24°59'51" E., a distance of 129.33 feet;

4. Thence S. 65°52'27" E., a distance of 100.01 feet, more or less, to the **TRUE POINT OF BEGINNING.**

The above described Railroad Easement contains 12,989 sq. ft. (0.298 acres) of land, more or less.

The purpose of the above-described Railroad Easement is for the construction, permanent placement, access, use and maintenance of a multi-use path and drainage and channel improvements and utilities.

BASIS OF BEARINGS: All bearings are based on the line connecting the C 1/4 corner of section 20, T. 1 N., R. 70 W. of the 6th P.M. (being a found 2.5" diameter aluminum cap in survey box, stamped in part "City of Boulder Control") and the C-E 1/16 corner of section 20, T. 1 N., R. 69 W. of the 6th P.M. (being a found illegible 2.5" diameter aluminum cap in water box) being a **GRID** bearing of **N. 89°38'05" E. 1329.40'** as obtained from a global positioning system (GPS) survey based on the Colorado High Accuracy Reference Network (CHARN). Said grid bearing is NAD 83 (2007) Colorado State Plane North Zone 501.

Geoffrey F. Stephenson, PLS 23521
For and on behalf of The Lund Partnership, Inc.
12265 W. Bayaud Avenue, Suite 130
Lakewood, CO 80228

COLORADO REGISTERED PROFESSIONAL LAND SURVEYOR GEOFFREY F. STEPHENSON 23521 7-26-13

EXHIBIT "A"

PROJECT NUMBER: STM M110-081
RAILROAD EASEMENT NUMBER: RE-2A
PROJECT CODE: 18405
DATE: JULY 25, 2013
DESCRIPTION

A Railroad Easement No. RE-2A of the City of Boulder, State of Colorado Project No. STM M110-81 (PC 18405) containing 8,819 sq. ft. (0.202 acres) of land, more or less, being a portion of that property as described in the Deed recorded in Book 121, Page 40 of the Boulder County Records, located in the S.E. 1/4 of Section 20, Township 1 N., Range 70 W., of the 6th Principal Meridian, in the City and County of Boulder, Colorado, said tract or parcel being more particularly described as follows:

COMMENCING at the C-E 1/16th corner of Section 20, being a found illegible 2.5" diameter aluminum cap in water box, whence the C 1/4 corner of Section 20, being a found 2.5" diameter aluminum cap in survey box stamped in part "City of Boulder Control" bears S. 89°38'05" W., a distance of 1329.40 feet; Thence S. 49°31'35" E., a distance of 1,231.39 feet to a point on the existing westerly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular northwesterly from the centerline of the main track and being the **TRUE POINT OF BEGINNING**;

1. Thence along said westerly right-of-way line, N. 24°59'51" E., a distance of 93.52 feet;

2. Thence along a non-tangent curve to the right, having a central angle of 10°39'44", a radius of 240.00 feet, an arc length of 44.66 feet, the chord of which bears S. 79°08'59" E., a distance of 44.60 feet to the beginning of a compound curve to the right;

3. Thence along said curve to the right, having a central angle of 30°04'55", a radius of 110.00 feet, an arc length of 57.75 feet, the chord of which bears S. 58°46'40" E., a distance of 57.09 feet to a point on the existing easterly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular southeasterly from the centerline of the main track;

4. Thence along said easterly right-of-way line, S. 24°59'51" W., a distance of 90.16 feet;

5. Thence along a non-tangent curve to the left, having a central angle of 09°29'42", a radius of 215.00 feet, an arc length of 35.63 feet, the chord of which bears N. 45°34'49" W., a distance of 35.59 feet to the beginning of a compound curve to the left;

6. Thence along said curve to the left, having a central angle of 23°29'27", a radius of 25.00 feet, an arc length of 10.25 feet, the chord of which bears N. 62°04'23" W., a distance of 10.18 feet to the beginning of a compound curve to the left;

7. Thence along said curve to the left, having a central angle of 22°16'08", a radius of 155.00 feet, an arc length of 60.24 feet, the chord of which bears N. 84°57'11" W., a distance of 59.86 feet, more or less, to the **TRUE POINT OF BEGINNING**.

The above described Railroad Easement contains 8,819 sq. ft. (0.202 acres) of land, more or less.

The purpose of the above-described Railroad Easement is for construction, permanent placement, access, use and maintenance of the relocated segment of the Boulder and White Rock Ditch and utilities.

COLORADO REGISTERED PROFESSIONAL LAND SURVEYOR
JEFFREY F. STEPHENSON
7-26-13

BASIS OF BEARINGS: All bearings are based on the line connecting the C 1/4 corner of section 20, T. 1 N., R. 70 W. of the 6th P.M. (being a found 2.5" diameter aluminum cap in survey box, stamped in part "City of Boulder Control") and the C-E 1/16 corner of section 20, T. 1 N., R. 69 W. of the 6th P.M. (being a found illegible 2.5" diameter aluminum cap in water box) being a **GRID** bearing of **N. 89°38'05" E. 1329.40'** as obtained from a global positioning system (GPS) survey based on the Colorado High Accuracy Reference Network (CHARN). Said grid bearing is NAD 83 (2007) Colorado State Plane North Zone 501.

Geoffrey F. Stephenson, PLS 23521
For and on behalf of The Lund Partnership, Inc.
12265 W. Bayaud Avenue, Suite 130
Lakewood, CO 80228

COLORADO REGISTERED
GEOFFREY F. STEPHENSON
7-26-13
23521
PROFESSIONAL LAND SURVEYOR

EXHIBIT "B"

MEMORANDUM OF EASEMENT

MEMORANDUM OF EASEMENT

THIS MEMORANDUM OF EASEMENT is hereby executed this 30th day of June, 2015, by and between **BNSF RAILWAY COMPANY**, a Delaware corporation ("**Grantor**"), whose address for purposes of this instrument is 2500 Lou Menk Drive, Fort Worth, Texas 76131, and the **CITY OF BOULDER, COLORADO**, a Colorado home rule municipality ("**Grantee**"), whose address for purposes of this instrument is 1777 Broadway, Boulder, Colorado 80302, which terms "Grantor" and "Grantee" shall include, wherever the context permits or requires, singular or plural, and the legal representatives, successors and assigns of the respective parties:

WITNESSETH:

WHEREAS, Grantor owns or controls certain real property situated in Boulder County, Colorado as described on **Exhibit "A"** attached hereto and incorporated herein by reference (the "**Premises**');

WHEREAS, Grantor and Grantee entered into an Easement Agreement, dated June 30, 2015 (the "**Easement Agreement**") which set forth, among other things, the terms of an easement granted by Grantor to Grantee over and across the Premises (the "**Easement**"); and

WHEREAS, Grantor and Grantee desire to memorialize the terms and conditions of the Easement Agreement of record.

For valuable consideration the receipt and sufficiency of which are hereby acknowledged, Grantor does grant unto Grantee and Grantee does hereby accept from Grantor the Easement over, under and across the Premises.

The term of the Easement, unless sooner terminated under provisions of the Easement Agreement, shall be perpetual.

All the terms, conditions, provisions and covenants of the Easement Agreement are incorporated herein by this reference for all purposes as though written out at length herein, and both the Easement Agreement and this Memorandum of Easement shall be deemed to constitute a single instrument or document. This Memorandum of Easement is not intended to amend, modify, supplement, or supersede any of the provisions of the Easement Agreement and, to the extent there may be any conflict or inconsistency between the Easement Agreement or this Memorandum of Easement, the Easement Agreement shall control.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, Grantor and Grantee have executed this Memorandum of Easement to as of the date and year first above written.

GRANTOR:

BNSF RAILWAY COMPANY, a Delaware corporation

By: _____
Name: KURT GERINGER
Title: General Director Real Estate

STATE OF TEXAS §
§
COUNTY OF TARRANT §

This instrument was acknowledged before me on the 30th day of June, 2015, by Kurt Geringer (name) as General Director Real Estate (title) of **BNSF RAILWAY COMPANY**, a Delaware corporation.

RHONDA L BURTON
My Commission Expires
September 21, 2016

_____
Notary Public

My appointment expires: 9/21/2016

(Seal)

GRANTEE:

CITY OF BOULDER, COLORADO,
a Colorado home rule municipality

By: _____
Jane S. Brautigam, City Manager

Attest:

_____
City Clerk

Approved as to form:

_____
Office of the City Attorney 4-17-15

EXHIBIT "A"

Scale: 1"= 100'+/-

Staubach Tracking TI#:
B&W Proj. No.: 012196.003
MAP REFERENCE:
Sta. - s63290
R/W - N/A

31.75 +33 20" C.I. Pipe Siph. 84'

31.81 +29 20" C.I.P. - 20'

Br. 31.89 +5p Tr. Pile Tr. B.D. - 51'

31.93 +55 18" C.I.P. Siph. - 46'

31.97 +54 12" Conc. I. Pipe - 20'

Beasley Ditch

MP 31.79
ES 1671+15

TE-2A

RE-2

TE-2

PROPERTY LINE

Pd5

Pd6

PROPERTY LINE

RE-2A

47TH ST

To: Denver

To: Wendover

C&S RY
CO-01
01

MEASUREMENTS BASED ON PROVIDED SURVEYS
(S) MEASUREMENTS TAKEN OFF SURVEY
(M) MEASUREMENT

This map used by BNSF RAILWAY COMPANY in the ordinary course of business, but it is subject to audit and should be used only with the expressed understanding the BNSF make no representations whatsoever about the quality, accuracy, errors or omissions relating to this map.

To: City of Boulder

At: Boulder
Boulder County
Colorado

Legend:
Permanent Easement
Temporary Easement

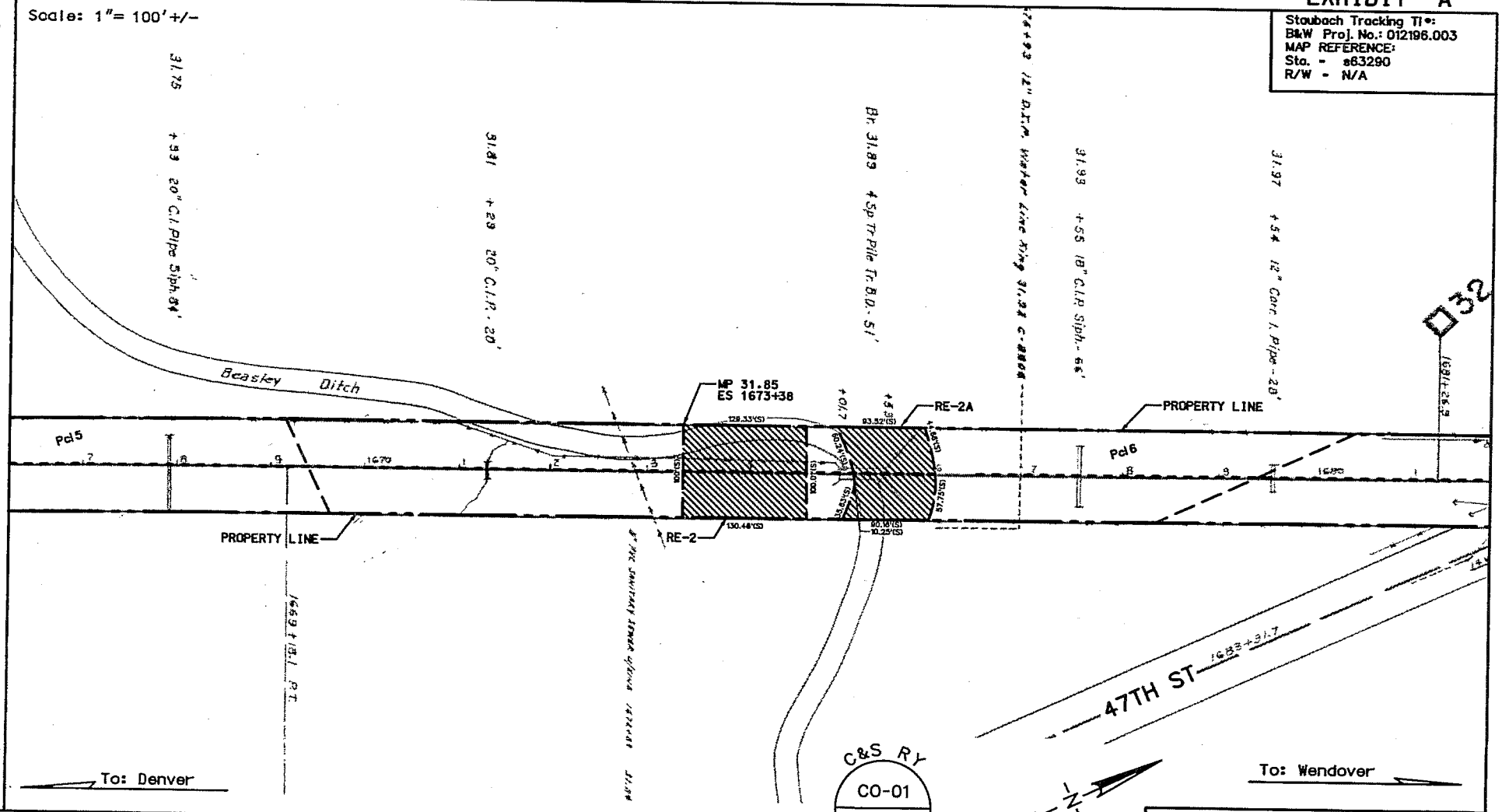
Powder River Division
Front Range Subdiv. - L.S. 0476-7
Val. Sec. 43013
C&S RY CO-01, Map 01
Sec. 20, T1N, R70W 6PM
November 5, 2014 Rev. 04/20/2015
M.P. 31.79 JNC

DRAWING NO. 3-62396Ar2

EXHIBIT "A"

Scale: 1"= 100'+/-

Staubach Tracking Tl#:
B&W Proj. No.: 012196.003
MAP REFERENCE:
Sta. - s63290
R/W - N/A



This map used by BNSF RAILWAY COMPANY in the ordinary course of business, but it is subject to audit and should be used only with the expressed understanding the BNSF make no representations whatsoever about the quality, accuracy, errors or omissions relating to this map.

To: City of Boulder

At: Boulder
Boulder County
Colorado

Legend:
Permanent Easement

MEASUREMENTS BASED ON PROVIDED SURVEYS
(S) MEASUREMENTS TAKEN OFF SURVEY
(M) MEASUREMENT

Powder River Division
Front Range Subdiv. - L.S. 0476-7
Val. Sec. 43013
C&S RY CO-01, Map 01
Sec. 20, T1N, R70W 6PM
November 5, 2014 Rev. 04/20/2015
M.P. 31.85 JNC

DRAWING NO. 3-62396Br2

EXHIBIT "A"

PROJECT NUMBER: STM M110-081
RAILROAD EASEMENT NUMBER: RE-2
PROJECT CODE: 18405
DATE: JULY 25, 2013
DESCRIPTION

A Railroad Easement No. RE-2 of the City of Boulder, State of Colorado Project No. STM M110-81 (PC 18405) containing 12,989 sq. ft. (0.298 acres) of land, more or less, being a portion of that property as described in the Deed recorded in Book 121, Page 40 of the Boulder County Records, located in the S.E. 1/4 of Section 20, Township 1 N., Range 70 W., of the 6th Principal Meridian, in the City and County of Boulder, Colorado, said tract or parcel being more particularly described as follows:

COMMENCING at the C-E 1/16th corner of Section 20, being a found illegible 2.5" diameter aluminum cap in water box, whence the C 1/4 corner of Section 20, being a found 2.5" diameter aluminum cap in survey box stamped in part "City of Boulder Control" bears S. 89°38'05" W., a distance of 1329.40 feet; Thence S. 49°28'05" E., a distance of 1,335.53 feet to a point on the existing easterly right-of-way line of the B.N.S.F. Railway Company property (May, 2013), said point being 50 feet measured perpendicular southeasterly from the centerline of the main track and being the **TRUE POINT OF BEGINNING**;

1. Thence along said easterly right-of-way line, S. 24°59'51" W., a distance of 130.46 feet;

2. Thence N. 65°13'33" W., a distance of 100.00 feet to the existing westerly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular northwesterly from the centerline of the main track;

3. Thence along said westerly right-of-way line, N. 24°59'51" E., a distance of 129.33 feet;

4. Thence S. 65°52'27" E., a distance of 100.01 feet, more or less, to the **TRUE POINT OF BEGINNING**.

The above described Railroad Easement contains 12,989 sq. ft. (0.298 acres) of land, more or less.

The purpose of the above-described Railroad Easement is for the construction, permanent placement, access, use and maintenance of a multi-use path and drainage and channel improvements and utilities.

BASIS OF BEARINGS: All bearings are based on the line connecting the C 1/4 corner of section 20, T. 1 N., R. 70 W. of the 6th P.M. (being a found 2.5" diameter aluminum cap in survey box, stamped in part "City of Boulder Control") and the C-E 1/16 corner of section 20, T. 1 N., R. 69 W. of the 6th P.M. (being a found illegible 2.5" diameter aluminum cap in water box) being a **GRID** bearing of **N. 89°38'05" E. 1329.40'** as obtained from a global positioning system (GPS) survey based on the Colorado High Accuracy Reference Network (CHARN). Said grid bearing is NAD 83 (2007) Colorado State Plane North Zone 501.

Geoffrey F. Stephenson, PLS 23521
For and on behalf of The Lund Partnership, Inc.
12265 W. Bayaud Avenue, Suite 130
Lakewood, CO 80228

COLORADO REGISTERED PROFESSIONAL LAND SURVEYOR GEOFFREY F. STEPHENSON 23521
7-26-13

EXHIBIT "A"

PROJECT NUMBER: STM M110-081
RAILROAD EASEMENT NUMBER: RE-2A
PROJECT CODE: 18405
DATE: JULY 25, 2013
DESCRIPTION

A Railroad Easement No. RE-2A of the City of Boulder, State of Colorado Project No. STM M110-81 (PC 18405) containing 8,819 sq. ft. (0.202 acres) of land, more or less, being a portion of that property as described in the Deed recorded in Book 121, Page 40 of the Boulder County Records, located in the S.E. 1/4 of Section 20, Township 1 N., Range 70 W., of the 6th Principal Meridian, in the City and County of Boulder, Colorado, said tract or parcel being more particularly described as follows:

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1. Thence along said westerly right-of-way line, N. 24°59'51" E., a distance of 93.52 feet;

2. Thence along a non-tangent curve to the right, having a central angle of 10°39'44", a radius of 240.00 feet, an arc length of 44.66 feet, the chord of which bears S. 79°08'59" E., a distance of 44.60 feet to the beginning of a compound curve to the right;

3. Thence along said curve to the right, having a central angle of 30°04'55", a radius of 110.00 feet, an arc length of 57.75 feet, the chord of which bears S. 58°46'40" E., a distance of 57.09 feet to a point on the existing easterly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular southeasterly from the centerline of the main track;

4. Thence along said easterly right-of-way line, S. 24°59'51" W., a distance of 90.16 feet;

5. Thence along a non-tangent curve to the left, having a central angle of 09°29'42", a radius of 215.00 feet, an arc length of 35.63 feet, the chord of which bears N. 45°34'49" W., a distance of 35.59 feet to the beginning of a compound curve to the left;

6. Thence along said curve to the left, having a central angle of 23°29'27", a radius of 25.00 feet, an arc length of 10.25 feet, the chord of which bears N. 62°04'23" W., a distance of 10.18 feet to the beginning of a compound curve to the left;

7. Thence along said curve to the left, having a central angle of 22°16'08", a radius of 155.00 feet, an arc length of 60.24 feet, the chord of which bears N. 84°57'11" W., a distance of 59.86 feet, more or less, to the **TRUE POINT OF BEGINNING**.

The above described Railroad Easement contains 8,819 sq. ft. (0.202 acres) of land, more or less.

The purpose of the above-described Railroad Easement is for construction, permanent placement, access, use and maintenance of the relocated segment of the Boulder and White Rock Ditch and utilities.

COLORADO REGISTERED PROFESSIONAL LAND SURVEYOR
RICHARD F. STEPHENSON
7-26-13

BASIS OF BEARINGS: All bearings are based on the line connecting the C 1/4 corner of section 20, T. 1 N., R. 70 W. of the 6th P.M. (being a found 2.5" diameter aluminum cap in survey box, stamped in part "City of Boulder Control") and the C-E 1/16 corner of section 20, T. 1 N., R. 69 W. of the 6th P.M. (being a found illegible 2.5" diameter aluminum cap in water box) being a **GRID** bearing of **N. 89°38'05" E. 1329.40'** as obtained from a global positioning system (GPS) survey based on the Colorado High Accuracy Reference Network (CHARN). Said grid bearing is NAD 83 (2007) Colorado State Plane North Zone 501.

Geoffrey F. Stephenson, PLS 23521
For and on behalf of The Lund Partnership, Inc.
12265 W. Bayaud Avenue, Suite 130
Lakewood, CO 80228

COLORADO REGISTERED
GEOFFREY F. STEPHENSON
7-26-13
23521
PROFESSIONAL LAND SURVEYOR

EXHIBIT "C"

NOTICE OF ASSIGNMENT

Goldfinch Exchange Company LLC
A Delaware limited liability company
40 Lake Bellevue Drive, Suite 275
Bellevue, WA 98005
425-646-4020
425-637-2873 fax

NOTICE OF ASSIGNMENT

TO: CITY OF BOULDER, COLORADO
and any assignees or exchange intermediaries of Buyer

You and BNSF Railway Company ("BNSF") have entered into the Easement Agreement, dated 12-30-2015 for the sale of an easement in the real property described therein. You are hereby notified that BNSF has assigned its rights as Seller, but not its obligations, to Goldfinch Exchange Company LLC for the purpose of effecting a tax deferred exchange under Internal Revenue Code Section 1031. This is an assignment of rights only and BNSF will transfer the easement directly to you.

ACKNOWLEDGED:

CITY OF BOULDER, COLORADO

By: Jane S Brautigam
Jane S. Brautigam, City Manager

Attest:

Alisa D Lewis
City Clerk

Approved as to form:

Office of the City Attorney 4-17-15

EXHIBIT D-1
EASEMENT AGREEMENT FOR CONSTRUCTION OF RECREATIONAL TRAIL PEDESTRIAN/BIKE TRAIL AND BWRD RELOCATION

TEMPORARY EASEMENT AGREEMENT
FOR CONSTRUCTION OF RECREATIONAL TRAIL/PEDESTRIAN BIKE PATH AND DRAINAGEWAY
(C&M Agreement)

THIS TEMPORARY EASEMENT AGREEMENT FOR CONSTRUCTION OF RECREATIONAL TRAIL/PEDESTRIAN BIKE PATH AND DRAINAGEWAY ("**Easement Agreement**") is made and entered into as of the 30th day of June 2015 ("**Effective Date**"), by and between **BNSF RAILWAY COMPANY**, a Delaware corporation ("**Grantor**"), and the **CITY OF BOULDER, COLORADO**, a Colorado home rule municipality ("**Grantee**").

A. Grantor owns or controls certain real property situated at or near the vicinity of Boulder, County of Boulder, State of Colorado, at Mile Post 31.79, as described or depicted on **Exhibit "A"** attached hereto and made a part hereof (the "**Premises**").

B. Grantor and Grantee have entered into that certain Construction and Maintenance Agreement dated as of June 23, 2015 concerning improvements on or near the Premises (the "**C&M Agreement**").

C. Grantee has requested that Grantor grant to Grantee an easement over the Premises for the Easement Purpose (as defined below).

D. Grantor has agreed to grant Grantee such easement, subject to the terms and conditions set forth in this Easement and in the C&M Agreement incorporated herein as if fully set forth in this instrument which terms shall be in full force and effect for purposes of this Easement even if the C&M Agreement is, for whatever reason, no longer in effect.

NOW, THEREFORE, for and in consideration of the foregoing recitals which are incorporated herein, the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

Section 1 Granting of Easement.

1.1 Easement Purpose. The "**Easement Purpose**" shall be for the purposes set forth in the C&M Agreement. Any improvements to be constructed in connection with the Easement Purpose are referred to herein as "**Improvements**" and shall be constructed, located, configured and maintained by Grantee in strict accordance with the terms of this Easement Agreement and the C&M Agreement.

1.2 Grant. Grantor does hereby grant unto Grantee a non-exclusive easement ("**Easement**") over and under the Premises for the Easement Purpose and for no other purpose. The Easement is granted subject to any and all restrictions, covenants, easements, licenses, permits, leases and other encumbrances of whatsoever nature whether or not of record, if any, relating to the Premises and subject to all with all applicable federal, state and local laws, regulations, ordinances, restrictions, covenants and court or administrative decisions and orders, including Environmental Laws (defined below) and zoning laws (collectively, "**Laws**"). Grantor may not make any alterations or improvements or perform any maintenance or repair activities within the Premises except in accordance with the terms and conditions of the C&M Agreement.

1.3 Reservations by Grantor. Grantor excepts and reserves the right, to be exercised by Grantor and any other parties who may obtain written permission or authority from Grantor:

(a) to install, construct, maintain, renew, repair, replace, use, operate, change, modify and relocate any existing pipe, power, communication, cable, or utility lines and appurtenances and other facilities or structures of like character (collectively, "**Lines**") upon, over, under or across the Premises;

(b) to install, construct, maintain, renew, repair, replace, use, operate, change, modify and relocate any tracks or additional facilities or structures upon, over, under or across the Premises; and

(c) to use the Premises in any manner as the Grantor in its sole discretion deems appropriate, provided Grantor uses all commercially reasonable efforts to avoid material interference with the use of the Premises by Grantee for the Easement Purpose.

Section 2 **Term of Easement**. This Easement shall commence no sooner than ten days after the Grantor receives a Notice of the Grantee's intention to occupy the Easement and, unless sooner terminated under provisions of this Easement Agreement, shall expire **one year** from the date of the aforementioned Notice or from the completion of construction, whichever occurs first.

Section 3 **No Warranty of Any Conditions of the Premises.** Grantee acknowledges that Grantor has made no representation whatsoever to Grantee concerning the state or condition of the Premises, or any personal property located thereon, or the nature or extent of Grantor's ownership interest in the Premises. Grantee has not relied on any statement or declaration of Grantor, oral or in writing, as an inducement to entering into this Easement Agreement, other than as set forth herein. GRANTOR HEREBY DISCLAIMS ANY REPRESENTATION OR WARRANTY, WHETHER EXPRESS OR IMPLIED, AS TO THE DESIGN OR CONDITION OF ANY PROPERTY PRESENT ON OR CONSTITUTING THE PREMISES, ITS MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, THE QUALITY OF THE MATERIAL OR WORKMANSHIP OF ANY SUCH PROPERTY, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES. GRANTOR SHALL NOT BE RESPONSIBLE TO GRANTEE OR ANY OF GRANTEE'S CONTRACTORS FOR ANY DAMAGES RELATING TO THE DESIGN, CONDITION, QUALITY, SAFETY, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY PROPERTY PRESENT ON OR CONSTITUTING THE PREMISES, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES. GRANTEE ACCEPTS ALL RIGHTS GRANTED UNDER THIS EASEMENT AGREEMENT IN THE PREMISES IN AN "AS IS, WHERE IS" AND "WITH ALL FAULTS" CONDITION, AND SUBJECT TO ALL LIMITATIONS ON GRANTOR'S RIGHTS, INTERESTS AND TITLE TO THE PREMISES. Grantee has inspected or will inspect the Premises, and enters upon Grantor's rail corridor and property with knowledge of its physical condition and the danger inherent in Grantor's rail operations on or near the Premises. Grantee acknowledges that this Easement Agreement does not contain any implied warranties that Grantee or Grantee's Contractors (as hereinafter defined) can successfully construct or operate the Improvements.

Section 4 **Nature of Grantor's Interest in the Premises.** GRANTOR DOES NOT WARRANT ITS TITLE TO THE PREMISES NOR UNDERTAKE TO DEFEND GRANTEE IN THE PEACEABLE POSSESSION OR USE THEREOF. NO COVENANT OF QUIET ENJOYMENT IS MADE. In case of the eviction of Grantee by anyone owning or claiming title to or any interest in the Premises, or by the abandonment by Grantor of the affected rail corridor, Grantor shall not be liable to refund Grantee any compensation paid hereunder.

Section 5 **Improvements.** Grantee shall take, in a timely manner, all actions necessary and proper to the lawful establishment, construction, operation, and maintenance of the Improvements, including such actions as may be necessary to obtain any required permits, approvals or authorizations from applicable governmental authorities. Any and all cuts and fills, excavations or embankments necessary in the construction, maintenance, or future alteration of the Improvements shall be made and maintained in such manner, form and extent as will provide adequate drainage of and from the adjoining lands and premises of the Grantor; and wherever any such fill or embankment shall or may obstruct the natural and pre-existing drainage from such lands and premises of the Grantor, the Grantee shall construct and maintain such culverts or drains as may be requisite to preserve such natural and pre-existing drainage, and shall also wherever necessary, construct extensions of existing drains, culverts or ditches through or along the premises of the Grantor, such extensions to be of adequate sectional dimensions to preserve the present flowage of drainage or other waters, and of materials and workmanship equally as good as those now existing. In the event any construction, repair, maintenance, work or other use of the Premises by Grantee will affect any Lines, fences, buildings, improvements or other facilities (collectively, "**Other Improvements**"), Grantee will be responsible at Grantee's sole risk to locate and make any adjustments necessary to such Other Improvements. Grantee must contact the owner(s) of the Other Improvements notifying them of any work that may damage these Other Improvements and/or interfere with their service and obtain the owner's written approval prior to so affecting the Other Improvements. Grantee must mark all Other Improvements on the Plans and Specifications and mark such Other Improvements in the field in order to verify their locations. Grantee must also use all reasonable methods when working on or near Grantor property to determine if any Other Improvements (fiber optic, cable, communication or otherwise) may

exist. The Grantee agrees to keep the above-described premises free and clear from combustible materials and to cut and remove or cause to be cut and removed at its sole expense all weeds and vegetation on said premises, said work of cutting and removal to be done at such times and with such frequency as to comply with Grantee and local laws and regulations and abate any and all hazard of fire.

Section 6 **Taxes and Recording Fees**. Grantee shall pay when due any taxes, assessments or other charges (collectively, "**Taxes**") levied or assessed upon the Improvements by any governmental or quasi-governmental body or any Taxes levied or assessed against Grantor or the Premises that are attributable to the Improvements. Grantee agrees to purchase, affix and cancel any and all documentary stamps in the amount prescribed by statute, and to pay any and all required transfer taxes, excise taxes and any and all fees incidental to recordation of the Memorandum of Easement. In the event of Grantee's failure to do so, if Grantor shall become obligated to do so, Grantee shall be liable for all costs, expenses and judgments to or against Grantor, including all of Grantor's legal fees and expenses.

Section 7 **Environmental.**

7.1 Compliance with Environmental Laws. Grantee shall strictly comply with all federal, state and local environmental Laws in its use of the Premises, including, but not limited to, the Resource Conservation and Recovery Act, as amended (RCRA), the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Toxic Substances Control Act (collectively referred to as the "**Environmental Laws**"). Grantee shall not maintain a "treatment," "storage," "transfer" or "disposal" facility, or "underground storage tank," as those terms are defined by Environmental Laws, on the Premises. Grantee shall not handle, transport, release or suffer the release of "hazardous waste" or "hazardous substances", as "hazardous waste" and "hazardous substances" may now or in the future be defined by any Environmental Laws.

7.2 Notice of Release. Grantee shall give Grantor immediate notice to Grantor's Resource Operations Center at (800) 832-5452 of any release of hazardous substances on or from the Premises, violation of Environmental Laws, or inspection or inquiry by governmental authorities charged with enforcing Environmental Laws with respect to Grantee's use of the Premises. Grantee shall use its best efforts to promptly respond to any release on or from the Premises. Grantee also shall give Grantor immediate notice of all measures undertaken on behalf of Grantee to investigate, remediate, respond to or otherwise cure such release or violation.

7.3 Remediation of Release. In the event that Grantor has notice from Grantee or otherwise of a release or violation of Environmental Laws which occurred or may occur during the term of this Easement Agreement and which is related to the use of the Premises by Grantee or its agents, Grantor may require Grantee, at Grantee's sole risk and expense, to take timely measures to investigate, remediate, respond to or otherwise cure such release or violation affecting the Premises. If during the construction or subsequent maintenance of the Improvements, soils or other materials considered to be environmentally contaminated are exposed, Grantee will remove and safely dispose of said contaminated soils. Determination of soils contamination and applicable disposal procedures thereof, will be made only by an agency having the capacity and authority to make such a determination.

7.4 Preventative Measures. Grantee shall promptly report to Grantor in writing any conditions or activities upon the Premises known to Grantee which create a risk of harm to persons, property or the environment and shall take whatever action is necessary to prevent injury to persons or property arising out of such conditions or activities that are related to the use of the Premises by Grantee or its agents; provided, however, that Grantee's reporting to Grantor shall not relieve Grantee of any obligation whatsoever imposed on it by this Easement Agreement. Grantee shall promptly respond to Grantor's request for information regarding said conditions or activities.

7.5 Evidence of Compliance. Grantee agrees periodically to furnish Grantor with proof satisfactory to Grantor that Grantee is in compliance with this **Section 7**. Should Grantee not comply fully with the above-stated obligations of this **Section 7**, notwithstanding anything contained in any other provision hereof, Grantor may, at its option, terminate this Easement Agreement by serving five (5) days' notice of termination upon

Grantee. Upon termination, Grantee shall remove the Improvements and restore the Premises as provided in **Section 9.**

Section 8 **Default and Termination.**

8.1 Grantor's Performance Rights. If at any time Grantee, or Grantee's Contractors, fails to properly perform its obligations under this Easement Agreement, Grantor, in its sole discretion, may: (i) seek specific performance of the unperformed obligations, or (ii) at Grantee's sole cost, may arrange for the performance of such work as Grantor deems necessary for the safety of its rail operations, activities and property, or to avoid or remove any interference with the activities or property of Grantor, or anyone or anything present on the rail corridor or property with the authority or permission of Grantor. Grantee shall promptly reimburse Grantor for all costs of work performed on Grantee's behalf upon receipt of an invoice for such costs. Grantor's failure to perform any obligations of Grantee or Grantee's Contractors shall not alter the liability allocation set forth in this Easement Agreement.

8.2 Abandonment. Grantor may, at its option, terminate this Easement Agreement by serving five (5) days' notice in writing upon Grantee if Grantee should abandon or cease to use the Premises for the Easement Purpose. Any waiver by Grantor of any default or defaults shall not constitute a waiver of the right to terminate this Easement Agreement for any subsequent default or defaults, nor shall any such waiver in any way affect Grantor's ability to enforce any section of this Easement Agreement.

8.3 Effect of Termination or Expiration. Neither termination nor expiration will release Grantee from any liability or obligation under this Easement, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration, or, if later, the date the Premises are restored as required by **Section 9.**

8.4 Non-exclusive Remedies. The remedies set forth in this **Section 8** shall be in addition to, and not in limitation of, any other remedies that Grantor may have under the C&M Agreement, at law or in equity.

Section 9 **Surrender of Premises.**

9.1 Removal of Improvements and Restoration. Upon termination of this Easement Agreement, whether by abandonment of the Easement or by the exercise of Grantor's termination rights hereunder, Grantee shall, at its sole cost and expense, immediately perform the following:

(a) remove all or such portion of Grantee's Improvements and all appurtenances thereto from the Premises, as Grantor directs at Grantor's sole discretion;

(b) repair and restore any damage to the Premises arising from, growing out of, or connected with Grantee's use of the Premises;

(c) remedy any unsafe conditions on the Premises created or aggravated by Grantee; and

(d) leave the Premises in the condition which existed as of the Effective Date.

9.2 Limited License for Entry. If this Easement Agreement is terminated, Grantor may direct Grantee to undertake one or more of the actions set forth above, at Grantee's sole cost, in which case Grantee shall have a limited license to enter upon the Premises to the extent necessary to undertake the actions directed by Grantor. The terms of this limited license include all of Grantee's obligations under this Easement Agreement. Termination will not release Grantee from any liability or obligation under this Easement Agreement, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination, or, if later, the date when Grantee's Improvements are removed and the Premises are restored to the condition that existed as of the Effective Date. If Grantee fails to surrender the Premises to Grantor upon any termination of the Easement, all liabilities and obligations of Grantee hereunder shall continue in effect until

the Premises are surrendered.

Section 10 **Liens**. Grantee shall promptly pay and discharge any and all liens arising out of any construction, alterations or repairs done, suffered or permitted to be done by Grantee on the Premises or attributable to Taxes that are the responsibility of Grantee pursuant to **Section 6**. Grantor is hereby authorized to post any notices or take any other action upon or with respect to the Premises that is or may be permitted by Law to prevent the attachment of any such liens to any portion of the Premises; provided, however, that failure of Grantor to take any such action shall not relieve Grantee of any obligation or liability under this **Section 10** or any other section of this Easement Agreement.

Section 11 **Tax Exchange**. Deleted.

Section 12 **Notices**. Any notice required or permitted to be given hereunder by one party to the other shall be delivered in the manner set forth in the C&M Agreement. Notices to Grantor under this Easement shall be delivered to the following address: BNSF Railway Company, Real Estate Department, 2500 Lou Menk Drive, Ft. Worth, TX 76131, Attn: Permits, or such other address as Grantor may from time to time direct by notice to Grantee.

Section 13 **Recordation**. It is understood and agreed that this Easement Agreement shall not be in recordable form and shall not be placed on public record and any such recording shall be a breach of this Easement Agreement.

Section 14 **Miscellaneous**.

14.1 All questions concerning the interpretation or application of provisions of this Easement Agreement shall be decided according to the substantive Laws of the State of Colorado without regard to conflicts of law provisions.

14.2 In the event that Grantee consists of two or more parties, all the covenants and agreements of Grantee herein contained shall be the joint and several covenants and agreements of such parties. This instrument and all of the terms, covenants and provisions hereof shall inure to the benefit of and be binding upon each of the parties hereto and their respective legal representatives, successors and assigns and shall run with and be binding upon the Premises.

14.3 If any action at law or in equity is necessary to enforce or interpret the terms of this Easement Agreement, the prevailing party or parties shall be entitled to reasonable attorneys' fees, costs and necessary disbursements in addition to any other relief to which such party or parties may be entitled.

14.4 If any provision of this Easement Agreement is held to be illegal, invalid or unenforceable under present or future Laws, such provision will be fully severable and this Easement Agreement will be construed and enforced as if such illegal, invalid or unenforceable provision is not a part hereof, and the remaining provisions hereof will remain in full force and effect. In lieu of any illegal, invalid or unenforceable provision herein, there will be added automatically as a part of this Easement Agreement a provision as similar in its terms to such illegal, invalid or unenforceable provision as may be possible and be legal, valid and enforceable.

14.5 This Easement Agreement is the full and complete agreement between Grantor and Grantee with respect to all matters relating to Grantee's use of the Premises, and supersedes any and all other agreements between the parties hereto relating to Grantee's use of the Premises as described herein. However, nothing herein is intended to terminate any surviving obligation of Grantee or Grantee's obligation to defend and hold Grantor harmless in any prior written agreement between the parties.

14.6 Time is of the essence for the performance of this Easement Agreement.

Witness the execution of this Easement Agreement as of the date first set forth above.

GRANTOR:

BNSF RAILWAY COMPANY, a Delaware corporation

By: _____
Name: KURT GERINGER
Title: General Director Real Estate

GRANTEE:

CITY OF BOULDER, COLORADO,
a Colorado home rule municipality

By: _____
Jane S. Brautigam, City Manager

Attest:

_____
City Clerk

Approved as to form:

_____
Office of the City Attorney 4-17-15

EXHIBIT "A"

Scale: 1"= 100'+/-

Staubach Tracking TI#:
B&W Proj. No.: 012196.003
MAP REFERENCE:
Sta. - s63290
R/W - N/A

31.75 +93 20" C.I. Pipe Siph. 84'

31.81 +29 20" C.I.P. - 28'

Br. 31.89 4 Sp Tr Pile Tr. B.D. - 51'

31.93 +55 18" C.I.P. Siph. - 66'

31.97 +54 12" Conc. I. Pipe - 28'

32

Beasley Ditch

MP 31.79
ES 1671+15

TE-2A

RE-2

TE-2

PROPERTY LINE

Pd5

Pd6

PROPERTY LINE

RE-2A

47TH ST

To: Denver

To: Wendover

C&S RY
CO-01
01

N

To: City of Boulder

At: Boulder
Boulder County
Colorado

Legend:
Permanent Easement
Temporary Easement

MEASUREMENTS BASED ON PROVIDED SURVEYS
(S) MEASUREMENTS TAKEN OFF SURVEY
(M) MEASUREMENT

Powder River Division
Front Range Subdiv. - L.S. 0476-7
Val. Sec. 43013
C&S RY CO-01, Map 01
Sec. 20, T1N, R70W 6PM
November 5, 2014 Rev. 04/20/2015
M.P. 31.79 JNC

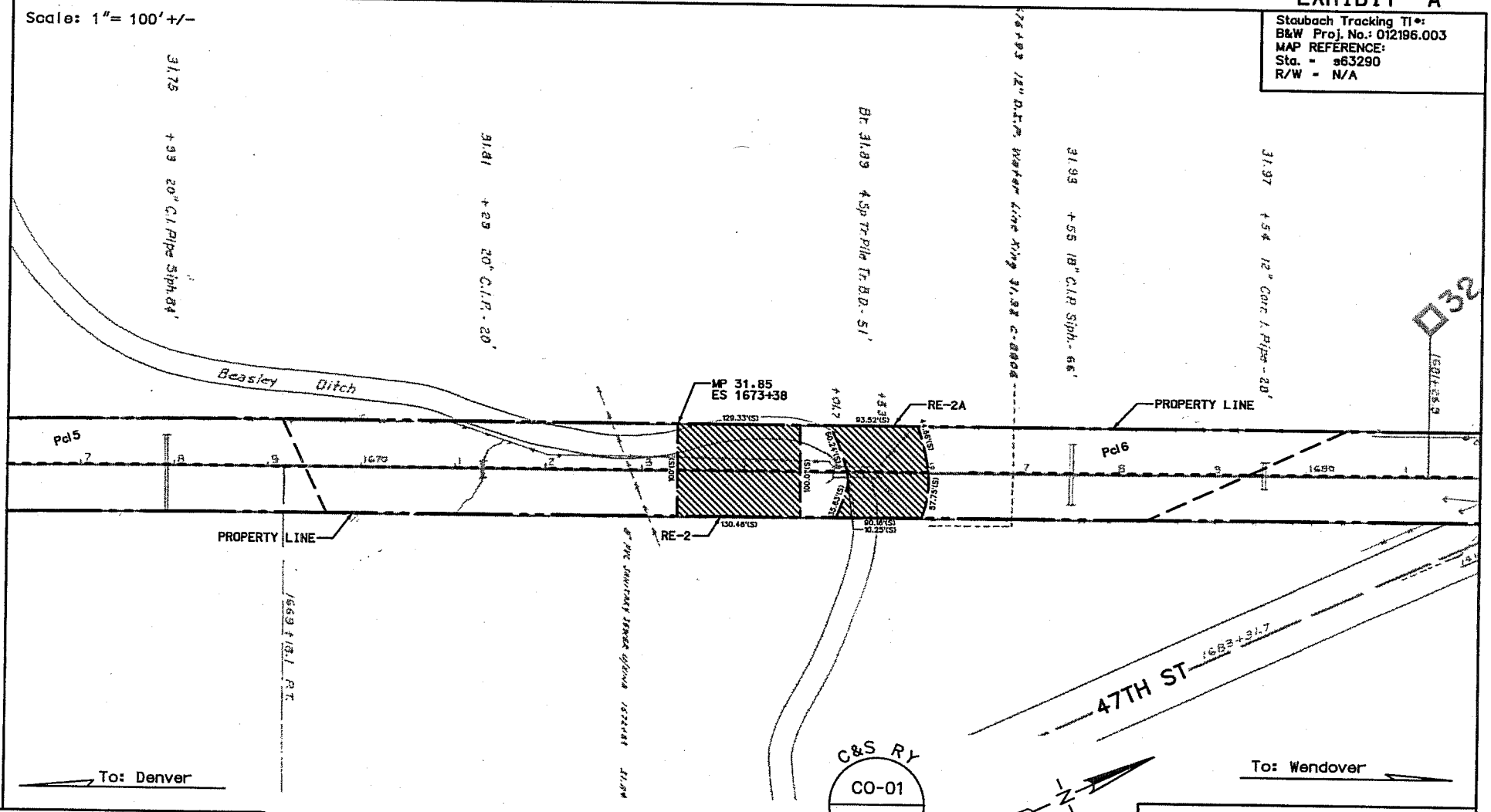
DRAWING NO. 3-62396Ar2

This map used by BNSF RAILWAY COMPANY in the ordinary course of business, but it is subject to audit and should be used only with the expressed understanding the BNSF make no representations whatsoever about the quality, accuracy, errors or omissions relating to this map.

EXHIBIT "A"

Staubach Tracking TI#:
B&W Proj. No.: 012196.003
MAP REFERENCE:
Sta. - s63290
R/W - N/A

Scale: 1"= 100'+/-



This map used by BNSF RAILWAY COMPANY in the ordinary course of business, but it is subject to audit and should be used only with the expressed understanding the BNSF make no representations whatsoever about the quality, accuracy, errors or omissions relating to this map.

To: City of Boulder

At: Boulder
Boulder County
Colorado

Legend:
▨ Permanent Easement

MEASUREMENTS BASED ON PROVIDED SURVEYS
(S) MEASUREMENTS TAKEN OFF SURVEY
(M) MEASUREMENT

Powder River Division
Front Range Subdiv. - L.S. 0476-7
Val. Sec. 43013
C&S RY CO-01, Map 01
Sec. 20, T1N, R70W 6PM
November 5, 2014 Rev. 04/20/2015
M.P. 31.85 JNC

DRAWING NO. 3-62396Br2

EXHIBIT "A"

PROJECT NUMBER: STM M110-081
TEMPORARY EASEMENT NUMBER: TE-2
PROJECT CODE: 18405
DATE: JULY 25, 2013
DESCRIPTION

A Temporary Easement No. TE-2 of the City of Boulder, State of Colorado Project No. STM M110-81 (PC 18405) containing 15,352 sq. ft. (0.352 acres) of land, more or less, being a portion of that property as described in the Deed recorded in Book 121, Page 40 of the Boulder County Records, located in the S.E. 1/4 of Section 20, Township 1 N., Range 70 W., of the 6th Principal Meridian, in the City and County of Boulder, Colorado, said tract or parcel being more particularly described as follows:

COMMENCING at the C-E 1/16th corner of Section 20, being a found illegible 2.5" diameter aluminum cap in water box, whence the C 1/4 corner of Section 20, being a found 2.5" diameter aluminum cap in survey box stamped in part "City of Boulder Control" bears S. 89°38'05" W., a distance of 1329.40 feet; Thence S. 49°28'05" E., a distance of 1,335.53 feet to a point on the existing easterly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular southeasterly from the centerline of the main track and being the **TRUE POINT OF BEGINNING**;

1. Thence N. 65°52'27" W., a distance of 100.01 feet to the existing westerly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular northwesterly from the centerline of the main track;

2. Thence along said westerly right-of-way line, N. 24°59'51" E., a distance of 222.92 feet;

3. Thence S. 45°40'26" E., a distance of 47.66 feet;

4. Thence S. 24°59'51" W., a distance of 94.75 feet;

5. Thence S. 49°13'33" E., a distance of 57.18 feet to said existing easterly right-of-way line;

6. Thence along said easterly right-of-way line S. 24°59'51" W., a distance of 95.33 feet, more or less, to the **TRUE POINT OF BEGINNING.**

The above described parcel contains 15,352 square feet (0.352 acres) of land, more or less.

The purpose of the above-described Temporary Easement is for the abandoning and filling a segment of the Boulder and White Rock Ditch.

BASIS OF BEARINGS: All bearings are based on the line connecting the C 1/4 corner of section 20, T. 1 N., R. 70 W. of the 6th P.M. (being a found 2.5" diameter aluminum cap in survey box, stamped in part "City of Boulder Control") and the C-E 1/16 corner of section 20, T. 1 N., R. 69 W. of the 6th P.M. (being a found illegible 2.5" diameter aluminum cap in water box) being a **GRID** bearing of **N. 89°38'05" E. 1329.40'** as obtained from a global positioning system (GPS) survey based on the Colorado High Accuracy Reference Network (CHARN). Said grid bearing is NAD 83 (2007) Colorado State Plane North Zone 501.

Geoffrey F. Stephenson, PLS 23521
For and on behalf of The Lund Partnership, Inc.
12265 W. Bayaud Avenue, Suite 130
Lakewood, CO 80228

COLORADO REGISTERED PROFESSIONAL LAND SURVEYOR GEOFFREY F. STEPHENSON 7-26-13 23521

EXHIBIT "A"

PROJECT NUMBER: STM M110-081
TEMPORARY EASEMENT NUMBER: TE-2A
PROJECT CODE: 18405
DATE: JULY 25, 2013
DESCRIPTION

A Temporary Easement No. TE-2A of the City of Boulder, State of Colorado Project No. STM M110-81 (PC 18405) containing 8,755 sq. ft. (0.201 acres) of land, more or less, being a portion of that property as described in the Deed recorded in Book 121, Page 40 of the Boulder County Records, located in the S.E. 1/4 of Section 20, Township 1 N., Range 70 W., of the 6th Principal Meridian, in the City and County of Boulder, Colorado, said tract or parcel being more particularly described as follows:

COMMENCING at the C-E 1/16th corner of Section 20, being a found illegible 2.5" diameter aluminum cap in water box, whence the C 1/4 corner of Section 20, being a found 2.5" diameter aluminum cap in survey box stamped in part "City of Boulder Control" bears S. 89°38'05" W., a distance of 1329.40 feet; Thence S. 34°07'25" E., a distance of 1,382.74 feet to a point on the existing westerly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular northwesterly from the centerline of the main track and being the **TRUE POINT OF BEGINNING**;

1. Thence along said westerly right-of-way line, N. 24°59'51" E., a distance of 221.13 feet;
2. Thence S. 65°13'33" E., a distance of 45.91 feet;
3. Thence S. 24°57'36" W., a distance of 159.79 feet;
4. Thence S. 61°47'25" W., a distance of 76.82 feet, more or less, to the **TRUE POINT OF BEGINNING.**

The above described parcel contains 8,755 square feet (0.201 acres) of land, more or less.

The purpose of the above-described Temporary Easement is for the abandoning and filling a segment of the Boulder and White Rock Ditch.

BASIS OF BEARINGS: All bearings are based on the line connecting the C 1/4 corner of section 20, T. 1 N., R. 70 W. of the 6th P.M. (being a found 2.5" diameter aluminum cap in survey box, stamped in part "City of Boulder Control") and the C-E 1/16 corner of section 20, T. 1 N., R. 69 W. of the 6th P.M. (being a found illegible 2.5" diameter aluminum cap in water box) being a **GRID** bearing of **N. 89°38'05" E. 1329.40'** as obtained from a global positioning system (GPS) survey based on the Colorado High Accuracy Reference Network (CHARN). Said grid bearing is NAD 83 (2007) Colorado State Plane North Zone 501.

Geoffrey F. Stephenson, PLS 23521
For and on behalf of The Lund Partnership, Inc.
12265 W. Bayaud Avenue, Suite 130
Lakewood, CO 80228

COLORADO REGISTERED PROFESSIONAL LAND SURVEYOR
GEOFFREY F. STEPHENSON
7-26-13
23521

EXHIBIT E
ESTIMATE FOR RAILROAD WORK

EXHIBIT E

AUTHORITY FOR EXPENDITURE

LOCATION :	NSS BOULDER	LINE SEGMENT :	476	AFE NUMBER :	
PLANITEM NUMBER :	000258390	MILEPOST :	31.85	RFA NUMBER :	5920015
PROPERTY OF :	BNSF RAILWAY COMPANY	DIVISION :	PR	CPAR NUMBER :	CB960015
OPERATED BY :	BNSF RAILWAY COMPANY	SUBDIVISION :	FRONT RANGE	BUDGET YEAR :	2015
JOINT FACILITY :	BOULDER COUNTY CO	TRACK TYPE :	S	BUDGET CLASS :	6
% BILLABLE (+/-) :	100.0	TAX STATE :	CO	REPORTING OFFICE :	111
		SPONSOR :	VP ENGINEERING	CENTER/ROLLUP :	POWSW

PURPOSE, JUSTIFICATION AND DESCRIPTION

PIP PRS DIV FRONT RANGE SUB LS 476 MP 31.85 - 100% BILLABLE TO BOULDER COUNTY, CO

PRIMARY FUNDING SOURCE IS COUNTY FUNDS

** BUY AMERICA(N) APPLIES **

PLAN ITEM	LINE SEG	BEG MP	END MP	TRK NBR	BEGIN STATION	END STATION	PROJECT TYPE	BUD YEAR
000258390	476	31.85	31.85	S	NSS BOULDER	NSS BOULDER	PUBLIC IMPROVEMENT PROJECT	2015

	CASH CAPITAL	NONCASH CAPITAL	OPERATING EXP	REMOVAL COSTS	BILLABLE	TOTALS
LABOR COSTS	0	0	0	0	190,301	190,301
MATERIAL COSTS	0	0	0	0	182,479	182,479
OTHER COSTS	0	0	0	0	271,844	271,844
TOTALS	0	0	0	0	644,624	644,624

SYSTEM MAINTENANCE AND PLANNING
ESTIMATE REF. NUMBER: 5920015
COSTING DATE: 02/25/2015

PRINTED ON: 02/25/2015
ESTIMATED BY: Elkins
PRINTED BY: Elkins

EXHIBIT E

***** MAINTAIN PROPRIETARY CONFIDENTIALITY *****

BNSF RAILWAY COMPANY
FHPM ESTIMATE FOR
BOULDER COUNTY CO

LOCATION NSS BOULDER | DETAILS OF ESTIMATE | PLAN ITEM : 000258390 | VERSION : 1

PURPOSE, JUSTIFICATION AND DESCRIPTION

PIP PRS DIV FRONT RANGE SUB LS 476 MP 31.85 - 100% BILLABLE TO BOULDER COUNTY, CO

REQUESTOR: BENTLEY TOMLIN
PRIMARY FUNDING SOURCE IS COUNTY FUNDS
** BUY AMERICA(N) APPLIES **

DESCRIPTION	QUANTITY	U/M	COST	TOTAL $
**********				
LABOR				
**********				
CONSTRUCT STRUCTURE - OPERATING	192.9	MH	5,565	
DRIVE PILES	490.0	MH	14,135	
FINALIZE PROJECT	318.1	MH	9,176	
PLACE CAPS	176.0	MH	5,077	
PLACE FIELD WELDS - CAP	35.2	MH	1,033	
PLACE SPANS	159.9	MH	4,613	
PLACE TRACK PANELS - ADDITION - CAP	52.0	MH	1,430	
PREPARE FOR STRUCTURE CHANGOUT	527.0	MH	15,202	
REMOVE/REPLACE TRACK	32.0	MH	880	
REPLACE CROSS TIES - CAP	52.0	MH	1,430	
SIGNAL FIELD LABOR - CAP	20.0	MH	621	
UNLOAD BALLAST - REPLACEMENT - CAP	20.4	MH	561	
UNLOAD MATERIAL	87.1	MH	2,513	
PAYROLL ASSOCIATED COSTS			41,051	
DA OVERHEADS			42,776	
EQUIPMENT EXPENSES			33,794	
INSURANCE EXPENSES			10,444	
TOTAL LABOR COST			190,301	190,301
**********				
MATERIAL				
**********				
BALLAST, FOR GENERIC USE ONLY	170.0	NT **	1,490	
TRACK PANEL, 136 STANDARD RAIL, 40 FT- 10 FT TIES-	4.0	EA **	19,276	
RAIL, TRANSN,BE,40 FT,136 - 1/4 WORN 132	4.0	EA **	5,124	
TIE, TRK,10FT,PRE-PLATED, PANDROL, 6IN, ROUND	20.0	EA **	2,684	
WELDKIT, GENERIC FOR ALL RAIL WEIGHTS	4.0	KT X	272	
BRIDGE MATERIAL	1.0	LS **	130,360	
SIGNAL MATERIAL	2.0	DAY **	440	
MATERIAL HANDLING			7,980	
ONLINE TRANSPORTATION			2,675	
USE TAX			10,222	
OFFLINE TRANSPORTATION			1,956	
TOTAL MATERIAL COST			182,479	182,479
**********				
OTHER				
**********				
CONTRACTED SERVICES	1.0	LS	180,000	
EQUIPMENT RENTAL	1.0	LS	31,500	
SIGNAL LEASED VEHICLE	2.0	DAY	100	
TOTAL OTHER ITEMS COST			211,600	211,600
PROJECT SUBTOTAL				584,380
CONTINGENCIES				53,861
BILL PREPARATION FEE				6,383
GROSS PROJECT COST				644,624
LESS COST PAID BY BNSF				0
TOTAL BILLABLE COST				644,624

EXHIBIT F

LIMITED ASSIGNMENT OF RE-2A

LIMITED ASSIGNMENT OF EASEMENT AGREEMENT
FOR RECREATIONAL TRAIL/PEDESTRIAN
BIKE PATH, WONDERLAND CREEK DRAINAGEWAY AND BWRD

This Limited Assignment of the Easement Agreement for Recreational Trail/Pedestrian Bike Path, Wonderland Creek Drainageway and BWRD dated _____, recorded at Reception No. _____ on _____, 2015 in the records of the Boulder County Clerk and Recorder, attached hereto and incorporated by reference herein as Attachment 1, (hereinafter referred to as "Railroad Easement"), is entered by and between the CITY OF BOULDER, a Colorado municipal corporation (hereinafter referred to as "City" or "Assignor") and the BOULDER AND WHITE ROCK DITCH AND RESERVOIR COMPANY, a Colorado non-profit corporation (hereinafter referred to as "Assignee" or "Ditch Company").

The Railroad Easement was purchased pursuant to a Construction and Maintenance Agreement ("C&M Agreement") between BNSF Railway Company ("BNSF") and the City dated _____. Pursuant to said C&M Agreement, BNSF approved the City's assignment of the Railroad Easement to the Assignee, limited to the purposes contained in this Assignment.

The City desires to make a limited assignment of the Railroad Easement to the Assignee, and the Assignee desires to accept said assignment.

NOW THEREFORE,

1. The City assigns the Railroad Easement to Assignee only for the purposes of construction, permanent placement, access, use and maintenance of the relocated segment of the Boulder and White Rock Ditch (hereinafter referred to as "BWRD") as more specifically described in Railroad Easement Number: RE-2A, attached hereto and incorporated by reference herein as Exhibit A to Attachment 1.

2. The Assignee hereby agrees that all maintenance of the BWRD shall be performed in accordance with that certain Agreement between the City of Boulder and the Boulder and White Rock Ditch and Reservoir Company (Wonderland Creek Greenways Improvement Project) dated _____, 2015, recorded at Reception No. _____ on _____, 2015 in the records of the Boulder County Clerk and Recorder.

IN WITNESS WHEREOF, Assignor and Assignee have executed this Limited Assignment on this _____ of May, 2015.

SIGNATURE BLOCKS

Attachment 1

RAILROAD EASEMENT

[this attachment will be the entire Exhibit D, AGREEMENT FOR RECREATIONAL TRAIL PEDESTRIAN/BIKE PATH, WONDERLAND CREEK DRAINAGEWAY AND BWRD, from the C&M Agreement]

Goldfinch Exchange Company LLC
A Delaware limited liability company
40 Lake Bellevue Drive, Suite 275
Bellevue, WA 98005
425-646-4020
425-637-2873 fax

NOTICE OF ASSIGNMENT

TO: CITY OF BOULDER, COLORADO
and any assignees or exchange intermediaries of Buyer

You and BNSF Railway Company ("BNSF") have entered into the Easement Agreement, dated 6-30-2015, 2015 for the sale of an easement in the real property described therein. You are hereby notified that BNSF has assigned its rights as Seller, but not its obligations, to Goldfinch Exchange Company LLC for the purpose of effecting a tax deferred exchange under Internal Revenue Code Section 1031. This is an assignment of rights only and BNSF will transfer the easement directly to you.

ACKNOWLEDGED:

CITY OF BOULDER, COLORADO

By: Jane S Brautigam
Jane S. Brautigam, City Manager

Attest:
Alisa D. Lewis
City Clerk

Approved as to form:
Office of the City Attorney 4-17-15

BNSF RAILWAY COMPANY

CERTIFICATE OF ASSISTANT SECRETARY

I, **Tammy K. Herndon**, hereby certify that I am an **Assistant Secretary** of **BNSF Railway Company** ("Company") which executed the Easement Agreement for Construction of Recreational Trail/Pedestrian Bike Path and Drainageway with an effective date of June 30, 2015, between **City of Boulder, Colorado** ("Grantee") and the Company ("Agreement"); that the Company is organized under the laws of the State of Delaware; and that **Kurt Geringer**, who executed said Agreement is the **General Director Real Estate** of the Company, and has been duly authorized to execute the Agreement and all documents pertaining to the Agreement on behalf of the Company. I hereby attest that the signature of **Kurt Geringer** affixed to such Agreement is genuine.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of the Company, this 30th day of June, 2015.

BNSF RAILWAY COMPANY CORPORATE SEAL DELAWARE

BNSF RAILWAY COMPANY

Tammy K. Herndon

Tammy K. Herndon
Assistant Secretary

AGREEMENT BETWEEN THE CITY OF BOULDER AND
THE BOULDER AND WHITE ROCK DITCH AND RESERVOIR COMPANY
(Wonderland Creek Greenways Improvement Project)

1. PARTIES. The parties to this Agreement are the **Boulder and White Rock Ditch and Reservoir Company,** a mutual ditch company ("Ditch Company"), and the **City of Boulder**, a Colorado municipal corporation (the "City").

2. RECITALS. The Ditch Company operates the Boulder and White Rock Ditch ("Ditch"), which begins at its point of diversion on the north bank of Boulder Creek near the Broadway Street bridge in the City of Boulder, Colorado. A portion of the Ditch is located in a drainageway known as Wonderland Creek. The City desires to obtain permission of the Ditch Company to relocate a segment of the Ditch and to construct certain other improvements to the Ditch as part of the City's Wonderland Creek Greenways Improvement Project ("Project"). The Project will separate stormwater flows in Wonderland Creek from the Ditch by realigning approximately 583 linear feet of the Ditch to the west, as generally depicted on the attached **Exhibit A**. The Project components relating to the Ditch include the following:

- The Ditch will be relocated a maximum distance of 140 feet to the west of its current location. Approximately 583 linear feet of new Ditch will be constructed in the new location.
- The new Ditch will have a longitudinal slope of 0.13%, and the channel section will consist of a trapezoid with a 12 foot bottom width and side slopes at a ratio of 2 horizontal feet to 1 vertical foot. The new channel section will be lined with an 18 inch thick clay liner.
- A turnout structure with trash rack will be constructed to prevent flood flows from continuing downstream along the Ditch. The turnout will be a 17 foot long, double 5'-0" wide by 4'-0" tall concrete box culvert.
- A pair of 5'-0" wide by 4'-0" tall slide gates will be installed to control Ditch and flood flows. For the day-to-day 95 cfs irrigation flow, the two turnout gates will be designed to open 1.94 feet, resulting in a Ditch freeboard of 0.43 feet. For the maximum decreed Ditch flows of 135 cfs, the gates will be designed to open 3.5 feet. This results in a Ditch freeboard of 0.24-feet.
- A 24" slide gate will be constructed at the turnout structure to allow for the bypass of minor flows from the Ditch.
- A gravel access road will be constructed to the turnout structure area from Talisman Court for use by the Ditch Company.
- A concrete Ditch maintenance access path will be constructed along the western bank of the Ditch.

- A 2'-0" tall by 12'-0" wide culvert will be constructed to allow the maintenance access path to cross Wonderland Creek in the area of the confluence with the Ditch.
- A 4'-6" tall by 16'-0" wide culvert will be constructed across the Ditch. This culvert will act as a pedestrian crossing to connect the multi-use trail upstream of the Ditch to the trail under the BNSF railroad.
- The Ditch berm along the eastern bank in the area of the spillway drop structure will be a minimum of 12 feet wide to allow for Ditch maintenance access.

Together these shall be referred to as the "Facilities." The Ditch Company agrees to modify its easement and to allow the proposed construction to occur, subject to the terms, conditions, covenants, and agreements set forth in this Agreement.

3. GRANT OF RELOCATION RIGHT AND RIGHT TO CONSTRUCT FACILITIES. For consideration and subject to the covenants, conditions, and limitations of this Agreement, the Ditch Company grants to the City the right to relocate the Ditch and to construct the Facilities as part of the Project situated in the City of Boulder, County of Boulder, State of Colorado. The details of this construction are described in the Project plans incorporated herein by reference as **Exhibit B**, as the same may be modified by the materials submittal and the shop drawings subject of paragraph 4(a) herein. The cover and index sheets to the Project plans are attached hereto.

4. CONSTRUCTION. The Facilities constructed or installed by the City on the above lands under the terms of this grant shall be constructed, installed, and maintained in accordance with the designs, specifications, provisions, and requirements approved by the Ditch Company as set forth in **Exhibit B**, and the following:

a. The Facilities, referred to in Sections 2 and 3 hereof, shall be constructed at no cost to the Ditch Company and in accordance with **Exhibit B**. The Ditch Company will provide the City with written approval of the design and specifications of the Facilities at the time of the signing of this Agreement, to be attached as **Exhibit C** and incorporated herein by reference. Additionally, the City agrees that the Ditch Company will be afforded the opportunity to review and approve material submittals and shop drawings associated with the fabrication and installation of the Facilities. The City agrees to provide the Ditch Company with copies of the as-built drawings following construction of the Facilities. The Ditch Company shall not be liable or responsible in any manner for the structural design, details or construction of the Facilities.

b. The City agrees to reimburse the Ditch Company (or pay directly) for all engineering review costs incurred by it in revising and approving the plans and specifications and entering into this Agreement, provided that such fees in total do not exceed $15,000.00. In addition, the City agrees to reimburse the Ditch Company (or pay directly) for all reasonable legal review costs incurred by it in entering into this Agreement, provided that such fees in total do not exceed $20,000.00

c. Except as may be modified by **Exhibit B**, all portions of the right-of-way and of the Ditch bottom, sides, and banks which are disturbed by the process of the City's construction shall be restored to original condition and all fencing and other facilities appurtenant to the Ditch right-of-way shall be replaced in a condition at least equal to the condition of such facilities and appurtenances prior to construction of the structures permitted by this Agreement.

d. The City shall notify the Ditch Company at least five days preceding the date of commencing work involved in the installation, or replacement of installations, permitted by this Agreement. The City and the Ditch Company will provide inspection of all installations or replacements during the construction thereof, and the City agrees to reimburse the Ditch Company for all administrative and inspection costs incurred by the Ditch Company's engineer and other Ditch Company personnel. Upon completion of the Project and no later than the July following completion of construction of the Facilities, the Ditch Company's engineer will inspect the project and verify substantial compliance with **Exhibit B**. For purposes of this Agreement, reimbursement shall be made by the City at the actual hourly rate for labor and equipment incurred by the Ditch Company. Payment shall be made as set forth in paragraph number 4.g., but shall not exceed $15,000.00, including amounts incurred under paragraph number 4.b.

e. The City agrees that the construction permitted by this Agreement shall proceed with reasonable diligence from the initiation of such construction to its completion.

f. If the construction of the Facilities or Project interrupts the Ditch Company's water supplies for any reason (i.e., the ability to receive the called for or decreed amount of water), the City shall pay as liquidated damages $10,000.00 per day for any day that the Ditch Company has requests for water from shareholders and cannot deliver water to such shareholders as a result of the construction of the Facilities.

g. An itemized statement for the total costs chargeable to the City shall be forwarded to the City as billed, and the same shall be paid to the Ditch Company within forty-five days after the billing date.

h. The City shall be responsible for preventing trash, debris, dirt, pollution and other foreign material from entering the Ditch as a result of the installation of the Facilities.

i. The City agrees to pay for signage along the Ditch in the amount of up to $500.00. The parties shall cooperate to determine the type and location of appropriate signage along the Ditch.

j. Subject to sufficient appropriations of funds by the City Council, the City agrees to reimburse the Ditch Company for up to 3 years for an upgrade to the Ditch Company's insurance policy.

5. MAINTENANCE. The Facilities constructed and installed by the City as set forth in the design plans and specifications, **Exhibit B**, shall be the property of the Ditch Company.

The three box culverts and the trash rack located on the turnout structure constructed and installed by the City as set forth in the design plans and specifications, **Exhibit B,** shall at all times be reasonably maintained by the City in a manner that will not create a hazard to the public or to the officials, employees, and contractors of the Ditch Company; will not damage or constitute a threat of damage to the facilities or operations of the Ditch; or interfere with the operation or maintenance of the Ditch. Except in the case of an emergency, in the event that said box culverts and trash rack installed by the City are not so reasonably maintained, the Ditch Company shall give notice to the City in writing of such defective or hazardous maintenance; and subject to City Council appropriation, the City shall correct such defect or hazard within thirty days. If proper correction is not made within the thirty-day period provided, then the Ditch Company and the City shall mutually agree on a schedule of compliance to remedy the defect. Extension of the thirty-day period may be granted by the Ditch Company.

In addition to the three box culverts and trash rack, the City shall reasonably maintain the section of the realigned Ditch in consultation with the Ditch Company. All City maintenance of the Ditch on BNSF Railway Company property will be performed in accordance with the Construction and Maintenance Agreement for Wonderland Creek Bridge between the BNSF Railway Company and the City.

In the case of an emergency, which is defined as a situation which impacts or could impact the ability of the Ditch to deliver water when delivery of such water is being called for by its shareholders, delivered pursuant to its decrees or required by the laws of the State of Colorado, or a situation which becomes known to the City or Ditch Company presenting an immediate threat to the public health or safety, the party responsible for maintenance as provided herein shall respond immediately to any reasonable maintenance requests made by the other party. Such requests may be made by telephone, but shall be followed by a written request. If the responsible party fails to respond to an emergency request within twenty-four hours, or if that response fails to allow for the delivery of water as described in this paragraph or to adequately address the threat to the public health or safety, then the non-responsible party may make such necessary repairs. The party responsible for maintenance shall reimburse the other party for the costs that are reasonable and necessary for the repairs.

In the event that the Ditch Company performs emergency maintenance on that section of the Ditch located on BNSF Railway Company property pursuant to this paragraph 5, the Ditch Company agrees to the following: (i) any access or maintenance activities must be limited to work within the 85 foot wide Ditch easement across the BNSF Railway Company property; (ii) and no maintenance or repairs shall cause any interference with the constant, continuous and uninterrupted use of the trains, property and facilities of the BNSF Railway Company or those using the Railway's facilities with its permission. For any emergency maintenance performed by the Ditch Company that will place men, machinery or heavy equipment or any portion thereof within 25 feet of the centerline of

the railroad track and above the deck of the railroad bridge across the Ditch, the Ditch Company agrees to contact the City as soon as practicable and abide by any special protective or safety measures required by the Railroad Roadmaster. The City agrees to pay for the costs of any required special protective or safety measures.

The City of Boulder Public Works/Utilities Division, Post Office Box 791, Boulder, Colorado 80306, telephone number (303) 413-7100, fax number (303) 441-4210, shall be the City's designated contact for maintenance related issues and problems. The Ditch Company's designated contact for maintenance related issues and problems shall be _____

_____

_____.

6. TERM. This Agreement and the covenants herein contained, shall be perpetual unless modified by Court order, or a signed written agreement of the parties or their successors in title.

7. ASSIGNMENT. This Agreement or the signed written agreement of the parties or their successors in title shall not be assigned by the City without the prior approval in writing of the Ditch Company. Any assignees or successors to the rights of the City shall be liable and bound under all of the provisions of this instrument to the same extent as the City.

8. GRANT OF NEW EASEMENTS. Upon completion of construction of the Facilities, he City agrees to grant new easements to the Ditch Company for operation and maintenance of the relocated Ditch by executing easement deeds substantially in the form attached as **Exhibit D** ("New Easements"), subject to the following conditions. The New Easements will include the following: (i) an easement across the City's Howard Hueston Park, attached hereto as **Exhibit D-1**; (ii) an easement across the Hayden Place Owners Association property, attached hereto as **Exhibit D-2**; and (iii) an easement across the BNSF Railway Company property, attached hereto as **Exhibit D-3**.

a. The City's grant of an easement across the Howard Hueston Park to the Ditch Company, Exhibit D-1, is subject to satisfaction of Section 162 of the City of Boulder Home Rule Charter and related terms of the Boulder Revised Code, which will require approximately 90 days.

b. The City is in the process of acquiring the easement for operation and maintenance of the Ditch on the Hayden Place Owners Association property. Upon successful acquisition of the easement by the City, the City's grant of an easement across the Hayden Place Owners Association property to the Ditch Company, Exhibit D-2, is subject to City Council approval pursuant to Section 2-2-8 of the Boulder Revised Code.

c. The City intends to assign its interests in the easement across the BNSF Railway Company property, Exhibit D-3, to the Ditch Company; however, such assignment is subject to approval by the BNSF Railway Company pursuant to the Construction and Maintenance Agreement for Wonderland Creek Bridge between the BNSF Railway Company and the City. The

assignment of the easement to the Ditch Company shall provide that the City shall remain responsible for its obligations under said Construction and Maintenance Agreement.

d. Notwithstanding any references to "easement" in Exhibit D, this Agreement grants no easements to the Ditch Company.

9. ABANDONMENT AND VACATION OF CURRENT EASEMENT. The Ditch Company will execute a vacation and abandonment of the prescriptive easement for the old Ditch channel following inspection and approval of the new Ditch channel. The Ditch Company shall record the New Easements and abandonment of the prescriptive easement in the real property records of the Boulder County Clerk and Recorder.

10. RESPONSIBILITY. By virtue of entering into this Agreement, the Ditch Company: (1) assumes no additional responsibilities or obligations related to the Project improvements described in Exhibit B, except as may be set forth in this Agreement; (2) disclaims all liability or responsibility with regard to subsequent easement grants by the City, or with regard to the City's own future or additional acts or activities within the Project area; except for damages or injury caused by the negligence or intentional acts of the Ditch Company, its agents, assigns or employees.; and (3) disclaims all liability with regard to public access along the multiuse path constructed by the City as part of the Project, except for damages or injury caused by the negligence or intentional acts of the Ditch Company, its agents, assigns or employees.

The City shall and will and does hereby agree, insofar as permitted by law and without waiving any defenses it has under the Colorado Governmental Immunity Act to any third party, to assume responsibility for any and all claims, liabilities, losses, damages, costs, expenses, judgments, or attorney's fees for or on account of personal injuries to or death of persons or damage to or loss or destruction of property, directly or indirectly caused by, due to arising out of, or in connection with, the City's limited maintenance of the three box culverts, trash rack and realigned section of the Ditch pursuant to paragraph 5 of this Agreement; excepting any damages, losses or injuries caused by the negligent or intentional acts of the Ditch Company, its respective agents, assigns or employees.

11. CONSIDERATION. As consideration for the grant of this Agreement, the City shall, upon execution of this Agreement, pay unto the Ditch Company the sum of $250.00, which sum shall be credited against payments due under paragraphs 4.b. and 4.d., but in no event shall any of the $250.00 be refunded to the City.

12. WAIVER OF BREACH. The waiver by any party to this Agreement of a breach of any term or provision of this Agreement, shall not operate or be construed as a waiver of any subsequent breach by any party.

13. BINDING EFFECT. This Agreement shall inure to the benefit of, and be binding upon, the parties, and their respective legal representatives, successors, and assigns; provided,

however, that nothing in this paragraph shall be construed to permit the assignment of this Agreement except as otherwise specifically authorized herein.

14. REMEDIES. This Agreement may be enforced by specific performance, including mandatory injunctive relief and damages, together with reasonable attorney's fees to the prevailing party, except that any action which requires the expenditure of City funds shall be subject to City Council appropriation.

15. WARRANTY OF AUTHORITY. Each party to the Agreement warrants that they have the requisite authority to enter into this Agreement and that the parties signing on their behalf have been duly authorized.

16. NOTICES AND ADDRESSES. Any notices or other documents required by this Agreement shall be sent to the following addresses, or such other addresses as the parties may indicate in writing, by postage prepaid, certified or registered mail:

City of Boulder
c/o Kurt Bauer, Engineering Project Manager
1777 Broadway, P.O. Box 791
Boulder, CO 80306-0791
With copies emailed to: bauerk@bouldercolorado.gov

The Boulder and White Rock Ditch and Reservoir Company
c/o Dan Grant, Secretary
PO Box 1826
Longmont, CO 80502
With copies emailed to: drgnlg@msn.com

17. TIME IS OF THE ESSENCE. Time is of the essence with respect to each and every aspect of this Agreement, and strict compliance with all time requirements is at the heart of this Agreement and shall be strictly enforced.

18. NO THIRD PARTY BENEFICIARIES/NO WAIVER OF GOVERNMENTAL IMMUNITY. This Agreement shall not create any duty of care or liability with respect to any person or entity not a party to this Agreement, or waive any of the privileges or immunities the City, its officers, employees, successors and assigns may present pursuant to law, including, but not limited to, the Colorado Governmental Immunity Act, Section 24-10-101, C.R.S. *et seq.*, as amended.

19. CAPTIONS. The captions of the paragraphs of this Agreement are for convenience only and shall not govern or influence the interpretation of the Agreement.

20. COMPUTATION OF TIME. In computing any period of time under this Agreement, the day of the act, event or default from which the designated period of time begins to run shall not

be included. Unless expressly indicated otherwise, all days shall be "calendar days," which means consecutive days including all holidays, Saturdays and Sundays. "Business days" exclude federal holidays, Saturdays and Sundays. If a deadline under this Agreement falls on a federal holiday, Saturday or Sunday, the deadline shall be the next business day.

21. COLORADO LAW. The Agreement shall be governed by the laws of the State of Colorado, insofar as any matter is regulated by applicable laws of the United States.

22. ENTIRE AGREEMENT. The making, execution and delivery of this Agreement by the Parties has been induced by no representations, statements, warranties or agreements other than those expressed in this Agreement. This Agreement embodies the entire understanding of the Parties as to the subject matter hereof and there are no further or other agreements or understandings, written or oral, in effect between the Parties relating to its subject matter unless expressly referred to in this Agreement. Modification of this Agreement by the Parties may be made only by a writing signed by the party or parties to be bound by the modification.

23. BINDING EFFECT AND ASSIGNMENT. It is the intent of the Parties that this Agreement be and remain binding on their respective agents, heirs and successors. The City shall not assign its obligations under this Agreement, provided however, that the City may contract with third parties for the completion of the work under this Agreement.

24. SEVERABILITY. The invalidity or unenforceability of any of the provisions of the Agreement shall not affect any other provision of this Agreement which shall thereafter be constructed in all respects as if such invalid or unenforceable provision were omitted.

25. DUPLICATE ORIGINALS; COUNTERPARTS. This Agreement may be executed in counterparts, each of which shall be deemed an original and valid and enforceable against each Party.

26. EFFECTIVE DATE. This Agreement shall be effective on the last date it is signed by the Parties.

IN WITNESS WHEREOF, the Parties have set their hands on the date and year written below.

[REMAINDER OF PAGE LEFT BLANK INTENTIONALLY]

THE BOULDER AND WHITE ROCK DITCH AND RESERVOIR COMPANY, a Colorado Nonprofit Corporation

By: _____
President
Date: 6/11/15

Attest: _____
Secretary

STATE OF COLORADO)
) ss.
COUNTY OF BOULDER)

SUBSCRIBED AND SWORN to before me, a notary public, this 11th day of June, 2015, by _____ as President of The Boulder and White Rock Ditch and Reservoir Company.

Witness my hand and official seal.

EDWARD M. BENDELOW
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 19954005064
MY COMMISSION EXPIRES NOV 03, 2016

(SEAL)

_____
Notary Public

CITY OF BOULDER

Jane S Brautigam

City Manager

ATTEST:

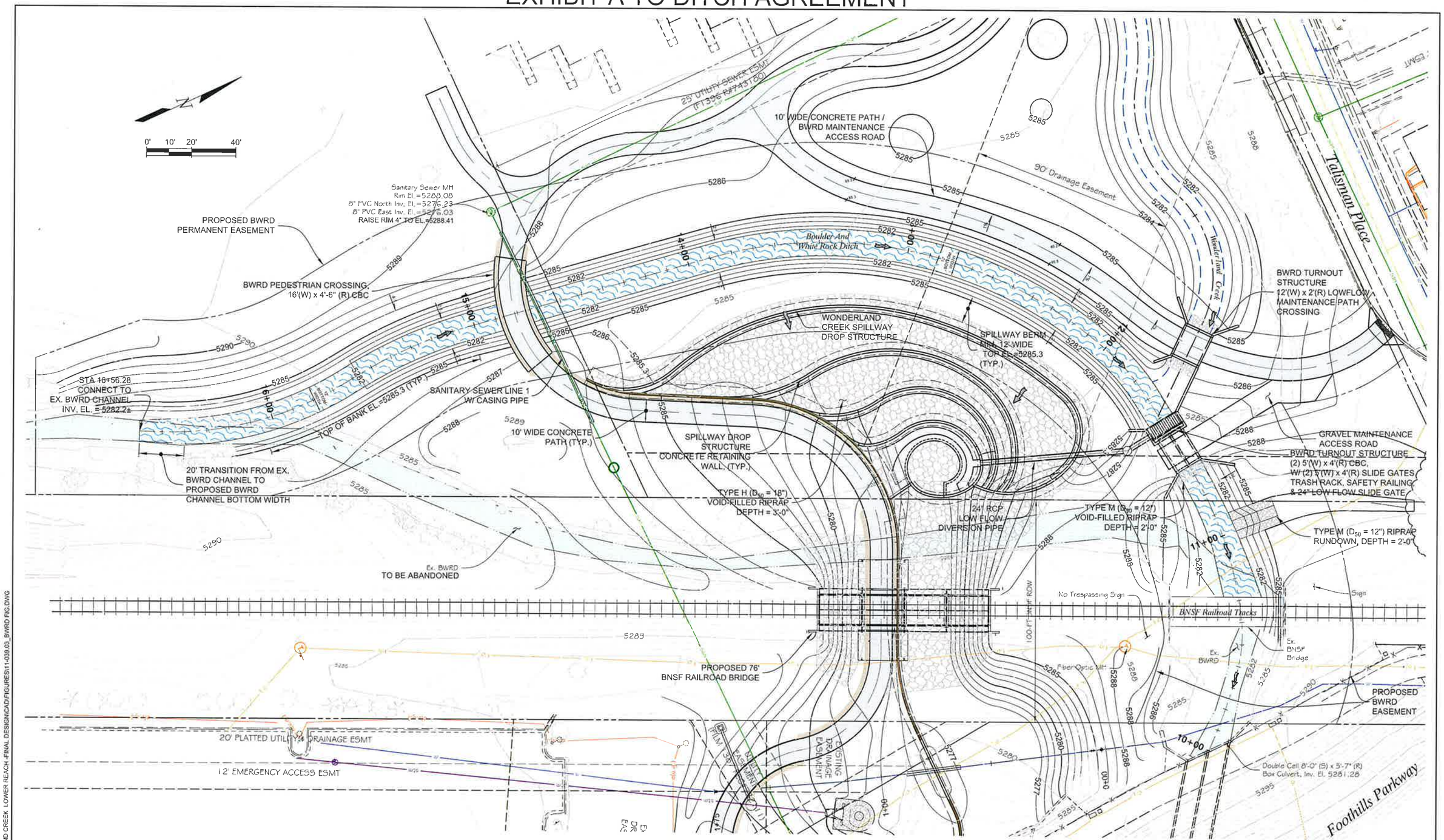
City Clerk

APPROVED AS TO FORM:

City Attorney's Office

Date: June 18, 2015

EXHIBIT A TO DITCH AGREEMENT



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AutoCAD 2014	Scale: AS SHOWN	

MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
777 S. WADSWORTH BLVD. 4-100
LAKEWOOD, COLORADO 80226
(303) 988-4939
MULLER
MEC PROJECT NO. 11039.03

F.O.R. SUBMITTAL

Sheet Revisions		
Date:	Comments	Init.

As Constructed
No Revisions:
Revised:
Void:

Region 4 RDM
CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT
BOULDER AND WHITEROCK DITCH IMPROVEMENTS

Designer:	JW3	Structure Numbers	
Detailer:	JHK		
Sheet Subset:	BWRD	Subset Sheets:	BWRD-1

Project No./Code
STM 110-081
18405
Sheet Number: 1

PLOTTED: 4/23/2015 3:00:33 PM
NAME: P:\11-039.03 WONDERLAND CREEK LOWER REACH -FINAL DESIGN\CAD\FIGURES\11-039.03_BWRD FIG.DWG

EXHIBIT B TO AGREEMENT

Oversight / NHS	
FHWA REGION VIII OVERSIGHT	■ NO ☐ YES
NATIONAL HIGHWAY SYSTEM	■ NO ☐ YES

DEPARTMENT OF TRANSPORTATION
STATE OF COLORADO
CONSTRUCTION BID PLANS
FEDERAL AID PROJECT NO. STM 110-081
CITY OF BOULDER PROJECT NO. xxxxxxxx
WONDERLAND CREEK
GREENWAYS IMPROVEMENT PROJECT
WINDING TRAIL DRIVE TO FOOTHILLS PARKWAY (SH 157)
CITY OF BOULDER, BOULDER COUNTY
APRIL, 2015

811 Know what's below Call before you dig.

Related Projects:
P. E. UNDER PROJECT:
Project Code: 19□48

R.O.W. Projects:
R.O.W. Project Description:
STM M110-081 18405
A□C M110-08□ 19□48

Contract Information

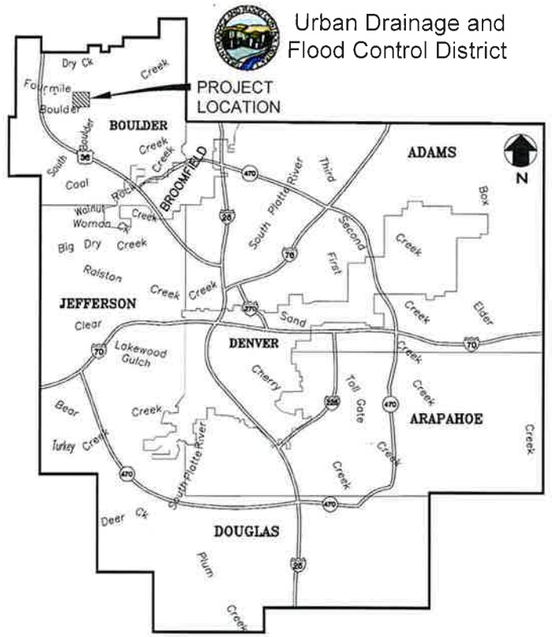
Contractor:	
Resident Engineer:	
Project Engineer:	
PROJECT STARTED: __/__/__	ACCEPTED: __/__/__
Comments:	

F.O.R. SUBMITTAL

TABULATION OF LENGTH AND DESIGN DATA

STATION	FEET CHANNEL
50+03.31 - BEGIN PROJECT	
72+40.00 - END D/S REACH	2236.69
200+00.00 - BEGIN U/S REACH	
230+20.00 - END PROJECT	3020
PROJECT LENGTH	5256.69
DESIGN DATA	
DESIGN STORM	100-YEAR
DESIGN FLOWS	2242 - 2189 CFS

Urban Drainage and Flood Control District



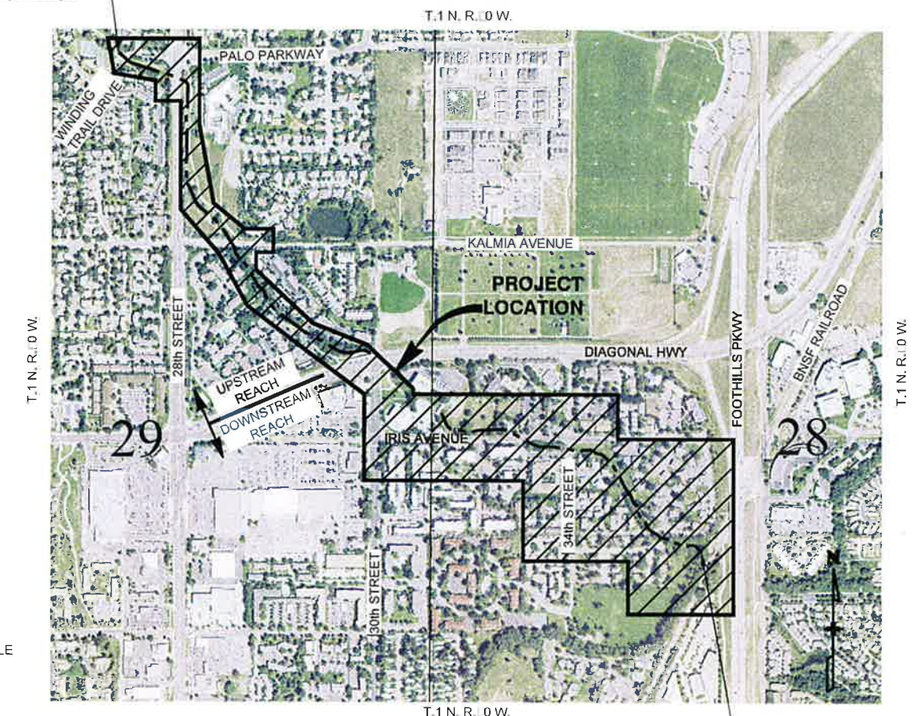
VICINITY MAP
NTS

THE PROJECT IS LOCATED WITHIN THE MAJOR DRAINAGEWAY PLANNING LIMITS SHOWN IN THE FOURMILE CANYON CREEK AND WONDERLAND CREEK MAJOR DRAINAGEWAY PLANNING FINAL PLAN □CITY OF BOULDER□MAY 2011□

BASIS OF ELEVATIONS: PROJECT ELEVATIONS ARE BASED ON BENCH MARK V 321 RESET□PID: LL1138□A STANDARD N.G.S. BENCH MARK DISK SET ON TOP OF A CONCRETE MONUMENT WITH A NAVD 88 ELEVATION OF 5296.81 FT. V 321 RESET IS A NATIONAL GEODETIC SURVEY □NGS□2ND ORDER CLASS 1 BENCH MARK.

COORDINATE DATUM: PROJECT COORDINATES ARE MODIFIED COLORADO STATE PLANE NORTH □ONE NAD '83/ 200□□COORDINATES. THE COMBINED ELEVATION/SCALE FACTOR USED TO MODIFY THE COORDINATES FROM STATE PLANE TO PROJECT COORDINATES IS 1.0002843248. THE RESULTING PROJECT COORDINATES ARE TRUNCATED BY 1□000□000' IN THE NORTHING AND 3□000□000' IN THE EASTING AFTER CONVERTING FROM STATE PLANE COORDINATES TO PROJECT COORDINATES. THE CHARN IS BASED ON THE NAD '83□200□□ DATUM.

END PROJECT
STA. 230□20.00



BEGIN PROJECT
STA. 50□03.31

PROJECT LOCATION MAP

0' 250' 500' 1000'

- APPROVALS -

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
SUITE #156 B
2480 W. 26TH AVE.
DENVER□COLORADO 80211
□303□455-62□□

PAUL A. HINDMAN□EXECUTIVE DIRECTOR — DATE

DAVID BENNETTS□MANAGER - DESIGN□CONSTRUCTION□AND MAINTENANCE — DATE

DAVID SKUODAS□PROJECT ENGINEER - DESIGN□CONSTRUCTION AND MAINTENANCE — DATE

City of Boulder
Public Works Department
1739 Broadway
Boulder, CO 80306
CITY OF BOULDER

KURT BAUER□P.E. — DATE

MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
777 S. WADSWORTH BLVD., STE. 4-100
LAKEWOOD, COLORADO 80226-4355
(303) 988-4939

CHRISTOPHER L. KROEGER□P.E. □#3□254□PROJECT MANAGER — DATE

JAMES A. WATT III□P.E. □#42806□PROJECT ENGINEER — DATE

Computer File Information	
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Last Modification Date: 3/2□/15 □4/3/15□	Initials: JHK
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AutoCAD 2014	Scale: AS SHOWN

MULLER ENGINEERING CO., INC.
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(303) 988-4939
MULLER
MEC PROJECT NO. 11039.03

F.O.R. SUBMITTAL

Sheet Revisions

Date:	Comments	Init.

As Constructed
No Revisions:
Revised:
Void:

Region 4 RDM
CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT
TITLE SHEET

Designer:	CLK	Structure Numbers	
Detailer:	JHK		
Sheet Subset:	GENERAL	Subset Sheets:	G-1

Project No./Code
STM 110-081
18405
Sheet Number: 1

PLOTTED: 4/14/2015 5:45:28 PM
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INDEX OF DRAWINGS

SHEET NO.	SUBSET ID	TITLE
		GENERAL
1	G-1	TITLE SHEET
2	G-2	INDEX OF DRAWINGS
3	G-3	CDOT STANDARDS PLANS LIST
4 - 5	G-4 to G-5	NOTES AND LEGEND
6	G-6	STRUCTURE GENERAL NOTES
□	G-□	SURVEY TABULATION
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		STORMWATER MANAGEMENT
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4□ - 60	SM-35 to SM-48	STORMWATER MANAGEMENT PLANS - FINAL
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		DEMOLITION
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		WONDERLAND CREEK DRAINAGEWAY IMPROVEMENTS
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123	SPC-2	SPRING CREEK PLACE CROSSING SECTIONS
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12□	SPC-6	SPRING CREEK PLACE CROSSING RAILING LAYOUT PLAN
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14□	WT-1	WINDING TRAIL PEDESTRIAN CROSSING
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811 Know what's below Call before you dig.

PLOTTED: 4/14/2015 4:45:49 PM
NAME: P:\11-039.03 WONDERLAND CREEK LOWER REACH -FINAL DESIGN\CAD\11-039.03_GEN.DWG

Computer File Information	
Creation Date: 0□/18/13	Initials: JHK
Last Modification Date: 4/15/15	Initials: JHK
Full Path: P:\11-039.03\CAD	
Drawing File Name: 11-039.03_GEN.dwg	
AutoCAD 2014	Scale: AS SHOWN

MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
777 S. WADSWORTH BLVD. 4-100
LAKEWOOD, COLORADO 80226
(303) 988-4939
MULLER
MEC PROJECT NO. 11039.03

F.O.R. SUBMITTAL

Sheet Revisions		
Date:	Comments	Init.

As Constructed
No Revisions:
Revised:
Void:

Region 4 RDM

CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT

INDEX OF DRAWINGS AND LEGEND

Designer:	CLK	Structure Numbers	
Detailer:	JHK		
Sheet Subset:	GENERAL	Subset Sheets:	G-2

Project No./Code
STM 110-081
18405
Sheet Number: 2

EXHIBIT C TO DITCH AGREEMENT

DEERE & AULT
CONSULTANTS, INC.

June 12, 2015

Mr. Ted Bendelow
Bendelow Law Office, LLC
1707 North Main Street, Suite 301
Longmont, Colorado 80501

Re: City of Boulder – Wonderland Creek Greenways Improvement Project

Dear Ted:

As requested, Deere & Ault Consultants (D&A) has reviewed the construction plans prepared for the City of Boulder's Wonderland Creek Greenways Improvement Project – Winding Trail Drive to Foothills Parkway (157), dated April 2015, prepared by Muller Engineering Company, on behalf of the Boulder and White Rock Ditch and Reservoir Company (Ditch Company). After review of the Wonderland Creek construction plans, it is our recommendation to the Ditch Company Board of Directors that the plans be approved subject to the terms and conditions of the agreement between the City of Boulder and the Ditch Company, and subject to the following:

- Ditch conveyance losses in the relocated section of ditch should be no more than the historical conveyance losses in the existing ditch that is being abandoned.
- Should trash or debris accumulate on the trash rack in front of the turnout structure and not be removed by the City of Boulder in a timely manner resulting in water backing up and subsequently overtopping the ditch, the Ditch Company, at its sole discretion, reserves the right to remove the trash rack.
- The City of Boulder is in the process of obtaining an easement to construct the relocated ditch on the Hayden Place Owners Association property. Until that easement is acquired and Boulder City Council approves the granting of the new easement to the Ditch Company, the existing ditch should be left in its existing condition.

If you have any questions regarding the review or the conditions of recommended approval of the project, please feel free to call.

Sincerely,

DEERE & AULT CONSULTANTS, INC.

Michael J. Ballantine

Michael J. Ballantine, P.E.
Principal

cc: Jules Van Thuyne
Dan Lisco
Bill Dowd
Phil Leffler
Art Palm
Dan Grant
Dennis Gould

P:\0112 Boulder White Rock\0112.035 Wonderland Creek Crossing\Review2.Ltr.Docx

600 S. Airport Road, Building A, Suite 205
Longmont, CO 80503
Phone: 303-651-1468 • Fax: 303-651-1469

For Administrative Purposes Only
Property Address: _____
Grantor: City of Boulder
Grantee: Boulder and White Rock Ditch and Reservoir Company
Case#: _____

GRANT OF DITCH EASEMENT

CITY OF BOULDER, a municipal corporation ("Grantor"), whose address is 1777 Broadway, Boulder, CO 80302, for $1.00 and other good and valuable consideration, the receipt of which is hereby acknowledged, does hereby grant, bargain, sell and convey to the BOULDER AND WHITE ROCK DITCH AND RESERVOIR COMPANY, a Colorado non-profit corporation ("Grantee"), whose address is 157 Baylor Drive, Longmont, CO 80503, an 85-foot wide easement for the installation, construction, operation, repair, maintenance, and reconstruction of an irrigation ditch and appurtenances thereto, together with all rights and privileges as are necessary or incidental to the reasonable and proper use of such easement, including access for ingress and egress, in and to, over, under, and across the following real property, situated in Boulder County, Colorado,

See Exhibit A attached

Grantor, for itself and for its successors, agents, lessees, and assigns, does hereby covenant and agree that no permanent structure or improvement shall be placed on said easement by itself or its successors or assigns, and that said use of such easement shall not otherwise be obstructed or interfered with.

Grantor warrants its ability to grant and convey this easement.

The terms of this easement shall run with the land and shall be binding upon and inure to the benefit of the Grantor, its agents, lessees and assigns, and all other successors to it in interest and shall continue as a servitude running in perpetuity with the property described above.

IN WITNESS WHEREOF, Grantor has caused this instrument to be duly executed as of

this __ day of _____, 2015.

GRANTOR:
CITY OF BOULDER
a municipal corporation

By:_____
Jane S. Brautigam
City Manager

[*NOTARY BLOCK FOLLOWS*]

STATE OF COLORADO)
)ss.
COUNTY OF BOULDER)

The foregoing instrument was acknowledged before me this _____ day of _____, 2015, by Jane S. Brautigam, City Manager of City of Boulder.

Witness my hand and official seal.
My commission expires: _____

_____
Notary Public

EXHIBIT "A"

PROJECT NUMBER: STM M110-081
PERMANENT EASEMENT NUMBER: PE-4
PROJECT CODE: 18405
DATE: APRIL 28, 2015
DESCRIPTION

A Permanent Easement No. PE-4 of the Boulder and White Rock Ditch and Reservoir Company, State of Colorado Project No. STM M110-81 (PC 18405) containing 19,586 sq. ft. (0.450 acres) of land, more or less, being a portion of that property as described in the Indenture recorded on February 9, 1972 in Film 760 at Reception No. 06848 said property also known as "Howard H. Heuston Park", located in Tract 617 in the S.E. 1/4 of Section 20, Township 1 N., Range 70 W., of the 6th Principal Meridian, in the City and County of Boulder, Colorado, said tract or parcel being more particularly described as follows:

COMMENCING at the C-E 1/16th corner of Section 20, being a found illegible 2.5" diameter aluminum cap in water box, whence the C 1/4 corner of Section 20, being a found 2.5" diameter aluminum cap in survey box stamped in part "City of Boulder Control" bears S. 89°38'05" W., a distance of 1329.40 feet; Thence S. 34°07'25" E., a distance of 1,382.74 feet to a point on the existing westerly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular northwesterly from the centerline of the main track and being and the **TRUE POINT OF BEGINNING**;

1. Thence along said westerly right-of-way line, S. 24°59'51" W., a distance of 105.70 feet;

2. Thence N. 65°00'09" W., a distance of 61.49 feet;

3. Thence N. 04°56'07" E., a distance of 50.53 feet;

4. Thence N. 27°27'47" E., a distance of 8.25 feet;

5. Thence along a non-tangent curve to the left, having a central angle of 34°33'16", a radius of 100.00 feet, an arc length of 60.31 feet, the chord of which bears N. 10°11'09" E., a distance of 59.40 feet;

6. Thence N. 07°05'29" W., a distance of 27.74 feet;

7. Thence along a curve to the right, having a central angle of 20°59'47", a radius of 200.00 feet, an arc length of 73.29 feet, the chord of which bears N. 03°24'24" E., a distance of 72.88 feet;

8. Thence N. 13°54'18" E., a distance of 6.50 feet to the south line of Tract "C" of Meadow Wood, a subdivision plat recorded May 21, 1975, in Plan File R P-5, F-1, #27 of the Boulder County Records;

9. Thence along said south line of Tract "C", N. 89°44'42" E., a distance of 87.66 feet;

10. Thence S. 13°54'18" W., a distance of 27.95 feet;

11. Thence along a curve to the left, having a central angle of 20°59'47", a radius of 115.00 feet, an arc length of 42.14 feet, the chord of which bears S. 03°24'24" W., a distance of 41.91 feet;

12. Thence S. 07°05'29" E., a distance of 27.74 feet;

13. Thence along a curve to the right, having a central angle of 17°40'52", a radius of 185.00 feet, an arc length of 57.09 feet, the chord of which bears S. 02°37'59" W., a distance of 56.86 feet, more or less, to the **TRUE POINT OF BEGINNING**.

The above described Permanent Easement contains 19,586 sq. ft. (0.450 acres) of land, more or less.

The purpose of the above-described Permanent Easement is for the construction, relocating, permanent placement, access, use and maintenance of the Boulder and White Rock Ditch and utilities.

BASIS OF BEARINGS: All bearings are based on the line connecting the C 1/4 corner of section 20, T. 1 N., R. 70 W. of the 6th P.M. (being a found 2.5" diameter aluminum cap in survey box, stamped in part "City of Boulder Control") and the C-E 1/16 corner of section 20, T. 1 N., R. 70 W. of the 6th P.M. (being a found illegible 2.5" diameter aluminum cap in water box) being a **GRID** bearing of **N. 89°38'05" E. 1329.40'** as obtained from a global positioning system (GPS) survey based on the Colorado High Accuracy Reference Network (CHARN). Said grid bearing is NAD 83 (2007) Colorado State Plane North Zone 501.

Geoffrey F. Stephenson, PLS 23521
For and on behalf of The Lund Partnership, Inc.
12265 W. Bayaud Avenue, Suite 130
Lakewood, CO 80228

COLORADO REGISTERED
GEOFFREY F. STEPHENSON
4/29/15
23521
PROFESSIONAL LAND SURVEYOR

For Administrative Purposes Only
Property Address: _____
Grantor: City of Boulder
Grantee: Boulder and White Rock Ditch and Reservoir Company
Case#: _____

GRANT OF DITCH EASEMENT

CITY OF BOULDER, a municipal corporation ("Grantor"), whose address is 1777 Broadway, Boulder, CO 80302, for $1.00 and other good and valuable consideration, the receipt of which is hereby acknowledged, does hereby grant, bargain, sell and convey to the BOULDER AND WHITE ROCK DITCH AND RESERVOIR COMPANY, a Colorado non-profit corporation ("Grantee"), whose address is 157 Baylor Drive, Longmont, CO 80503, an 85-foot wide easement for the installation, construction, operation, repair, maintenance, and reconstruction of an irrigation ditch and appurtenances thereto, together with all rights and privileges as are necessary or incidental to the reasonable and proper use of such easement, including access for ingress and egress, in and to, over, under, and across the following real property, situated in Boulder County, Colorado,

See Exhibit A attached

Grantor, for itself and for its successors, agents, lessees, and assigns, does hereby covenant and agree that no permanent structure or improvement shall be placed on said easement by itself or its successors or assigns, and that said use of such easement shall not otherwise be obstructed or interfered with.

Grantor warrants its ability to grant and convey this easement.

The terms of this easement shall run with the land and shall be binding upon and inure to the benefit of the Grantor, its agents, lessees and assigns, and all other successors to it in interest and shall continue as a servitude running in perpetuity with the property described above.

IN WITNESS WHEREOF, Grantor has caused this instrument to be duly executed as of

this ___ day of _____, 2015.

GRANTOR:
CITY OF BOULDER
a municipal corporation

By:_____
Jane S. Brautigam
City Manager

[*NOTARY BLOCK FOLLOWS*]

STATE OF COLORADO)
)ss.
COUNTY OF BOULDER)

The foregoing instrument was acknowledged before me this _____ day of _____, 2015, by Jane S. Brautigam, City Manager of City of Boulder.

Witness my hand and official seal.
My commission expires: _____

_____
Notary Public

Hayden Place Owners Association

EXHIBIT "A"

PROJECT NUMBER: STM M110-081
PERMANENT EASEMENT NUMBER: PE-3A
PROJECT CODE: 18405
DATE: JULY 25, 2013
DESCRIPTION

A Permanent Easement No. PE-3A of the City of Boulder, State of Colorado Project No. STM M110-81 (PC 18405) containing 32,047 sq. ft. (0.736 acres) of land, more or less, being a portion of Tract "C" Meadow Wood a subdivision plat recorded May 21, 1975, in Plan File R P-5, F-1, #27 of the Boulder County Records, located in the S.E. 1/4 of Section 20, Township 1 N., Range 70 W., of the 6th Principal Meridian, in the City and County of Boulder, Colorado, said tract or parcel being more particularly described as follows:

COMMENCING at the C-E 1/16th corner of Section 20, being a found illegible 2.5" diameter aluminum cap in water box, whence the C 1/4 corner of Section 20, being a found 2.5" diameter aluminum cap in survey box stamped in part "City of Boulder Control" bears S. 89°38'05" W., a distance of 1329.40 feet; Thence S. 49°31'35" E., a distance of 1,231.39 feet to a point on the easterly line of said Tract "C" Meadow Wood and the **TRUE POINT OF BEGINNING**;

1. Thence along a non-tangent curve to the left, having a central angle of 70°00'27", a radius of 155.00 feet, an arc length of 189.39 feet, the chord of which bears S. 48°54'32" W., a distance of 177.83 feet;

2. Thence S. 13°54'18" W., a distance of 77.48 feet to the south line of Tract "C" Meadow Wood;

3. Thence along the south line of Tract "C" Meadow Wood, S. 89°44'42" W., a distance of 87.66 feet;

4. Thence N. 13°54'18" E., a distance of 98.92 feet;

5. Thence along a curve to the right, having a central angle of 60°14'09", a radius of 240.00 feet, an arc length of 252.31 feet, the chord of which bears N. 44°01'22" E., a distance of 240.85 feet;

6. Thence N. 32°03'42" E., a distance of 21.06 feet;

7. Thence along a non-tangent curve to the left, having a central angle of 63°36'28", a radius of 45.77 feet, an arc length of 50.81 feet, the chord of which bears N. 00°43'58" E., a distance of 48.24 feet to the south line of Talisman Filing No. Two, a subdivision plat recorded March 16, 1977, in Plan File P-5, F-4, #36 of the Boulder County Records;

8. Thence along the south line of said Talisman Filing No. Two,. N. 89°39'02" E., a distance of 32.48 feet;

COLORADO REGISTERED
PROFESSIONAL LAND SURVEYOR
GEOFFREY F. STEPHENSON
7-26-13
23521

9. Thence along a non-tangent curve to the right, having a central angle of 45°50'40", a radius of 75.35 feet, an arc length of 60.29 feet, the chord of which bears S. 04°16'34" W., a distance of 58.69 feet;

10. Thence along a non-tangent curve to the right, having a central angle of 11°39'43", a radius of 240.00 feet, an arc length of 48.85 feet, the chord of which bears N. 89°41'18" E., a distance of 48.76 feet to the easterly line of said Tract "C" Meadow Wood;

11. Thence along the easterly line of Tract "C" Meadow Wood, S. 24°59'51" W., a distance of 93.52 feet, more or less, to the **TRUE POINT OF BEGINNING**.

The above described Permanent Easement contains 32,047 sq. ft. (0.736 acres) of land, more or less.

The purpose of the above-described Permanent Easement is for the construction of a relocated segment of the Boulder and White Rock Ditch including permanent placement of the ditch, access, use and maintenance of the ditch.

BASIS OF BEARINGS: All bearings are based on the line connecting the C 1/4 corner of section 20, T. 1 N., R. 70 W. of the 6th P.M. (being a found 2.5" diameter aluminum cap in survey box, stamped in part "City of Boulder Control") and the C-E 1/16 corner of section 20, T. 1 N., R. 69 W. of the 6th P.M. (being a found illegible 2.5" diameter aluminum cap in water box) being a **GRID** bearing of **N. 89°38'05" E. 1329.40'** as obtained from a global positioning system (GPS) survey based on the Colorado High Accuracy Reference Network (CHARN). Said grid bearing is NAD 83 (2007) Colorado State Plane North Zone 501.

COLORADO REGISTERED
GEOFFREY F. STEPHENSON
7-26-13
23521
PROFESSIONAL LAND SURVEYOR

Geoffrey F. Stephenson, PLS 23521
For and on behalf of The Lund Partnership, Inc.
12265 W. Bayaud Avenue, Suite 130
Lakewood, CO 80228

EXHIBIT D TO AGREEMENT

Exhibit D-3
BNSF Railway

LIMITED ASSIGNMENT OF EASEMENT AGREEMENT
FOR RECREATIONAL TRAIL/PEDESTRIAN
BIKE PATH, WONDERLAND CREEK DRAINAGEWAY AND BWRD

This Limited Assignment of the Easement Agreement for Recreational Trail/Pedestrian Bike Path, Wonderland Creek Drainageway and BWRD dated _____, recorded at Reception No. _____ on _____, 2015 in the records of the Boulder County Clerk and Recorder, attached hereto and incorporated by reference herein as Attachment 1, (hereinafter referred to as "Railroad Easement"), is entered by and between the CITY OF BOULDER, a Colorado municipal corporation (hereinafter referred to as "City" or "Assignor") and the BOULDER AND WHITE ROCK DITCH AND RESERVOIR COMPANY, a Colorado non-profit corporation (hereinafter referred to as "Assignee" or "Ditch Company").

The Railroad Easement was purchased pursuant to a Construction and Maintenance Agreement ("C&M Agreement") between BNSF Railway Company ("BNSF") and the City dated _____. Pursuant to said C&M Agreement, BNSF approved the City's assignment of the Railroad Easement to the Assignee, limited to the purposes contained in this Assignment.

The City desires to make a limited assignment of the Railroad Easement to the Assignee, and the Assignee desires to accept said assignment.

NOW THEREFORE,

1. The City assigns the Railroad Easement to Assignee only for the purposes of construction, permanent placement, access, use and maintenance of the relocated segment of the Boulder and White Rock Ditch (hereinafter referred to as "BWRD") as more specifically described in Railroad Easement Number: RE-2A, attached hereto and incorporated by reference herein as Exhibit A to Attachment 1.

2. The Assignee hereby agrees that all maintenance of the BWRD shall be performed in accordance with that certain Agreement between the City of Boulder and the Boulder and White Rock Ditch and Reservoir Company (Wonderland Creek Greenways Improvement Project) dated _____, 2015, recorded at Reception No. _____ on _____, 2015 in the records of the Boulder County Clerk and Recorder.

IN WITNESS WHEREOF, Assignor and Assignee have executed this Limited Assignment on this _____ of May, 2015.

BNSF RAILWAY COMPANY

By:_____

Title:_____

STATE OF _____)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 2015 by _____ as _____ of BNSF Railway Company, a Delaware corporation.

WITNESS my hand and official seal.

_____
Notary Public

My Commission Expires:_____

CITY OF BOULDER

BY: _____
City Manager

ATTEST:

_____
City Clerk

APPROVED AS TO FORM:

_____
City Attorney Office

Attachment 1

RAILROAD EASEMENT

[this attachment will be the entire Exhibit D, AGREEMENT FOR RECREATIONAL TRAIL PEDESTRIAN/BIKE PATH, WONDERLAND CREEK DRAINAGEWAY AND BWRD, from the C&M Agreement]

MEMORANDUM OF EASEMENT

THIS MEMORANDUM OF EASEMENT is hereby executed this _____ day of_____, 2015, by and between **BNSF RAILWAY COMPANY**, a Delaware corporation ("**Grantor**"), whose address for purposes of this instrument is 2500 Lou Menk Drive, Fort Worth, Texas 76131, and **The City of Boulder, Colorado**, a Colorado home rule municipality ("**Grantee**"), whose address for purposes of this instrument is 1777 Broadway, Boulder, Colorado 80302, which terms "Grantor" and "Grantee" shall include, wherever the context permits or requires, singular or plural, and the legal representatives, successors and assigns of the respective parties:

WITNESSETH:

WHEREAS, Grantor owns or controls certain real property situated in Boulder County, _____ as described on **Exhibit "A"** attached hereto and incorporated herein by reference (the "**Premises**');

WHEREAS, Grantor and Grantee entered into an Easement Agreement, dated _____, 2015 (the "**Easement Agreement**") which set forth, among other things, the terms of an easement granted by Grantor to Grantee over and across the Premises (the "**Easement**"); and

WHEREAS, Grantor and Grantee desire to memorialize the terms and conditions of the Easement Agreement of record.

For valuable consideration the receipt and sufficiency of which are hereby acknowledged, Grantor does grant unto Grantee and Grantee does hereby accept from Grantor the Easement over, under and across the Premises.

The term of the Easement, unless sooner terminated under provisions of the Easement Agreement, shall be perpetual.

All the terms, conditions, provisions and covenants of the Easement Agreement are incorporated herein by this reference for all purposes as though written out at length herein, and both the Easement Agreement and this Memorandum of Easement shall be deemed to constitute a single instrument or document. This Memorandum of Easement is not intended to amend, modify, supplement, or supersede any of the provisions of the Easement Agreement and, to the extent there may be any conflict or inconsistency between the Easement Agreement or this Memorandum of Easement, the Easement Agreement shall control.

IN WITNESS WHEREOF, Grantor and Grantee have executed this Memorandum of Easement to as of the date and year first above written.

GRANTOR:

BNSF RAILWAY COMPANY, a Delaware corporation

By: _____
Name: _____
Title: _____

STATE OF TEXAS §
§
COUNTY OF TARRANT §

This instrument was acknowledged before me on the _____ day of _____, 2015, by _____ (name) as _____(title) of **BNSF RAILWAY COMPANY**, a Delaware corporation.

_____
Notary Public

My appointment expires:_____

(Seal)

GRANTEE:
The City of Boulder, Colorado, a Colorado home rule municipality

By:

_____
Jane S. Brautigam, City Manager

Attest:

_____
City Clerk

Approved as to form:

_____
Office of the City Attorney

STATE OF _____ §
§
COUNTY OF _____ §

This instrument was acknowledged before me on the _____ day of _____, 2015, by Jane S. Brautigam as City Manager of the City of Boulder, a Colorado home rule municipality.

_____
Notary Public

My appointment expires:_____

(Seal)

EXHIBIT "A"

PROJECT NUMBER: STM M110-081
RAILROAD EASEMENT NUMBER: RE-2A
PROJECT CODE: 18405
DATE: JULY 25, 2013
DESCRIPTION

A Railroad Easement No. RE-2A of the City of Boulder, State of Colorado Project No. STM M110-81 (PC 18405) containing 8,819 sq. ft. (0.202 acres) of land, more or less, being a portion of that property as described in the Deed recorded in Book 121, Page 40 of the Boulder County Records, located in the S.E. 1/4 of Section 20, Township 1 N., Range 70 W., of the 6th Principal Meridian, in the City and County of Boulder, Colorado, said tract or parcel being more particularly described as follows:

COMMENCING at the C-E 1/16th corner of Section 20, being a found illegible 2.5" diameter aluminum cap in water box, whence the C 1/4 corner of Section 20, being a found 2.5" diameter aluminum cap in survey box stamped in part "City of Boulder Control" bears S. 89°38'05" W., a distance of 1329.40 feet; Thence S. 49°31'35" E., a distance of 1,231.39 feet to a point on the existing westerly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular northwesterly from the centerline of the main track and being the **TRUE POINT OF BEGINNING**;

1. Thence along said westerly right-of-way line, N. 24°59'51" E., a distance of 93.52 feet;

2. Thence along a non-tangent curve to the right, having a central angle of 10°39'44", a radius of 240.00 feet, an arc length of 44.66 feet, the chord of which bears S. 79°08'59" E., a distance of 44.60 feet to the beginning of a compound curve to the right;

3. Thence along said curve to the right, having a central angle of 30°04'55", a radius of 110.00 feet, an arc length of 57.75 feet, the chord of which bears S. 58°46'40" E., a distance of 57.09 feet to a point on the existing easterly right-of-way line of the B.N.S.F. Railway Company, (May, 2013), said point being 50 feet measured perpendicular southeasterly from the centerline of the main track;

4. Thence along said easterly right-of-way line, S. 24°59'51" W., a distance of 90.16 feet;

5. Thence along a non-tangent curve to the left, having a central angle of 09°29'42", a radius of 215.00 feet, an arc length of 35.63 feet, the chord of which bears N. 45°34'49" W., a distance of 35.59 feet to the beginning of a compound curve to the left;

6. Thence along said curve to the left, having a central angle of 23°29'27", a radius of 25.00 feet, an arc length of 10.25 feet, the chord of which bears N. 62°04'23" W., a distance of 10.18 feet to the beginning of a compound curve to the left;

7. Thence along said curve to the left, having a central angle of 22°16'08", a radius of 155.00 feet, an arc length of 60.24 feet, the chord of which bears N. 84°57'11" W., a distance of 59.86 feet, more or less, to the **TRUE POINT OF BEGINNING**.

The above described Railroad Easement contains 8,819 sq. ft. (0.202 acres) of land, more or less.

The purpose of the above-described Railroad Easement is for construction, permanent placement, access, use and maintenance of the relocated segment of the Boulder and White Rock Ditch and utilities.

COLORADO REGISTERED PROFESSIONAL LAND SURVEYOR
GREG F. STEPHENSON
7-26-13

BASIS OF BEARINGS: All bearings are based on the line connecting the C 1/4 corner of section 20, T. 1 N., R. 70 W. of the 6th P.M. (being a found 2.5" diameter aluminum cap in survey box, stamped in part "City of Boulder Control") and the C-E 1/16 corner of section 20, T. 1 N., R. 69 W. of the 6th P.M. (being a found illegible 2.5" diameter aluminum cap in water box) being a **GRID** bearing of **N. 89°38'05" E. 1329.40'** as obtained from a global positioning system (GPS) survey based on the Colorado High Accuracy Reference Network (CHARN). Said grid bearing is NAD 83 (2007) Colorado State Plane North Zone 501.

Geoffrey F. Stephenson, PLS 23521
For and on behalf of The Lund Partnership, Inc.
12265 W. Bayaud Avenue, Suite 130
Lakewood, CO 80228

COLORADO REGISTERED PROFESSIONAL LAND SURVEYOR
GEOFFREY F. STEPHENSON
7-26-13
23521

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
DENVER REGULATORY OFFICE, 9307 S. WADSWORTH BOULEVARD
LITTLETON, COLORADO 80128-6901

May 19, 2015

City of Boulder
c/o Mr. Kurt Bauer
P. O. Box 791
Boulder, Colorado 80306

Re: Department of the Army Permit No. NWO-2011-2278-DEN
Wonderland Creek Major Drainageway Project – Winding Trail Drive to Foothills Pkwy

Dear Mr. Bauer:

Enclosed is Department of the Army Permit No. NWO-2011-2278-DEN to excavate and place fill material into 0.64 acre of Wonderland Creek streambed and impact 1.11 acres of wetlands to address safety concerns associated with flood conveyance; protect existing and proposed infrastructure and private property; and improve multi-purpose trail connectivity. The project area is located along Wonderland Creek between Winding Trail Drive and Foothills Parkway through a residential and commercial development in Boulder. The project area is in Section 20, Township 1 North, Range 70 West in Boulder County, Colorado.

Please notify Rena Brand at (303) 979-4120, or the above address, when work on this project is begun and also when completed. She may also be called if you have any questions concerning the permit. When communicating with our office regarding this project please reference **File No. NWO-2011-2278-DEN.**

Sincerely,

Kiel G. Downing
Chief, Denver Regulatory Office

Enclosure

Copy Furnished:

Mary Powell
ERO Resources Corp.
1842 Clarkson St.
Denver, CO 80218

DEPARTMENT OF THE ARMY
SECTION 404 PERMIT

Project Name:	Wonderland Creek Major Drainageway Project – Winding Trail Dr to Foothills Pkwy
Permittee:	City of Boulder
Permit No:	NWO-2011-2278-DEN
Waterway:	Wonderland Creek and adjacent wetlands
Location:	The project is located along Wonderland Creek between Winding Trail Drive and Foothills Parkway through a residential and commercial development in Boulder. The project area is in Section 20, Township 1 North, Range 70 West in Boulder County, Colorado.
Issuing Office:	Corps Omaha District, Denver Regulatory Office

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Contents:

1. **General Information, Signature Blocks**
2. **Detailed Description of Authorized Work**
3. **General Conditions**
4. **Special Conditions**
5. **Figures and Attachments**

1. GENERAL INFORMATION, SIGNATURE BLOCKS

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer. You are authorized to perform work in accordance with the terms and conditions specified below.

1. **Congressional Authorities**: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. **Limits of this authorization.**

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. **Limits of Federal Liability**. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. **Reliance on Applicant's Data**: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. **Reevaluation of Permit Decision**. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. **Extensions**. The time limit for completing the work authorized ends on **May 31, 2017**. If you find that you need more time to complete the authorized activity, submit your **request for a time extension to this office for consideration at least one month before the above date is reached.** Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

5/13/15

Permittee Date

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

Joel R. Cross 5-19-15

Colonel, Corps of Engineers Date
District Commander

BY:

Kiel G. Downing
Chief, Denver Regulatory Office

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, the transferee must sign and date below.

Transferee Signature Date

Transferee (Print or Type) Title

Organization or Company (Print or Type)

Address (Print or Type) Phone

2. DETAILED DESCRIPTION OF AUTHORIZED WORK

In accordance with the terms and conditions of this Department of the Army permit, the City of Boulder is granted authorization by the Secretary of the Army to excavate and place fill material into 0.64 acre of Wonderland Creek streambed and impact 1.11 acres of wetlands to address safety concerns associated with flood conveyance; protect existing and proposed infrastructure and private property; and improve multi-purpose trail connectivity. The project area is located along Wonderland Creek between Winding Trail Drive and Foothills Parkway through a residential and commercial development in Boulder. The project area is in Section 20, Township 1 North, Range 70 West in Boulder County, Colorado. Issuance of this permit and the description of the project are based on documents submitted in the original permit application submitted November 2014, and subsequent revisions of plans submitted during application review.

2.1. Location. The project area is located along Wonderland Creek between Winding Trail Drive and Foothills Parkway through a residential and commercial development in Boulder. The project area is in Section 20, Township 1 North, Range 70 West in Boulder County, Colorado.

2.2. Existing Conditions. Generally, Wonderland Creek is combination of a trapezoidal drainage channel and storm sewer culverts. Prior to residential development, there was no formal Wonderland Creek channel. During flood events, surface water likely sheet-flowed across the land and was intercepted by the Boulder White Rock Ditch (BWRD), which was constructed in the late 1800's. Several agricultural irrigation ditches ran through the area, including one near the existing Wonderland Creek channel that flowed into the BWRD. Currently, the BWRD intercepts most flows in Wonderland Creek, a configuration that is a remnant of the drainage's origin as an irrigation ditch. The BWRD has decreed water rights off Boulder Creek and Goose Creek and has historically intercepted flows in Wonderland Creek. As development increased, surface flows were directed into constructed drainage channels that were eventually formalized into Wonderland Creek. There are 1.56 acres of wetlands and 0.19 acre of open water/channel in the project area, not all of the resources will be impacted.

2.3. Description of Work. The project proposes to excavate and place clean fill material into 0.64 acre of Wonderland Creek streambed and 1.11 acres of wetlands to address safety concerns associated with flood conveyance; protect existing and proposed infrastructure and private property; and improve multi-purpose trail connectivity. At most, 453 trees will be removed. See attached plans and drawings for a more detailed description of work for each reach. If any non-site fill material is used, the permittee will have to identify the source which will be evaluated by this office prior to the start of construction.

2.4. Impacts and Mitigation. To compensate for these impacts, 0.64 acre of Wonderland Creek streambed will be restored, and 1.11 acre of wetlands will be created with on-site native plantings. Also, 1,884 shrubs and trees will be planted. See mitigation plans and drawings for more details.

3. GENERAL CONDITIONS

1. The time limit for completing the work authorized ends on **May 31, 2017**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

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4. SPECIAL CONDITIONS

A. The permittee agrees that all reports or correspondence required under these special conditions shall include the following information:

Project:	Wonderland Creek Major Drainageway Project – Winding Trail Dr to Foothills Pkwy
Corps Permit No:	NWO-2011-2278-DEN
County:	Boulder County
Permittee:	City of Boulder
Expiration Date:	**May 31, 2017**

and shall be sent to:

US Army Corps of Engineers
Denver Regulatory Office
9307 S. Wadsworth Blvd.
Littleton, CO 80128-6901

B. The permittee agrees to construct the project and mitigation as shown on drawings which are attached to, and made a part of, this permit.

C. The permittee agrees to follow the **Section 401 Certification Requirements** that are attached to, and made part of, this permit.

D. The permittee agrees to contact the U. S. Fish and Wildlife Service, Office of Migratory Birds, at (303) 236-8171, for permitting requirements prior to the removal or destruction of any bird nest.

E. The permittee agrees that they are responsible for all work accomplished in accordance with the terms and conditions of this authorization. If a contractor or other authorized representative will be accomplishing the work hereby authorized in behalf of the permittee, such parties shall be provided a copy of this authorization so they are aware of the terms and conditions. An activity that fails to comply with the terms and conditions of this authorization will be considered unauthorized and all responsible parties will be subject to appropriate enforcement action.

F. The permittee is responsible for ensuring that the Corps is notified of the location of any borrow site that will be used in conjunction with the construction of the authorized activity so that the Corps may evaluate the site for potential impacts to aquatic resources, historic properties, and endangered species. The permittee shall not initiate work at the borrow site in conjunction with the authorized activity until approval is received from the Corps.

G. Invasive Aquatic Species : If heavy equipment is used for the subject project that was previously working in another stream, river, lake, pond or wetland within 10 days of initiating work, one of the following procedures is necessary to prevent the spread of New Zealand Mud Snails and other aquatic hitchhikers: (1) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and keep the equipment dry for 10 days; or (2)Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with either a 1:1 solution of Formula 409 Household Cleaner and water, or a solution of QUAT 4. Treated equipment must be kept moist for at least 10 minutes; or (3) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with water greater than 120 degrees F for at least 10 minutes.

H. The permittee agrees to restore 0.64 acre of streambed, and create 1.11 acre of wetland commencing by, and completing before May 31, 2017. The permittee shall hire a professional ecologist to oversee the mitigation, which will be accomplished in accordance with the attached mitigation plan and with these special conditions. In cases where a conflict between the two exists, the special conditions supersede the mitigation plan.

I. The permittee agrees that the created wetlands will be considered successful and self-sustaining when the following conditions have been met without intervention in the form of irrigation or replanting of desirable vegetation during the last three (3) years of a five (5) consecutive year period or as determined by the Corps:

a. At least 80 % (determined by ocular estimate of herbaceous and shrub foliar cover) of the mitigation site is vegetated, with at least 50% of the total number of dominant species present will consist of species rated as facultative or wetter.

b. Trees and shrubs, to include volunteer specimens, will have a survival rate of at least 85%. Species composition shall be representative of species planted.

c. Those species shown on the Colorado Noxious Weed Inventory list-A shall be 100% eradicated. Those species shown on list-B shall be no more than 10% or less of the total cover in the mitigation area. The lists can be found at https://www.colorado.gov/pacific/agconservation/noxiousweeds .

J. The permittee agrees that the mitigation areas will have no more than 20% non-native species in all stratigraphic levels (forbs, shrubs, trees) unless determined otherwise by the Corps.

K. The permittee agrees to verify that the mitigation site has the appropriate hydrology to ensure success of wetland creation and/or enhancement. This verification will be reported in the first annual monitoring report submitted after construction of the mitigation site and can be done with photographs, moisture probe data, ground water monitoring stations or other techniques approved by the Corps. If site conditions indicate that adequate hydrology is not present, the permittee agrees that remedial efforts will be undertaken after consultation with the Corps.

L. The permittee agrees to monitor the authorized work and mitigation during the summer months each year beginning in 2017. Annual Reports will be submitted to the Corps of Engineers before December 31 of each year beginning in 2017. The format of this report shall follow the requirements shown in the attached *Annual Mitigation Monitoring Report Format Requirements*. The permittee agrees to monitor all wetlands within, or contiguous to, the project site that are to remain 'undisturbed' as the authorized work progresses. If there is any indication that the 'undisturbed' wetlands, are being adversely impacted, the permittee will contact the DA for potential remedial actions to be taken. The permittee's responsibility to complete the required compensatory mitigation will not be considered fulfilled until it has been demonstrated mitigation success and have received written verification from the Corps. If, at any time during the first two years after initial implementation of mitigation, site conditions indicate that the success criteria are not likely to be achieved, the permittee agrees that remedial efforts will be undertaken after consultation with the Corps of Engineers. In addition to on-site remedial efforts, if the Corps determines that additional on-site efforts are unsuccessful, remedial efforts may include new mitigation plans and sites, the purchase of credits from a mitigation bank or participation in an in-lieu fee program.

M. Based on information provided by the applicant, the Corps has determined the overall project purpose is to address safety concerns associated with flood conveyance; protect existing and proposed infrastructure and private property; and improve multi-purpose trail connectivity. This project purpose was the basis upon which the Corps conducted its review of the application, as well as a basis for the Corps' determination that permit issuance is in the best interest of the public. Accordingly, the Corps authorizes no change in project purpose, or in the nature of the permitted activity, without prior review and approval.

N. The permittee agrees that all construction debris will be disposed of on land in such a manner that it cannot enter a waterway or wetland except as approved herein.

O. The permittee agrees that equipment for handling and conveying materials during construction shall be operated to prevent dumping or spilling the materials into the water except as approved herein.

P. The permittee agrees that care will be taken to prevent any petroleum products, chemicals, or other deleterious materials from entering the water.

Q. The permittee agrees that steps will be taken to prevent materials spilled or stored on shore from washing into the water as a result of cleanup activities, natural runoff, flooding, and that, during construction, any materials which are accidentally spilled into the water will be retrieved.

R. The permittee agrees that all work in the waterway will be performed in such a manner so as to minimize increases in suspended solids and turbidity which may degrade water quality and damage aquatic life outside the immediate area of operation.

S. The permittee agrees that all areas along the bank disturbed or newly created by the construction activity will be seeded with vegetation indigenous to the area for protection against subsequent erosion.

T. The permittee agrees that the clearing of vegetation will be limited to that which is absolutely necessary for construction of the project except as approved herein.

U. The permittee agrees that close coordination will be maintained by the contractor with downstream water users, advising them of any water quality changes to be caused by the construction.

V. The permittee agrees that all dredged or excavated materials, with the exception of that authorized herein, will be placed on an upland site above the ordinary high water line in a confined area, not classified as a wetland, to prevent the return of such materials to the waterway.

W. The permittee agrees that deposition of excavated materials on shore and all earthwork operations on shore will be carried out in such a way that sediment runoff and soil erosion to the water are controlled.

X. The permittee agrees that adequate pipes shall be installed in any temporary crossing to carry normal flows and prevent the restriction of expected high flows during construction.

Y. The permittee agrees that concrete trucks will be washed at a site and in such a manner that washwater cannot enter the waterway.

Z. The permittee agrees that the use of machinery in the waterway will be kept to a minimum.

AA. The permittee agrees that when the Corps has been notified that a filling activity is adversely affecting fish or wildlife resources or the harvest thereof and the Corps subsequently directs remedial measures, the permittee will comply with such directions as may be received to suspend or modify the activity to the extent necessary to mitigate or eliminate the adverse effect as required.

BB. The permittee agrees that fuel storage tanks above ground shall be diked or curbed or other suitable means provided to prevent the spread of liquids in case of leakage in the tanks or piping.

CC. After a detailed and careful review of all of the conditions contained in this permit, the permittee acknowledges that, although said conditions were required by the Corps of Engineers, nonetheless the permittee agreed to those conditions voluntarily to facilitate issuance of the permit; the permittee will comply fully with all the terms of all the permit conditions.

COLORADO
Department of Public
Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

January 15, 2015

City of Boulder
Attn: Kurt Bauer
PO Box 791
Boulder, CO 80306

Re: **Section 401 Water Quality Certification**
Colorado 401 Certification No.: 4358
US Corps of Engineers 404 Permit No.: NWO-2011-2278-DEN
Description: Stream restoration and floodplain improvements
Location: Latitude 403037707 North, Longitude -105.253186 West in Boulder County, Colorado
Watercourse: Wonderland Creek, South Platte River Basin, Seg. COSPBO02b of Boulder Creek Sub-basin
Designation: Reviewable

Dear Mr. Bauer:

The Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Division (Division) has completed its review of the subject Clean Water Act (CWA) Section 404 Permit Application, and our preliminary determination with the issuance of the State of Colorado 401 Certification Public Notice (5 CCR 1002-82.5(B)). An antidegradation review has also been completed pursuant to Regulation No. 31, Basic Standards and Methodologies for Surface Water (5 CCR 1002-31). The Division's review concluded that only temporary impacts to water quality should occur as a result of this project.

This letter shall serve as official notification that the Division is issuing "Regular Certification" in accordance with 5 CCR 1002-82.5(A)(2).

The 401 Certification issued by the Division pursuant to 5 CCR 1002-82.3(C) shall apply to both the construction and operation of the project for which a federal license or permit is required, and shall apply to the water quality impacts associated with the project. This certification does not constitute a relinquishment of the Division's authority as defined in the Colorado Water Quality Control Act, nor does it fulfill or waive any other local, state, or federal regulations.

If you have any questions or need additional information, please contact me at (303) 692-2374.

Sincerely,

Scott Garncarz
Water Quality Assessor
Environmental Data Unit
Water Quality Control Division

JAN

Attachment

cc: US Army Corps of Engineers, Denver Regulatory Office
Applicant's Agent, Ms. Mary Powell, ERO Resources Corp.
File

Section 401 Certification Requirements
State of Colorado

(A) The following requirements shall apply to all certifications:

(1) Authorized representatives from the Division shall be permitted to enter upon the site where the construction activity or operation of the project is taking place for purposes of inspection of compliance with BMPs and certification conditions.

(2) In the event of any changes in control or ownership of facilities where the construction activity or operation of the project is taking place, the successor shall be notified in writing by his predecessor of the existence of the BMPs and certification conditions. A copy of such notification shall be provided to the Division.

(3) If the permittee discovers that certification conditions are not being implemented as designed, or if there is an exceedance of water quality standards despite compliance with the certification conditions and there is reason to believe that the exceedance is caused, in whole or in part, by the project, the permittee shall verbally notify the Division of such failure or exceedance within two (2) working days of becoming aware of the same. Within ten (10) working days of such notification, the permittee shall provide to the Division, in writing, the following:

(a) In the case of the failure to comply with the certification conditions, a description of (i) the nature of such failure, (ii) any reasons for such failure, (iii) the period of noncompliance, and (iv) the measures to be taken to correct such failure to comply; and

(b) In the case of the exceedance of a water quality standard, (i) an explanation, to the extent known after reasonable investigation, of the relationship between the project and the exceedance, (ii) the identity of any other known contributions to the exceedance, and (iii) a proposal to modify the certification conditions so as to remedy the contribution of the project to the exceedance.

(4) Any anticipated change in discharge location and/or quantities associated with the project which may result in water quality impacts not considered in the original certification must be reported to the Division by submission of a written notice by the permittee prior to the change. If the change is determined to be significant, the permittee will be notified within ten days, and the change will be acknowledged and approved or disapproved.

(5) Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions herein is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with limitations and prohibitions herein. The Division shall be notified immediately in writing of each such diversion or bypass.

(6) At least fifteen days prior to commencement of a project in a watercourse, which the Division has certified, or conditionally certified, the permittee shall notify the following:

(a) Applicable local health departments;

(b) Owners or operators of municipal and domestic water treatment intakes which are located within twenty miles downstream from the site of the project; and

(c) Owners or operators of other intakes or diversions which are located within five miles downstream from the site of the project.

The permittee shall maintain a list of the persons and entities notified, including the date and form of notification.

(7) Immediately upon discovery of any spill or other discharge to waters of the state not authorized by the applicable license or permit, the permittee shall notify the following;

(a) Applicable local health departments;

(b) Owners or operators of municipal and domestic water treatment intakes which are located within twenty miles downstream from the site of the project; and

(c) Owners or operators of other intakes or diversions which are located within five miles downstream from the site of the project.

The permittee shall maintain a list of the persons and entities notified, including the date and form of notification.

(8) Construction operations within watercourses and water bodies shall be restricted to only those project areas specified in the federal license or permit.

(9) No construction equipment shall be operated below the existing water surface unless specifically authorized by the 401 certification issued by the Division.

(10) Work should be carried out diligently and completed as soon as practicable. To the maximum extent practicable, discharges of dredged or fill material shall be restricted to those periods when impacts to designated uses are minimal.

(11) The project shall incorporate provisions for operation, maintenance, and replacement of BMPs to assure compliance with the conditions identified in this section, and any other conditions placed in the permit or certification. All such provisions shall be identified and compiled in an operation and maintenance plan which will be retained by the project owner and available for inspection within a reasonable timeframe upon request by any authorized representative of the Division.

(12) The use of chemicals during construction and operation shall be in accordance with the manufacturers specifications. There shall be no excess application and introduction of chemicals into state waters.

(13) All solids, sludges, dredged or stockpiled materials and all fuels, lubricants, or other toxic materials shall be controlled in a manner so as to prevent such materials from entering state waters.

(14) All seed, mulching material and straw used in the project shall be state certified weed-free.

(15) Discharges of dredged or fill material in excess of that necessary to complete the project are not permitted.

(16) Discharges to state waters not identified in the license or permit and not certified in accordance therewith are not allowed, subject to the terms of any 401 certification.

(17) Except as otherwise provided pursuant to subsection 82.7(C), no discharge shall be allowed which causes non-attainment of a narrative water quality standard identified in the Basic Standards and Methodologies for Surface Waters, Regulation #31 (5 CCR 1002-31), including, but not limited to discharges of substances in amounts, concentrations or combinations which:

(a) Can settle to form bottom deposits detrimental to beneficial uses; or

(b) Form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or

(c) Produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species, or to the water, or

(d) Are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or

(e) Produce a predominance of undesirable aquatic life; or

(f) Cause a film on the surface or produce a deposit on shorelines.

(B) Best Management Practices:

(1) Best management practices are required for all projects for which Division certification is issued except for section 402 permits. Project applicants must select BMPs to be employed in their project. A listing and description of best management practices is located in Appendix I of Regulation No. 82: 401 Certification Regulation 5 CCR 1002-82.

(2) All requests for certifications which require BMPs shall include a map of project location, a site plan, and a listing of the selected BMPs chosen for the project. At a minimum, each project must provide for the following:

(a) Permanent erosion and sediment control measures that shall be installed at the easiest practicable time consistent with good construction practices and that shall be maintained and replaced as necessary throughout the life of the project.

(b) Temporary erosion and sediment control measures that shall be coordinated with permanent measures to assure economical, effective, and continuous control throughout the construction phase and during the operation of the project.

Approved Authorized Work and Drawings
(Detailed Description)
Wonderland Creek Major Drainageway Improvements
City of Boulder, Colorado
Corps File NWO-2011-2278-DEN

Authorized Work: The City's objectives with the project are to reduce flooding of private property adjacent to Wonderland Creek; eliminate downstream flooding along the Boulder and White Rock Ditch (BWRD); eliminate overtopping of the BNSF Railroad; provide regional trail connections; correct the unsafe pedestrian crossing of the BNSF Railroad tracks; stabilize Wonderland Creek; and minimize impacts to existing wetlands.

Foothills Parkway Authorized Improvements

The existing culvert has the capacity to route the entire 100-year event and there would be no improvements to the culverts under Foothills Parkway. To prevent 100-year flows from being conveyed under Foothills Parkway into the currently undersized downstream of Wonderland Creek and flooding private property, the upstream face of the Foothills Parkway culverts would be restricted as part of the project improvements. This restriction would cause the 100-year spill south along the BNSF Railroad embankment to continue. A future project would be needed to remove these properties from the floodplain and remove the restriction from the Foothills culverts.

BNSF Authorized Improvements

A new crossing is authorized at the BNSF Railroad to allow storm flows that exceed the capacity of the BWRD to pass under the railroad without flooding the tracks. The crossing would also serve as a pedestrian crossing to connect the authorized Wonderland Creek Trail to the existing trail running north and south along Foothills Parkway. A new channel for Wonderland Creek would be graded downstream of the crossing to connect to the existing Wonderland Creek to the Foothills Parkway Culvert.

A bridge with an approximate open area of 440-sf is required to pass the 100-year flow under the railroad while maintaining a headwater elevation of approximately 5284 ft, so as not to flood the track ballast. Vertical abutments would result in a bridge span of around 76 ft. The available vertical clearance for the Wonderland Creek Trail is limited. To maximize clearance for the trail, a relatively short span between the abutments and the pier is authorized to minimize the required girder depth. The trail elevation would be set approximately 0.5 ft above the channel invert and a concrete seat wall would be constructed adjacent to the trail, allowing the trail to stay dry up to just under a 5-year storm event.

BWRD Authorized Improvements

In its existing location, the BWRD is aligned parallel to the BNSF Railroad and approximately 400 ft of the ditch alignment is located within existing BNSF right-of way. The project would realign the BWRD further west outside of the BNSF right-of way, but would continue to use the existing wooden bridge to cross the BNSF Railroad.

The realignment would include a small pedestrian bridge to allow pedestrians to cross over the irrigation ditch and travel down the embankment to the pedestrian crossing at Wonderland Creek at the authorized BNSF Railroad bridge. A turnout structure is authorized just upstream of the wooden BNSF bridge to limit the amount of storm water allowed through the Foothills Parkway culvert. Limiting storm flows would reduce flooding in residential areas east of Foothills Parkway.

A spillway would be constructed along the east bank of the BWRD for storm water that exceeds the capacity of the BWRD culvert. The crest elevation is set to contain the BWRD maximum decreed flow rate of 135 cfs. The length of the weir is set by the depth over the spillway necessary to minimize upstream backwater elevations and remove adjacent structures from the floodplain. A 100-year water surface elevation of 5286.5 ft over the spillway provides little to no freeboard for the structures upstream. The spillway would be designed to protect the BWRD embankment during flood events and the final shape and materials for the spillway would be determined during final design.

To reduce flooding of adjacent structures downstream of Spring Creek Place and to maximize the area available for wetland mitigation, a wider channel is proposed. The existing drainage easement downstream of Spring Creek Place is not wide enough to accommodate the authorized widening. To reduce flood elevations while minimizing additional easements and right-of-way, walls are authorized on either side of the channel for close to 80 feet downstream of Spring Creek Place, at which point the available width increases allowing for sloping channel banks.

Boulder White Rock Ditch (BWRD) to Spring Creek Place

While the walls minimize the widening required along the south bank of the channel downstream of Spring Creek Place, a portion of an existing parking lot would still need to be removed and reconfigured to increase channel conveyance and to allow for the Wonderland Creek Trail alignment.

Sediment that has deposited in the channel over the years would be removed, lowering the channel close to 2 ft near Spring Creek Place and restoring the historic channel invert. The confluence with the BWRD would be re-constructed to fit with the relocated irrigation ditch. For maintenance purposes, the channel would be accessed from a authorized access road along the west bank of the relocated BWRD, or from the Wonderland Creek Trail along the south bank of Wonderland Creek.

Spring Creek Place Culvert

The authorized improvements include sediment removed in the existing triple cell structure and constructing a five-cell structure in its place. All deposition in the area of the culvert and down to the BWRD would be excavated. The authorized structure is oversized to account for 10% blockage of the culvert but would not contain the 100-year event. The crossing structure would be overtopped by approximately 6 in of water during the 100-year event, providing a passable culvert for emergency vehicles.

The Spring Creek Place culvert would also serve as a crossing for the Wonderland Creek Trail. To accommodate required minimum trail curve radii, two (2) of the cells on each side of the structure would be extended.

To maintain a low-flow channel through the culvert, low-height walls would direct the low-flow to the center of the culvert. This allows the vertical dimension of the outer cells to stay at 4.5 ft and maximize the capacity of the culvert, while maintaining a more consistent low flow channel width to aid in reducing deposition rates along the channel corridor.

Spring Creek Place to 34th Street

The culvert improvements at Spring Creek Place help to reduce flood depths for a short distance upstream, but closer to 34th Street the flood depths are controlled by the channel slope and section. The channel invert near 34th Street needs to be lowered to reduce flood depths near 34th Street. A authorized3.6 ft drop at the existing 34th Street culvert outfall would lower the channel and provide a lower tail water elevation at the outfall of the Iris Avenue Overflow Culvert to contain the 100-yr floodplain upstream of Iris Avenue.

Walls are required throughout this section of Wonderland Creek to maintain the channel capacity, accommodate the authorized Wonderland Creek Trail, stay within existing right-of-way, and maximize the area available for wetland mitigation. In general, walls were placed on the north and east bank of Wonderland Creek and used as retaining walls for the Wonderland Creek Trail and channel maintenance access. This approach helps to minimize disturbance to the south and west channel bank. At one point, the Wonderland Creek Trail alignment is close to an existing mature tree and an entrance to a multi-family housing unit. To maximize the distance between the trail, the tree, and the entrance, tiered boulder walls are authorized along the south and west bank of Wonderland Creek.

34th Street Culvert

There are no recommended improvements to the 34th Street culvert. While the existing culvert does not have capacity for the 100-year event, an overflow culvert is authorized to capture and route larger storm flows from the north side of Iris Avenue, discharging downstream of 34th Street. Wonderland Creek base flows and smaller storm flows would be routed through a smaller culvert under Iris Avenue to the channel upstream of 34th Street, maximizing the use of the existing 34th Street capacity. See the Iris Avenue section for additional information on the Iris overflow culvert and the Iris Avenue culvert.

34th Street to Bridger Trail

Improvements to the channel upstream of 34th Street are confined to only what is required to construct the outfall of the Iris Avenue culvert. The Iris Avenue culvert outfalls near Bridger Trail and would require headwall, wing walls, and outfall protection. An existing storm sewer outfall would be extended through the south wing wall and combined with discharge from a pump house located near the southwest corner of Bridger Trail and Iris Avenue. Channel improvements extend nearly 40 ft downstream of the culvert outfall and the remaining 180 ft would remain untouched. This section of Wonderland Creek can be accessed from the north bank off of Iris Avenue for maintenance needs.

Iris Avenue Culverts

Two (2) culverts are authorized at Iris Avenue: the Iris Avenue culvert and the Iris Avenue overflow culvert. The Iris Avenue culvert would replace the existing culvert and route base flows and a portion of storm flows to the section of channel between Bridger Trail and 34th Street. This connection would allow this section of Wonderland Creek to remain similar to existing conditions. Using the capacity of the existing channel and 34th Street culvert reduces the size of the Iris Avenue overflow culvert. A weir structure is authorized at the culvert entrance to direct base flows and low flows through the Iris Avenue culvert, only allowing larger storm flows to the overflow culvert. The Iris Avenue overflow culvert would serve as an overflow culvert to route a large portion of the higher storm flows under Iris Street to an outfall just east of 34th Street.

Upstream of Iris Avenue

The design of this channel section was influenced by a combination of capacity requirements to contain the 100-yr floodplain, the invert elevation of the Iris Avenue culvert, and need to size the channel bottom to help balance the required wetland mitigation area while minimizing the required easements and right-of-way.

Four (4) drop structures are authorized upstream of Iris Avenue, allowing the channel to tie into the existing channel at the existing parking access bridge. The two (2) downstream drops are 2 ft tall, and the two (2) upstream drops are 1 ft tall for a total of 6 ft of drop to tie into the required Iris Avenue overflow culvert invert elevation. In addition to the drop structures, a boulder weir structure is authorized at the Iris

Avenue culvert entrance to direct base flows and low flows through the culvert and maintain the existing channel alignment.

As a result of the widening and lowering of the channel, walls are authorized to minimize the additional easements and right of way needed. A cast-in-place wall to retain Iris Avenue along the south bank is authorized for the first several hundred feet upstream. The north bank would be used for access to the channel for maintenance purposes.

Diagonal Highway to Kalmia Avenue

To eliminate flooding of adjacent structures downstream of Kalmia Avenue, retaining walls are necessary to maximize the use of the existing drainage easement. The retaining walls would have an average height of approximately 6 ft.

Due to physical constraints and close proximity of structures adjacent to the drainage easement, the retaining walls along the eastern bank of Wonderland Creek would likely need to be constructed using concrete caissons or a top down construction method.

A 110 ft long pedestrian bridge would replace the existing low flow pedestrian crossing along this section of channel. The pedestrian bridge low chord would be positioned above the 100-year water surface. A low flow pedestrian crossing configuration is not an option in this area due to the tight constraints and the need to maximize flood conveyance. A low flow crossing would result in flooding of structures along the west bank.

Three (3) drop structures are required along this portion of Wonderland Creek. A 4 ft drop structure would be constructed just downstream of the Kalmia Avenue culverts to lower the channel below the elevation of the multi-use trail and allow for drainage from the authorized pedestrian underpass. The other two (2) drop structures are located downstream of the authorized pedestrian bridge. The drop structures would hold the channel slope in this area at a constant 0.4%. The downstream drop structures would have drops between 1.5 ft. and 2 ft. These low height drop structures would likely consist of un-grouted boulder structures. Due to the larger drop elevation of the 4 ft drop structure, it would likely be grouted.

Maintenance access to Wonderland Creek is provided just downstream of the Kalmia Avenue near the 4 ft drop structure. Access is also provided in the area of the apartment complex fire access bridge.

Kalmia Avenue Culvert

The authorized improvement to the Kalmia Avenue culverts would include adding a pedestrian underpass to the crossing. The 11 ft (S) x 6ft (R) western most cell of the existing structure would be removed and replaced with a 12 ft (S) x 8ft (R) cell. The new cell would be used for the multi-use trail underpass. The new cell would have an invert of 5323.23 ft, which is 2 ft below the existing box culvert invert of 5325.23 ft. A concrete dividing wall would keep Wonderland Creek base flows and storm flows lower than the 2-year storm event out of the underpass. The Kalmia Avenue culvert has been modeled assuming a 10% blockage to account for debris clogging. The authorized configuration would fully pass the 100-year flows without overtopping Kalmia Avenue. As previously mentioned, a 4 ft drop structure would be constructed directly downstream of the Kalmia Avenue Crossing. This drop structure would lower the channel grades below the elevation of the authorized underpass allowing it to free drain.

Kalmia Avenue to Existing 28th Street Culvert Connection

Minimal channel work would be required in this area to allow for the Kalmia Avenue underpass. A low tailwater basin would be required just upstream of the Kalmia underpass to outfall an existing 36 in storm sewer line. The existing large grouted boulder drop structures would remain in place.

28th Street Existing Culvert Connection to 28th Street

No improvements are authorized to the existing 28th Street culvert. However, the current regulatory FEMA HEC-RAS models does not account for any blockage at the entrance to this culvert. During the flooding events of September, 2013 the trash rack at the entrance to the existing 28th Street culvert experienced significant clogging. For this reason, a 40% clogging factor has been applied to the culvert in the authorized HEC-RAS modeling.

A double 16 ft (S) x 10 ft(R) culvert is authorized under 28th Street. The north cell of the double culvert would be used as an underpass for the multi-use trail. A seat wall is authorized to keep low flows out of the underpass. The base flows and storm flows of Wonderland Creek would now be directed through the authorized28th Street culvert to the east side of 28th Street. The underpass in combination with the existing culvert would accommodate the 100-year flows, eliminating area flooding. A weir is authorized at the entrance of the existing culvert to direct the base flows toward the authorized28th Street culvert underpass. These base flows would support the authorized Wonderland Creek channel along the east side of 28th Street. Approximately 700 linear ft of additional open channel would be created in this area. Retaining walls would be required on the east side of the authorized channel to provide conveyance for the 100-year flows that are directed through the 28th Street underpass. Wetlands would be created along this reach and would provide mitigation for wetlands disturbed in the downstream portion of the project.

Three (3) drop structures are authorized downstream of the 28th Street culvert. The two (2) upstream structures would have between 0.75 ft and 1 ft of fall and would provide a stable channel slope of 0.4%. The downstream most drop structure in this area would be 4.75 ft tall and would replace the existing undersized grouted riprap rundown structure.

The new drop structure would connect the authorized channel along the east side of 28th Street to the existing channel at the downstream end of the existing 28th Street culvert outfall. An overhead electrical line runs parallel to 28th Street along the eastern side of the road. It is likely that one power pole would need to be relocated in the area of the new double 16 ft (S) x 10 ft (R) culvert. Retaining walls would need to be constructed around the remaining poles in the area to make way for the authorized channel.

28th Street to Winding Trail Drive

To provide 100-year containment, the channel must be lowered and widened. A walled channel is required to eliminate the floodplain spills to the south. A low flow pedestrian crossing is authorized o get the multi-use trail across the creek and allow for a smoother connection to the at-grade crossing of Winding Trail Drive. The pedestrian crossing would provide conveyance for 2-year events. This pedestrian crossing also allows for maintenance access to the channel in this reach. To contain the 100-year floodplain, a relatively smooth channel section is required. The authorized vegetation would likely resemble the existing irrigated turf.

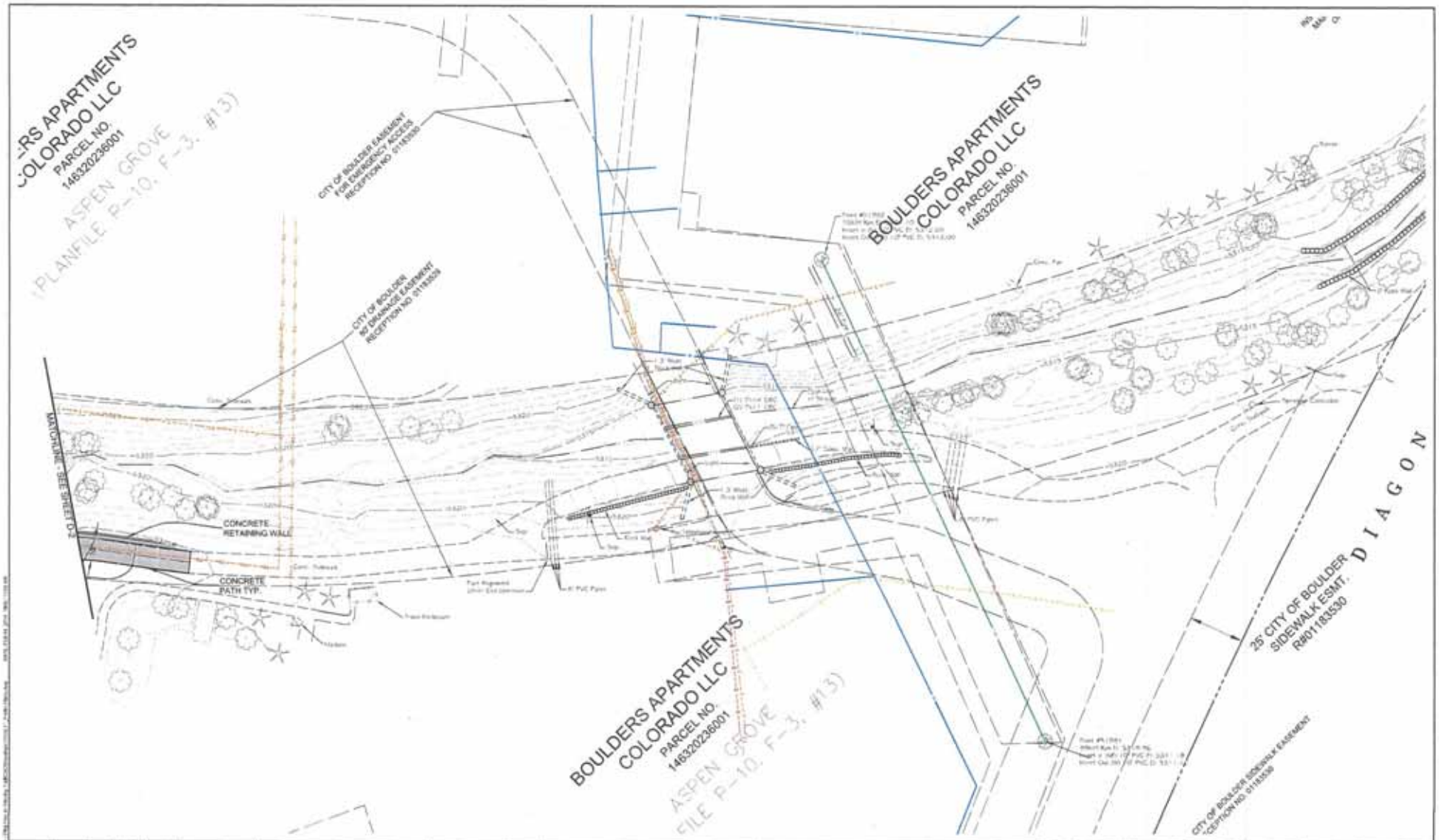
Three (3) drop structures are authorized between Winding Trail Drive and 28th Street. The two (2) upstream drops would vary between 1 ft and 2.5 ft tall drop structures. The downstream 1.5 ft drop structure is authorized just upstream of the 28th Street underpass. A control weir would be incorporated into this drop structure to control the flow between the authorized28th Street culvert and the existing culvert.

Winding Trail Drive Culvert

The authorized improvement to the Kalmia Avenue culverts would include adding an additional cell to the south side of the existing culverts and extending the existing three (3) cell culvert. The new cell would be a 14 ft (S) x 4 ft (R) culvert and would be placed directly south of the existing structure. This additional cell would not eliminate the overtopping of Winding Trail Drive, but it would allow containment of the flows and prevent the spill to the south. An extension to the existing Winding Trail Drive culvert is required to allow a 10 ft wide multi-use trail with a 2 ft shoulder to cross Wonderland Creek on the east side of Winding Trail Drive. This widened trail would be extended along the east side of Winding Trail Drive to connect into sidewalk improvements that the City of Boulder will be constructing along the west side of 28th Street as part of a separate project. The triple 11 ft (S) x 4 ft (R) culvert would be extended approximately 8 ft to accommodate the widened trail section. A 10% blockage factor has been applied to the authorized and existing culverts in this area

The total existing stream length of Wonderland Creek that is authorized for improvement is approximately 5,081 ft. This existing stream length includes 1,289 linear ft of pipes, culvert, and/or bridges as well as 343 ft of concrete lined low flow channel upstream of 28th Street. There would be unavoidable impacts to 0.64 ac of streambed and 1.11 ac of wetlands, including unavoidable temporary impacts that would occur as construction vehicles access the project area during construction. The project is expected to permanently impact approximately 1.11 ac of wetlands and approximately 5,081 linear ft of stream channel.

Avoidance and Minimization Information: The authorized project has been designed to minimize impacts on the stream channel, wetlands, and riparian areas to the greatest extent practicable. In addition to avoiding and minimizing direct impacts, the project would include Best Management Practices (BMP's) during construction to minimize indirect impacts on the stream channel and adjacent areas. Standard BMPs such as the use of sediment-control logs, construction limits fencing, vehicle-tracking control at the site entrance, and temporary rock check dams would be used to reduce impacts outside of the project area.



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Region 4

CITY OF BOULDER

WONDERLAND CREEK - WINDING TRAIL DR. TO DIAGONAL HWY.

MAJOR DRAINAGEWAY IMPROVEMENT PLANS

Designer:	CLK	Structure Numbers	
Detailer:	JHK		
Sheet Subset:		Subset Sheets:	MD-1

Project No./Code: STA 04-XX

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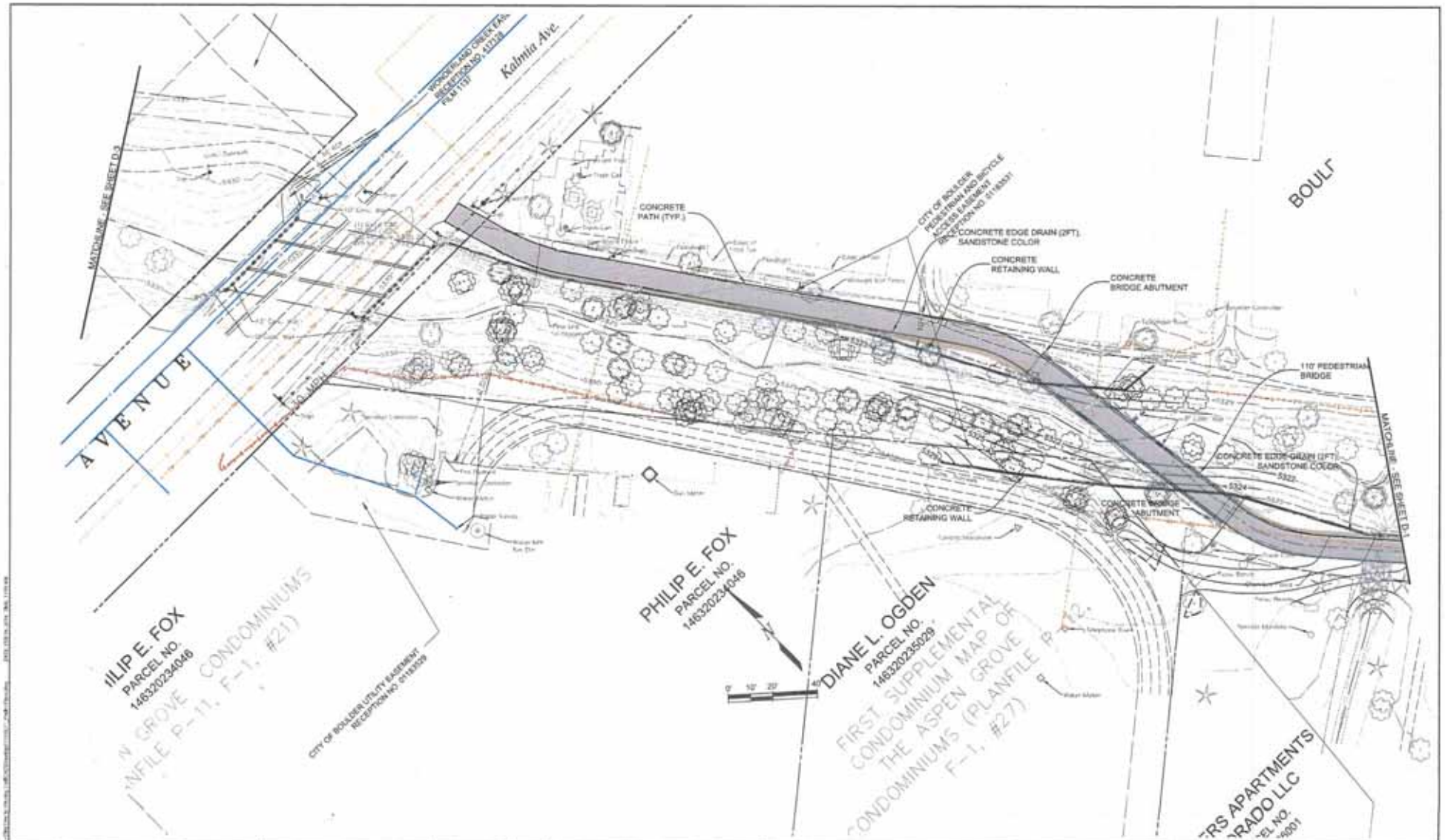
Sheet Number: 1



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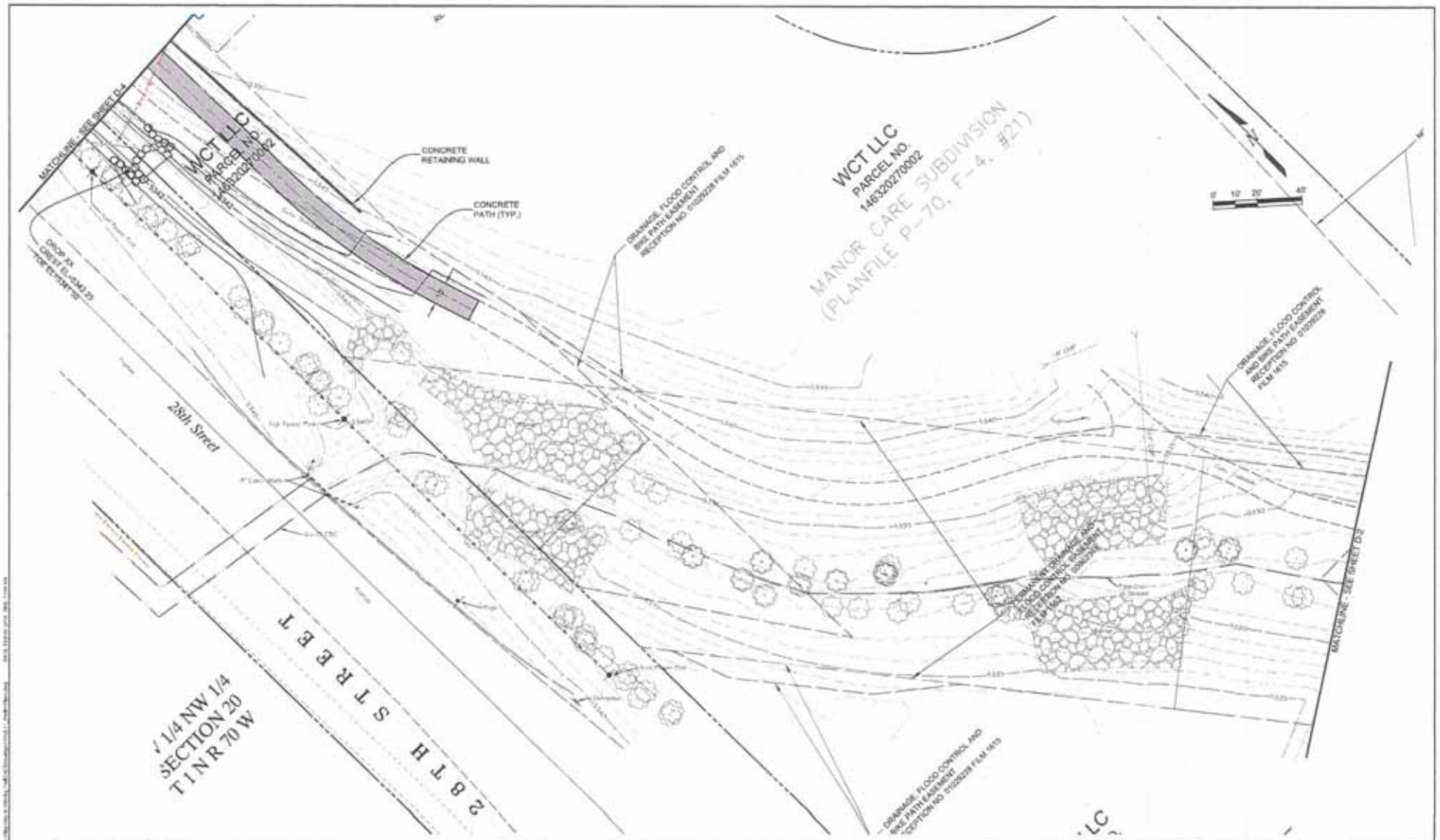

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MAJOR DRAINAGEWAY IMPROVEMENT PLANS

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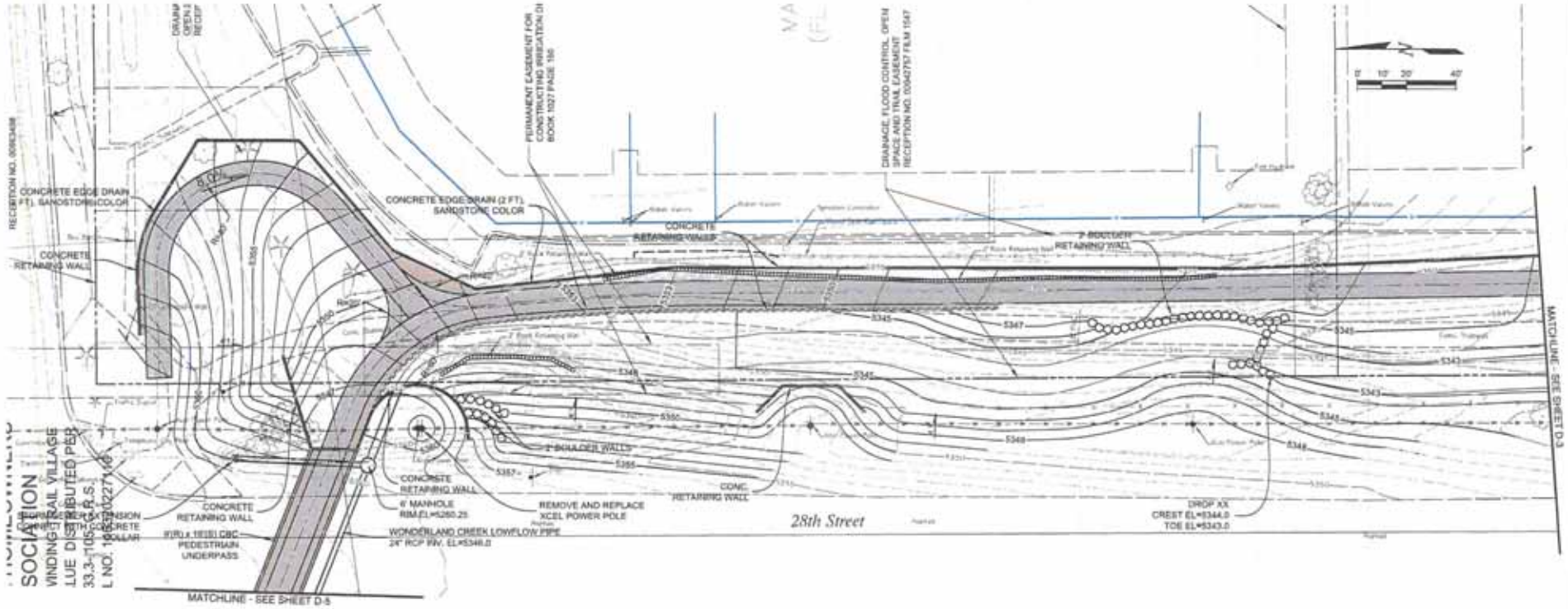

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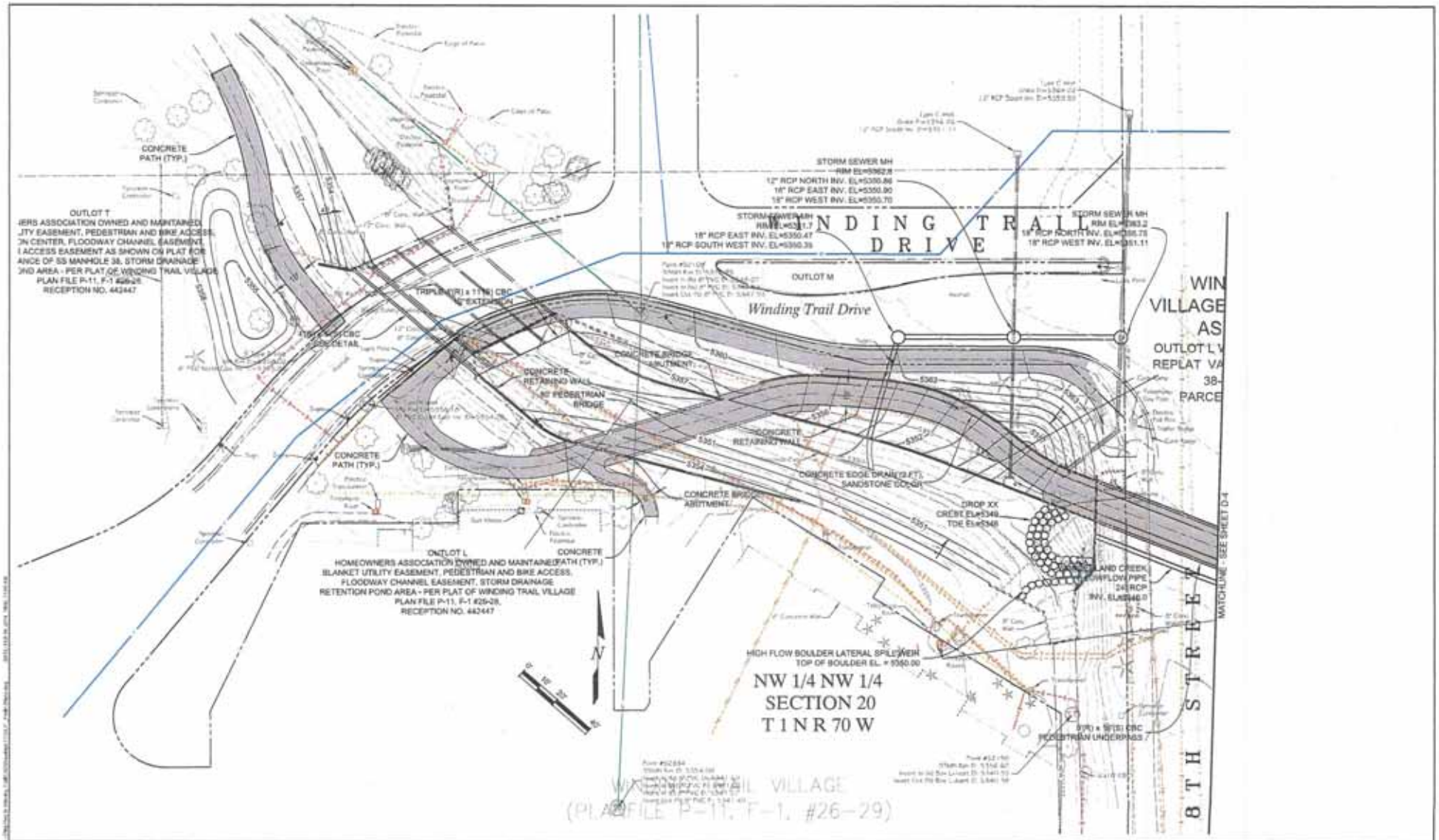

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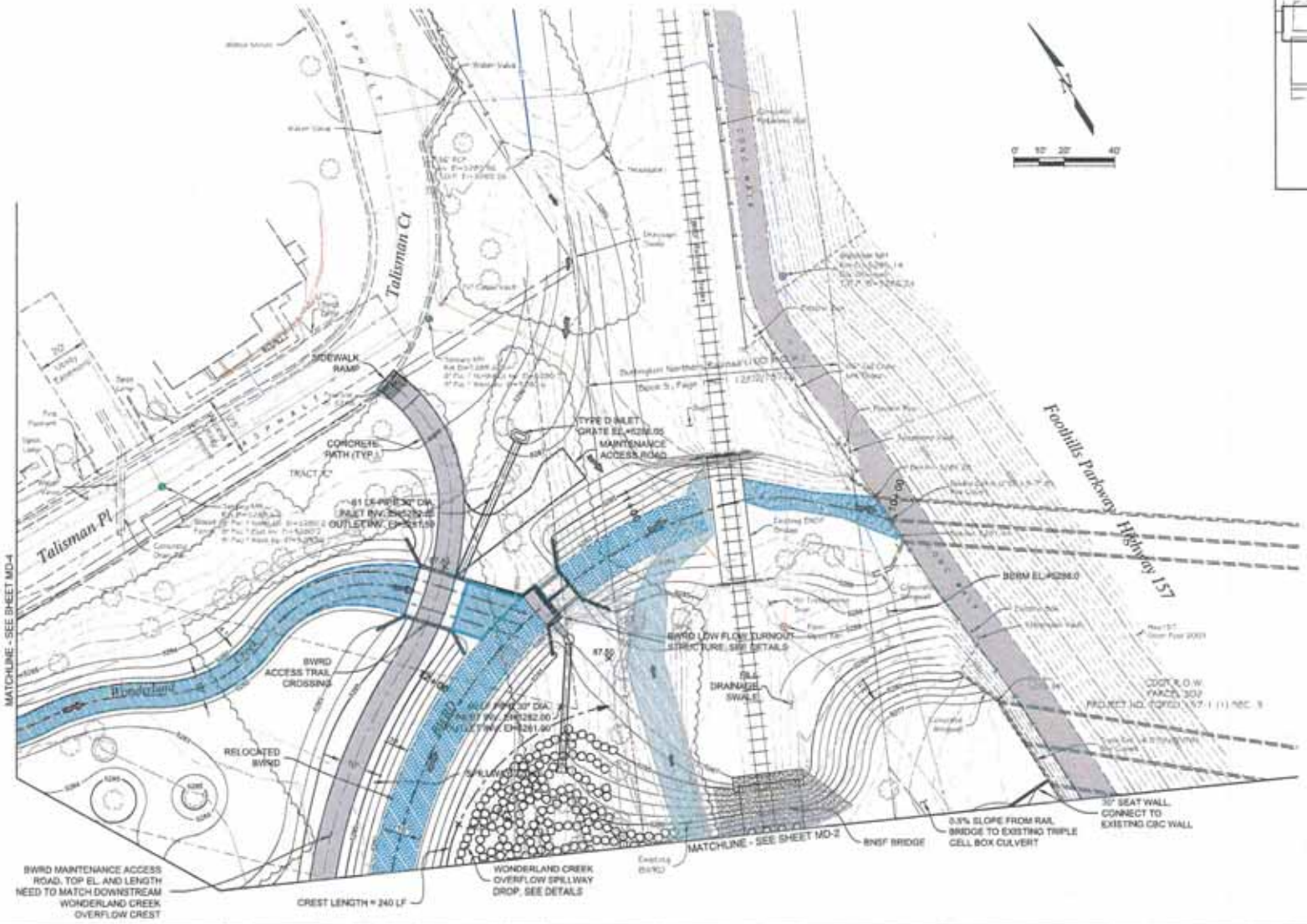

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Region 4

CITY OF BOULDER

WONDERLAND CREEK - 30TH STREET TO FOOTHILLS PARKWAY

MAJOR DRAINAGEWAY IMPROVEMENTS PLAN

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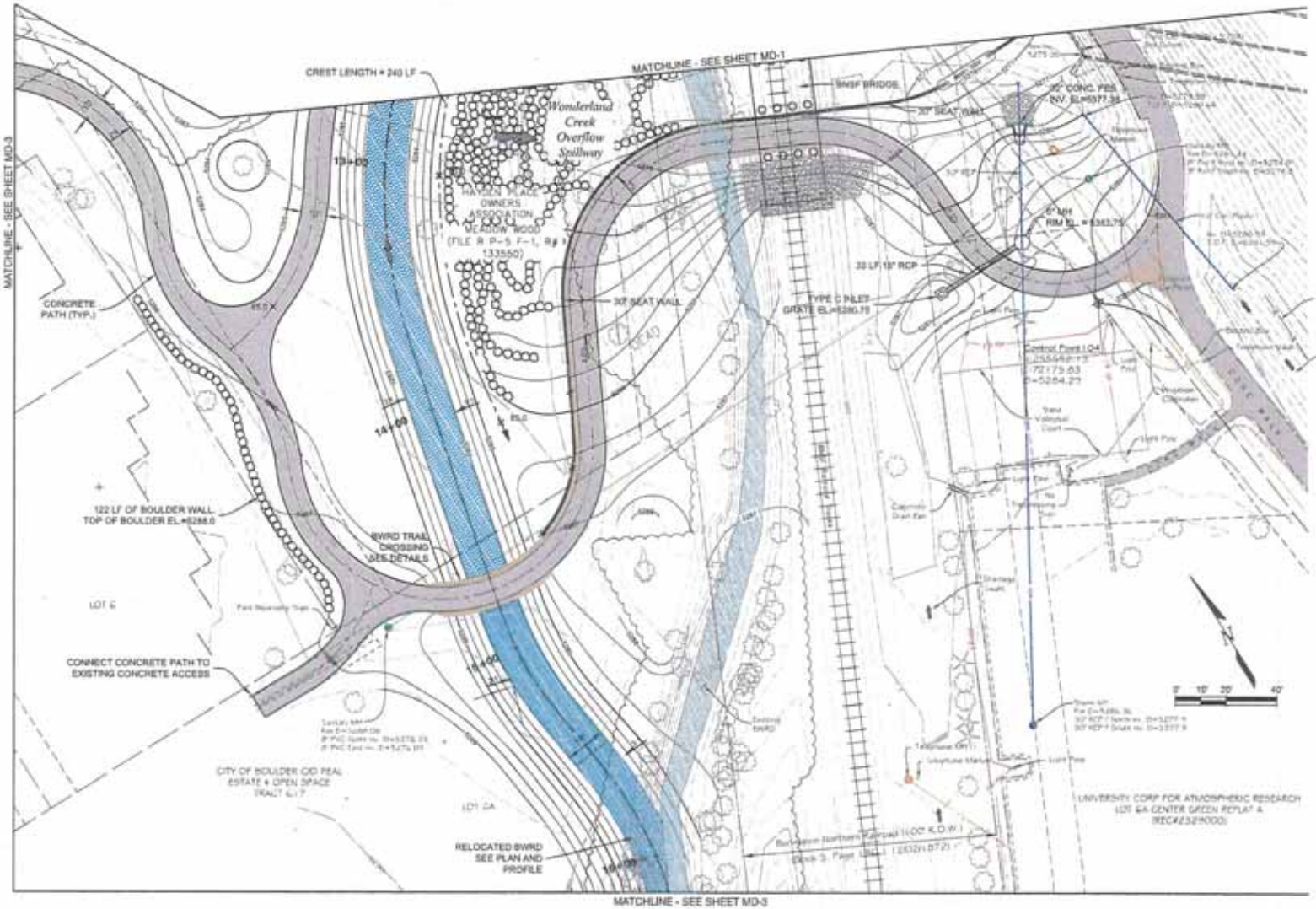

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CITY OF BOULDER

WONDERLAND CREEK - 30TH STREET TO FOOTHILLS PARKWAY

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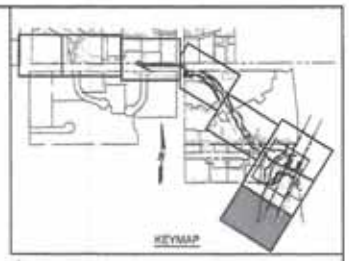

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Region 4

CITY OF BOULDER

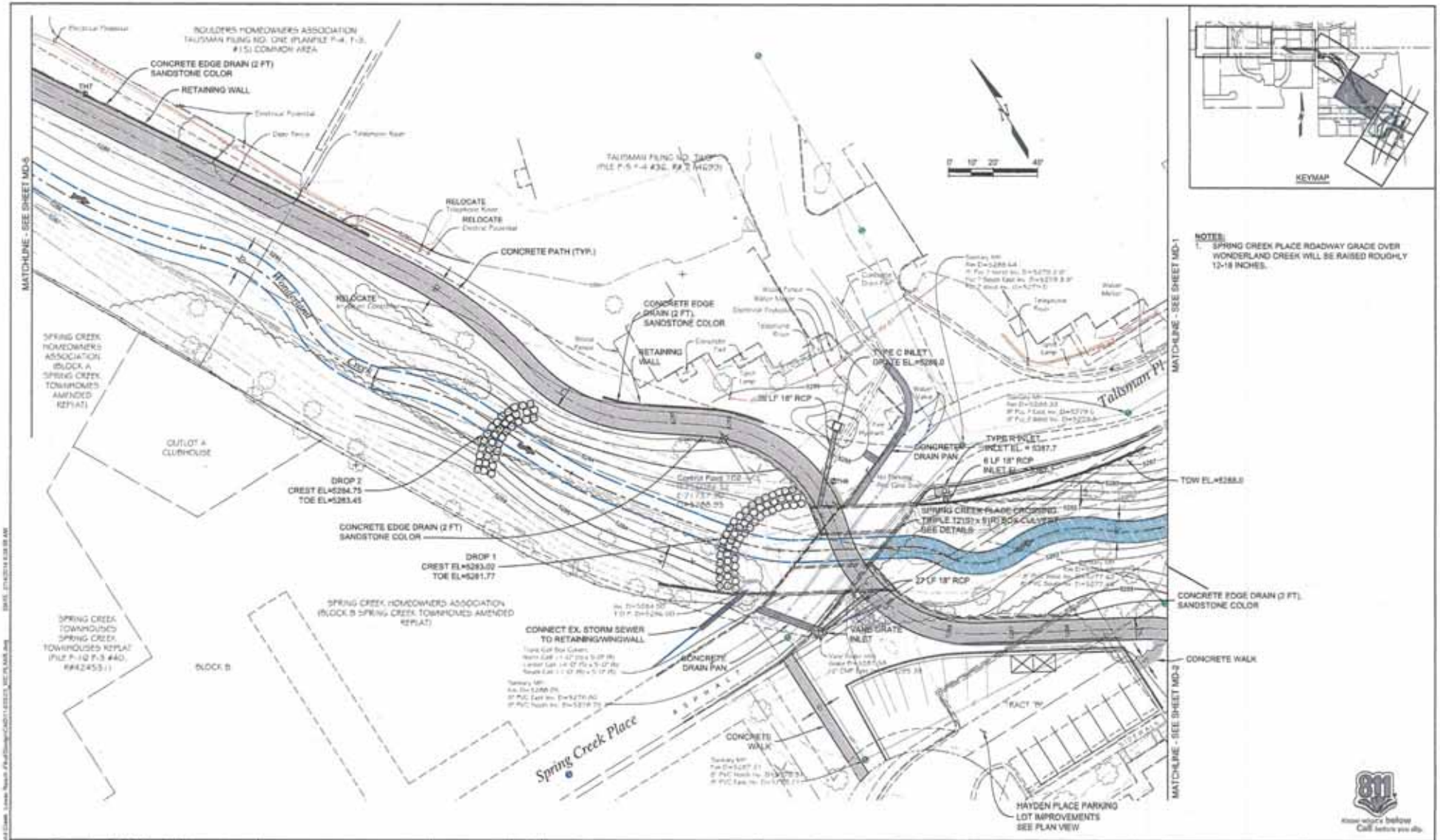
WONDERLAND CREEK - 30TH STREET TO FOOTHILLS PARKWAY

MAJOR DRAINAGEWAY IMPROVEMENTS PLAN

Designer:	CLK	Structure Numbers	
Detailer:	JHK		
Sheet Subset:	CIVIL	Subset Sheets:	MD-3

Project No./Code
STA 04-XX
1xxx8

Sheet Number: MD-3



NOTES:
1. SPRING CREEK PLACE ROADWAY GRADE OVER WONDERLAND CREEK WILL BE RAISED ROUGHLY 12-18 INCHES.

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Region 4

CITY OF BOULDER

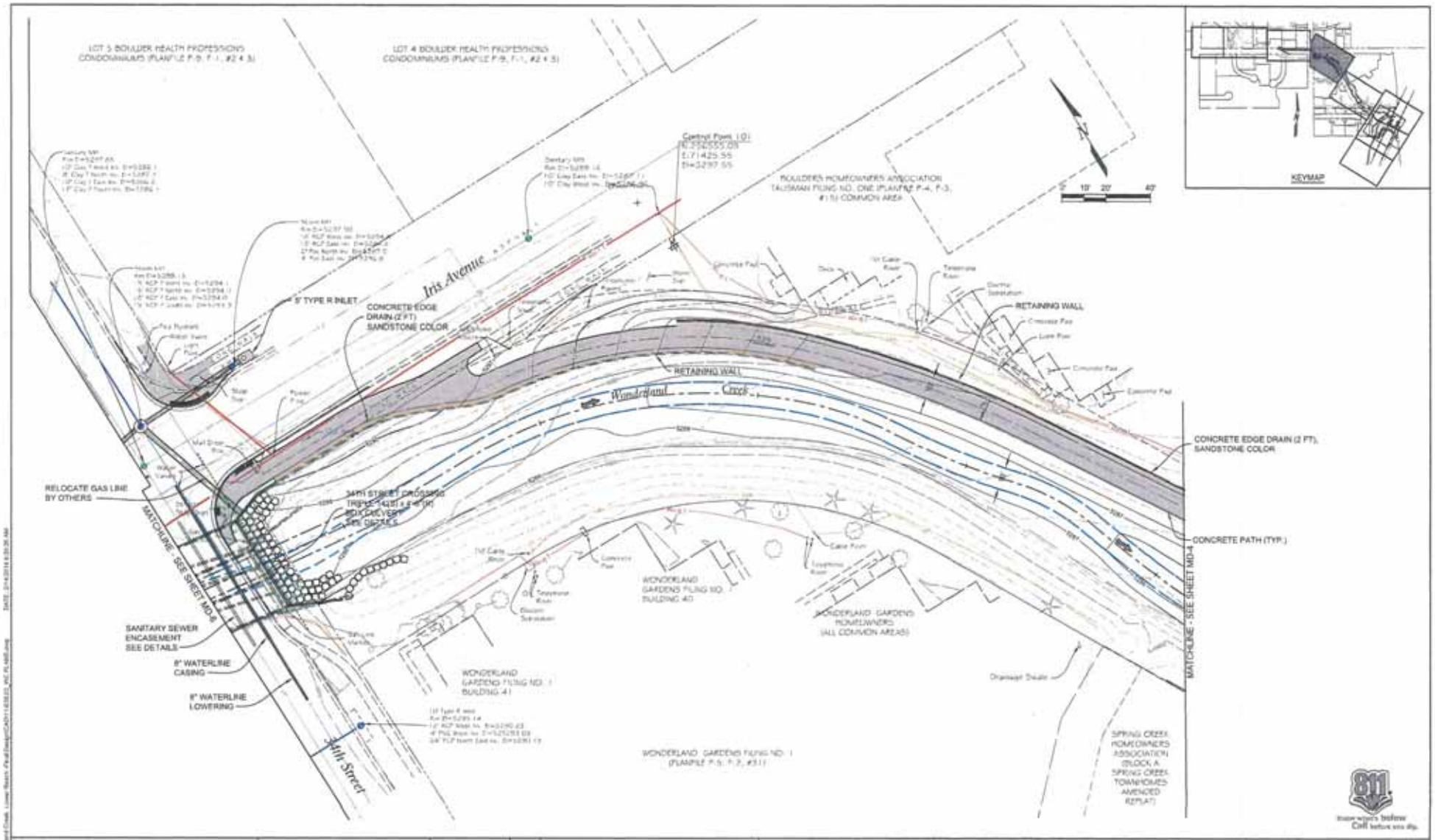
WONDERLAND CREEK - 30TH STREET TO FOOTHILLS PARKWAY

MAJOR DRAINAGEWAY IMPROVEMENTS PLAN

Designer:	CLK	Structure Numbers	
Detailer:	JHK		
Sheet Subset:	CIVIL	Subset Sheets:	MD-4

Project No./Code: STA 04-XX 1xxx8

Sheet Number: MD-4



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Region 4

CITY OF BOULDER

WONDERLAND CREEK - 30TH STREET TO FOOTHILLS PARKWAY

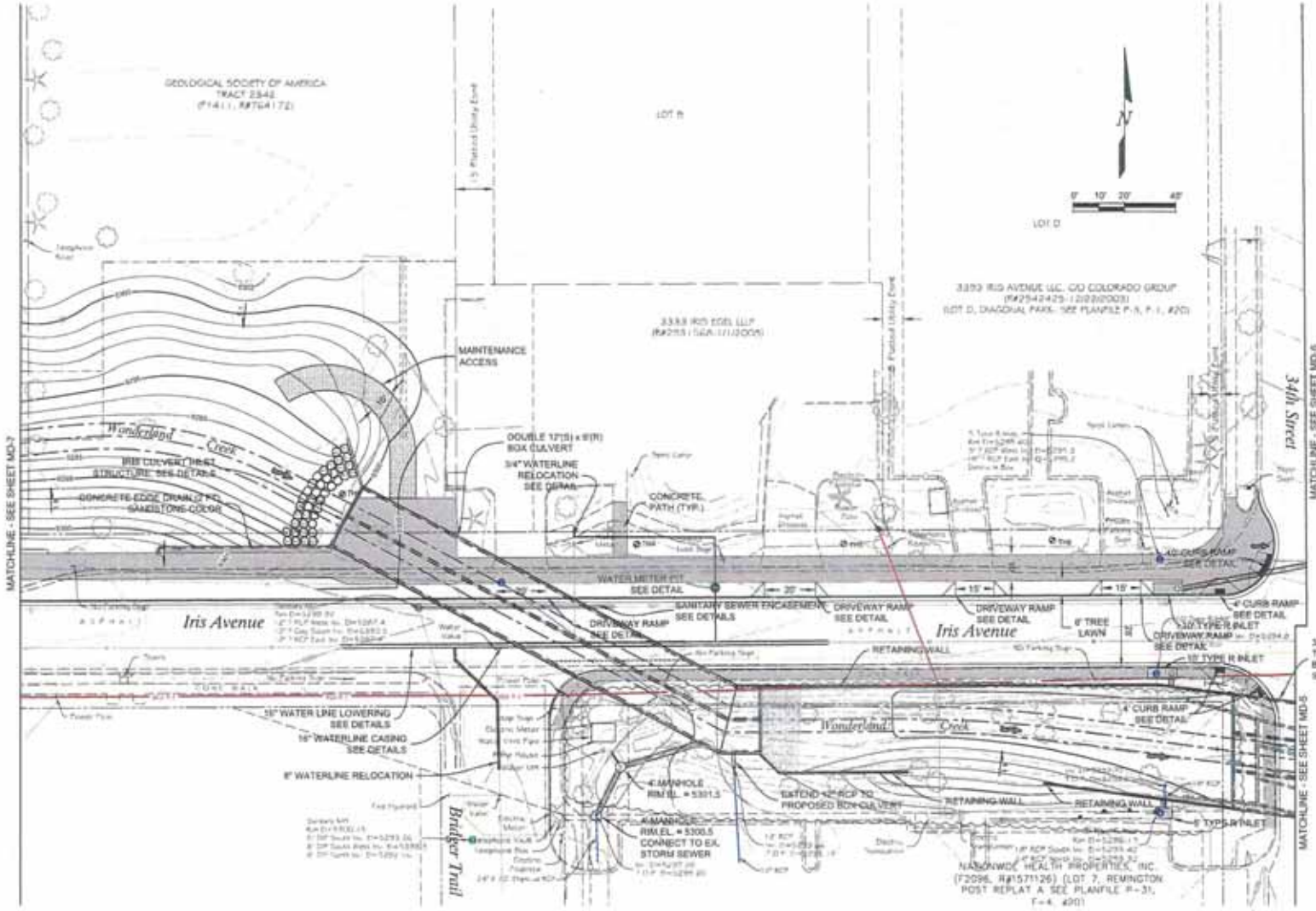
MAJOR DRAINAGEWAY IMPROVEMENTS PLAN

Designer:	CLK	Structure Numbers:	
Detailer:	JHK		
Sheet Subset:	CIVIL	Subset Sheets:	MD-5

Project No./Code: STA 04-XX

1xxx8

Sheet Number: MD-5



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Region 4

CITY OF BOULDER

WONDERLAND CREEK - 30TH STREET TO FOOTHILLS PARKWAY

MAJOR DRAINAGEWAY IMPROVEMENTS PLAN

Designer:	CLK	Structure Numbers	
Detailer:	JHK		
Sheet Subset:	CIVIL	Subset Sheets:	MD-6

Project No./Code: STA 04-XX

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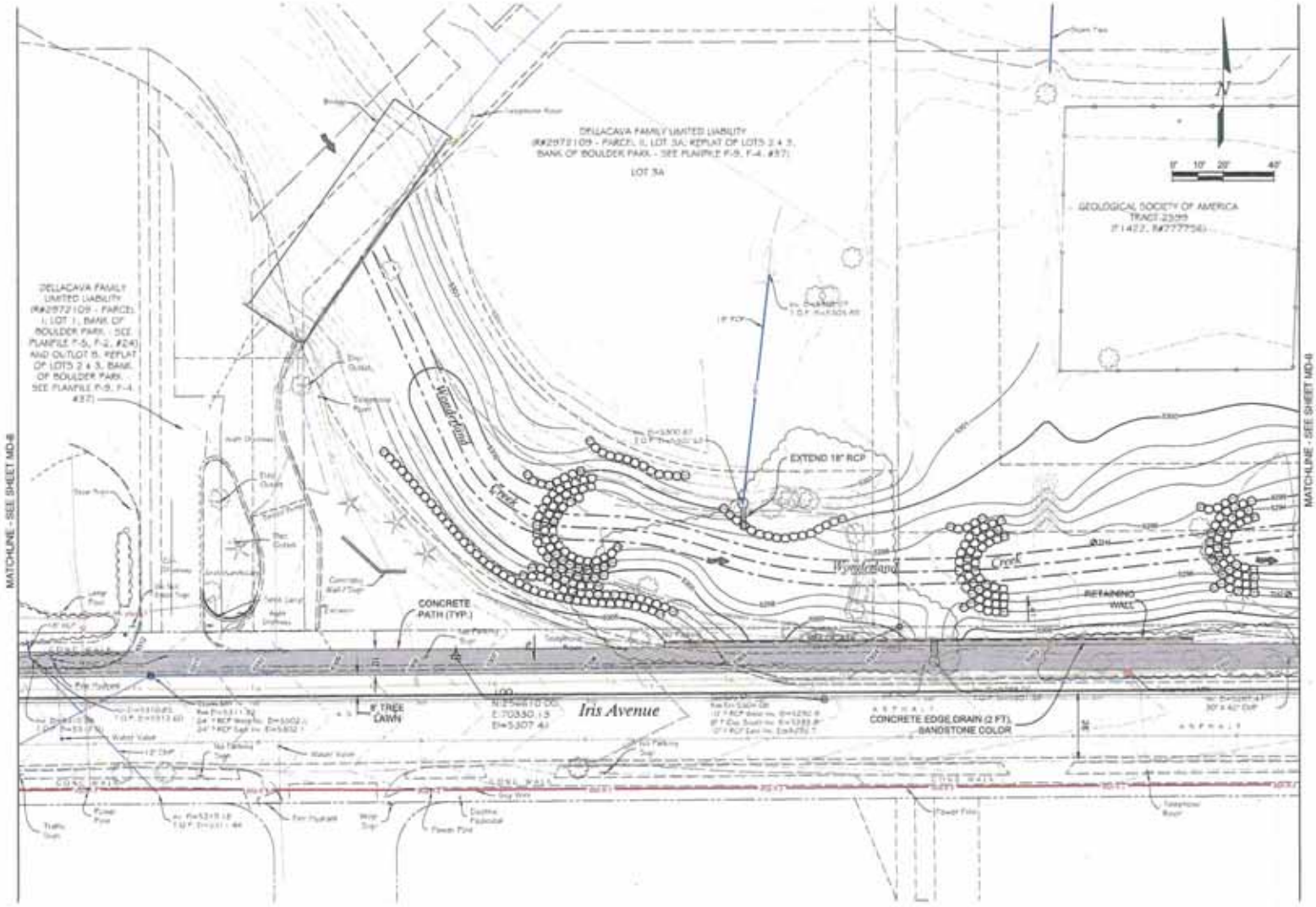
Sheet Number: MD-6



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Region 4

CITY OF BOULDER

WONDERLAND CREEK - 30TH STREET TO FOOTHILLS PARKWAY

MAJOR DRAINAGEWAY IMPROVEMENTS PLAN

Designer:	CLK	Structure Numbers	
Detailer:	JHK		
Sheet Subset:	CIVIL	Subset Sheets:	MD-7

Project No./Code: STA 04-XX

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Sheet Number: MD-7

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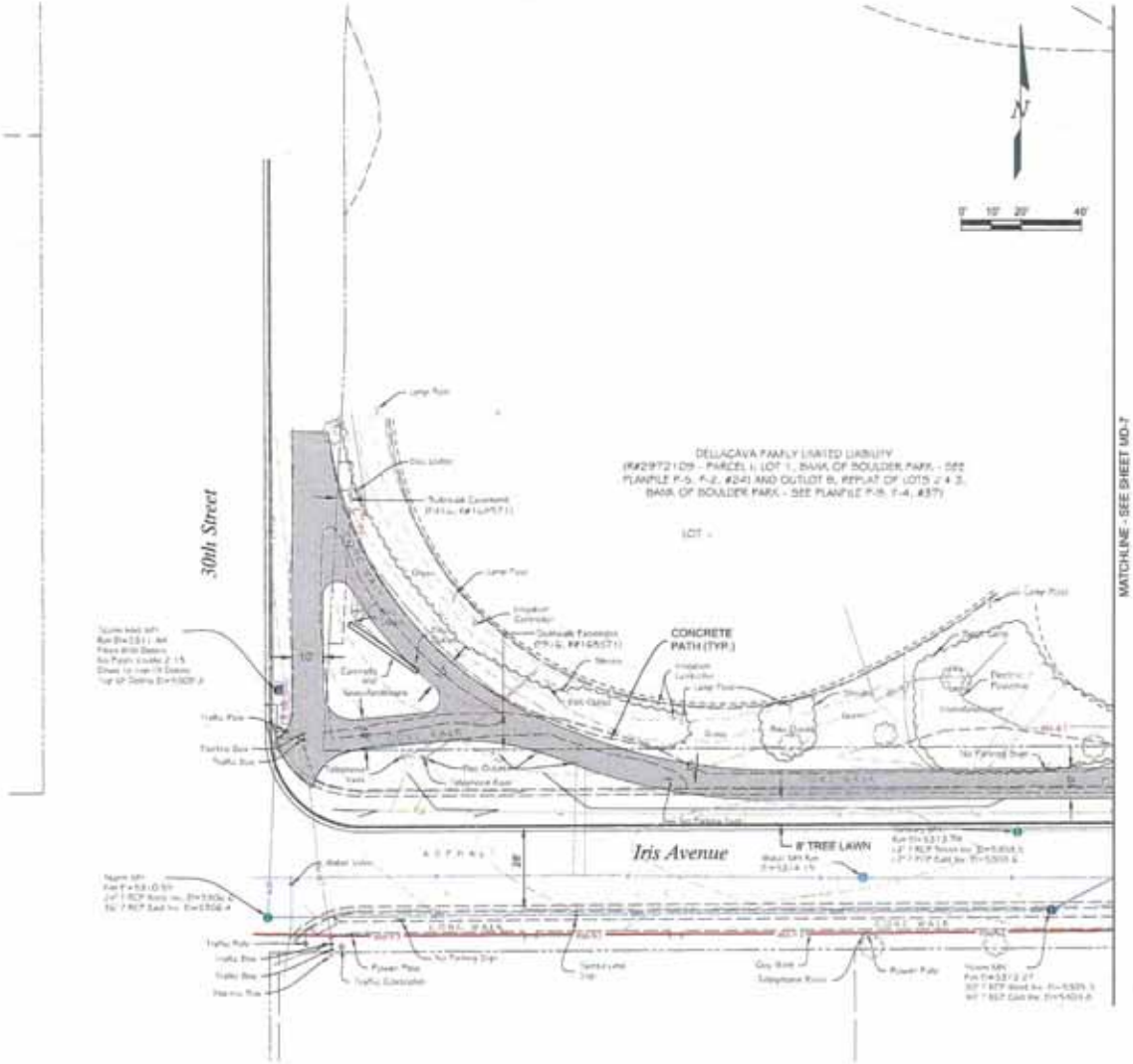

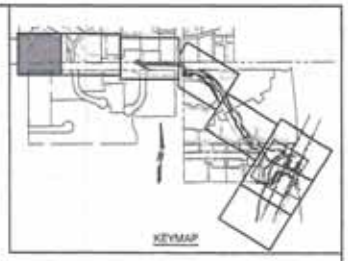

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CITY OF BOULDER

WONDERLAND CREEK - 30TH STREET TO FOOTHILLS PARKWAY

MAJOR DRAINAGEWAY IMPROVEMENTS PLAN

Designer:	CLK	Structure Numbers:	
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Sheet Subset:	CIVIL	Subset Sheets:	MD-8

Project No./Code: STA 04-XX

1xxx8

Sheet Number: MD-8

Approved Mitigation Plan and Drawings
Wonderland Creek Major Drainageway Improvements
City of Boulder, Colorado
Corps File NWO-2011-2278-DEN

The Corps has approved the mitigation plan described below. The City understands the Corps may require that additional special permit conditions be included in any authorization issued to compensate for adverse environmental impacts.

Objectives

The City proposes that the objectives of the mitigation plan are to mitigate on the project area at an area and functional compensatory mitigation ratio of no less than 1:1. The compensatory mitigation would include restoring ground water levels behind the drop structures, establishing and enhancing wetlands through bank stabilization, and creating wetland overbank areas along the stream channels. Because the project would contribute to the flood control and water quality needs of the watershed, the compensatory mitigation would address the needs of the stream reach on which they occur and would benefit the watershed.

Site Selection

The City chose the compensatory mitigation sites to meet watershed needs by providing/replacing lost functions in the area of impacts and having the compensatory mitigation integrated with the design and implementation.

Site Protection Instrument

The City would be responsible for implementing long-term management and monitoring of the compensatory mitigation. The proposed project would occur within dedicated open space and/or drainage easements that would not be developed for residential or commercial uses in the future; therefore, there is little threat to the compensatory mitigation sites from future changes in land uses incompatible with the mitigation.

Baseline Information

A discussion of baseline conditions in the project area is included the wetland delineation report (Appendix A). The proposed compensatory mitigation would replicate the existing baseline conditions as closely as practicable and would provide functions to at least the same degree as the impacted wetlands.

Determination of Credits

The approved permittee-responsible mitigation by the City would be at an area wetland compensatory mitigation ratio of no less than 1:1. The wetland impacts would be mitigated on-site and, therefore, would replace the local wetland, riparian, and aquatic functions in the affected stream reach, which would reduce adverse effects on the watershed. The compensatory mitigation ratio of no less than 1:1 is focused on replacing the wetland, riparian, and aquatic habitat functions as close to the impact area as possible. This ratio and location would help maintain important functions in the affected reach and reduce adverse effects on the watershed.

Mitigation Work Plan

The City proposes the following mitigation work plan:

- The mitigation areas would be constructed at the location and to the extent shown in the attached project plan sheets.
- The mitigation areas would be constructed using earthmoving equipment such as excavators, backhoes, bulldozers, and small front-end loaders.
- The mitigation areas would be built concurrent with construction of the overall project.
- Interim effects of project disturbance would be mitigated by the stormwater management BMPs.
- The source of water for the compensatory mitigation areas would be surface and ground water associated with Wonderland Creek. Because surface water has been present during multiple site visits, it is likely a reliable water supply for the mitigation area.
- The mitigation area would be seeded with a native wetland seed mix.
- State-listed noxious weeds would be managed in the mitigation area.

Table 1 lists the estimated number of tree sizes that would be removed, the approved ratio for replacement with native species, and the quantities of shrubs and trees that will be planted. The actual number of trees removed may vary as the project is modified in the field to minimize impacts to trees.

Table 1. Tree impact and mitigation numbers.

Tree Size Class	Number Removed	Mitigation Ratio	Mitigation Quantities
Trees 1 to 6 inch dia	299	5:1 shrubs	1495 shrubs
Trees 7 to 12 inch dia	113	2:1 poles	266 poles
Trees > 12 inch dia	41	3:1 1.5 inch dia	123 1-inch dia

Maintenance Plan

The City will maintain the compensatory mitigation site until the mitigation success criteria have been met without intervention in the form of irrigation, removal of undesirable vegetation, or replanting of desirable vegetation for a five-consecutive-year period or other time period determined by the Corps. The City will review the compensatory mitigation site at least annually during the growing season to determine and report on the status and progress of the compensatory mitigation site and determine any needed remedial actions. State-listed noxious weeds would be controlled and reseeding and irrigation would occur as needed to establish self-sustaining desirable vegetation. Any maintenance measures implemented would be reported to the Corps in the annual monitoring report.

Performance Standards

Wetland mitigation would be considered successful and self-sustaining when the following conditions have been met without intervention in the form of irrigation, removal of undesirable vegetation, or replanting of desirable vegetation for a five consecutive- year period or other time period determined by the Corps:

• At least 1.11 acres of wetlands are present in the project area and those wetlands have at least 80 percent shrub or herbaceous vegetative cover. At least 50 percent of the species in the wetlands would be species rated as facultative or wetter.
• Those species shown on the Colorado Noxious Weed Inventory List A would be 100 percent eradicated. Those species shown on List B would be no more than 10 percent of the total cover in the mitigation area.
• The number of live planted trees, including volunteers would be 100 percent of the number planted.
• The areal cover of planted shrubs and vegetative shoots, including volunteers, would be 100% of that planted and will have a vegetative cover of at least 75%.

These mitigation success criteria would allow the Corps to objectively evaluate if the compensatory mitigation is developing as proposed and would provide the acreage and function intended. Annual monitoring and reporting on the progress of meeting the success criteria and any remedial measures taken would allow the City and the Corps to assess the expected stages of aquatic resource development, identify potential problems, and develop appropriate adaptive management.

Monitoring Requirements

The Compensatory Mitigation Rule requires a monitoring period of not less than five years (33 CFR Section 332.6(2)(b)). The City commits to no less than five years of monitoring for the project, but may request that the Corps waive the remaining monitoring requirements if the compensatory mitigation project has met the success criteria for three consecutive years. The Compensatory Mitigation Rule allows the Corps to waive or extend the monitoring period (33 CFR Section 332.6(2)(b)).

Long-term Management Plan
The City agrees that once the mitigation areas have been constructed and planted, proper precautions would be taken to prevent domestic animals and human activity from adversely affecting them, and there would be no mowing or other detrimental effects to the mitigation areas.

The compensatory mitigation has been designed to be, to the maximum extent practicable, self-sustaining once the mitigation success standards have been achieved.

The City will be the party responsible for all long-term management of the compensatory mitigation project. All of the compensatory mitigation projects undertaken by the City are fully funded. This includes project implementation, long-term management and maintenance, and any required remedial measures.

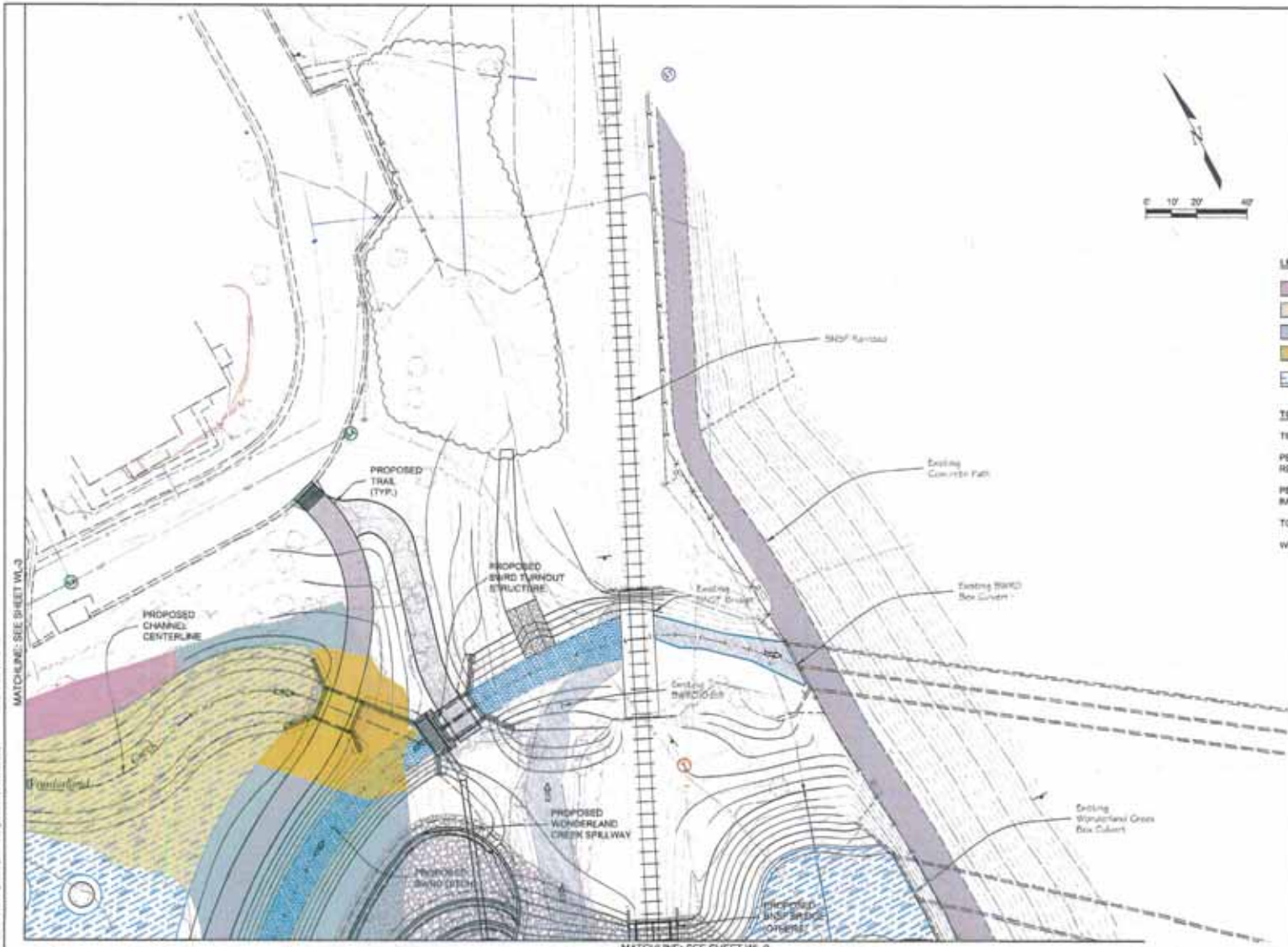
Adaptive Management Plan
The City proposes that if, during the first two years after initial implementation of mitigation, the site conditions indicate that the success criteria are not likely to be achieved, the City agrees to undertake remedial actions after consultation with the Corps.

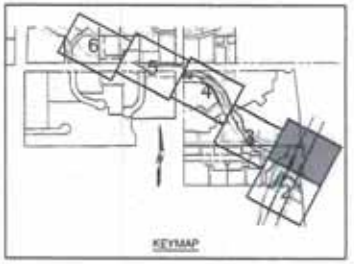
The City believes that this is the most effective process for adaptive management and ensures that any needed corrections in the compensatory mitigation project are coordinated with the Corps and then implemented by the City.

Financial Assurances

The City is a permanent entity with access to adequate funds to cover the mitigation monitoring and any necessary remedial actions. The City's budget includes routine maintenance, which includes mitigation monitoring and maintenance. This ensures adequate funding is available for compensatory mitigation monitoring and maintenance.

The City believes that its past performance under other Corps permits demonstrates its financial ability and commitment to assure that projects approved by the Corps, including compensatory mitigation, are fully implemented and maintained by the City.





LEGEND

- NON-IMPACTED WETLANDS
- TEMPORARY WETLAND IMPACTS (1:1 MITIGATION)
- PERMANENT WETLAND IMPACTS (2:1 MITIGATION)
- WETLAND MITIGATION PERMANENT WETLAND STREAM IMPACTS (1:1) MITIGATION
- WETLAND MITIGATION

TOTAL PROJECT WETLAND IMPACTS / MITIGATION SUMMARY

TEMPORARY WETLAND IMPACTS	40,384 SF
PERMANENT WETLAND IMPACTS: REQUIRES (2:1 MITIGATION)	18,752 SF (ACTUAL = 9,376 SF)
PERMANENT WETLAND (STREAM) IMPACTS: REQUIRES (1:1 MITIGATION)	28,089 SF
TOTAL WETLAND IMPACTS	67,205 SF
WETLAND MITIGATION	67,205 SF

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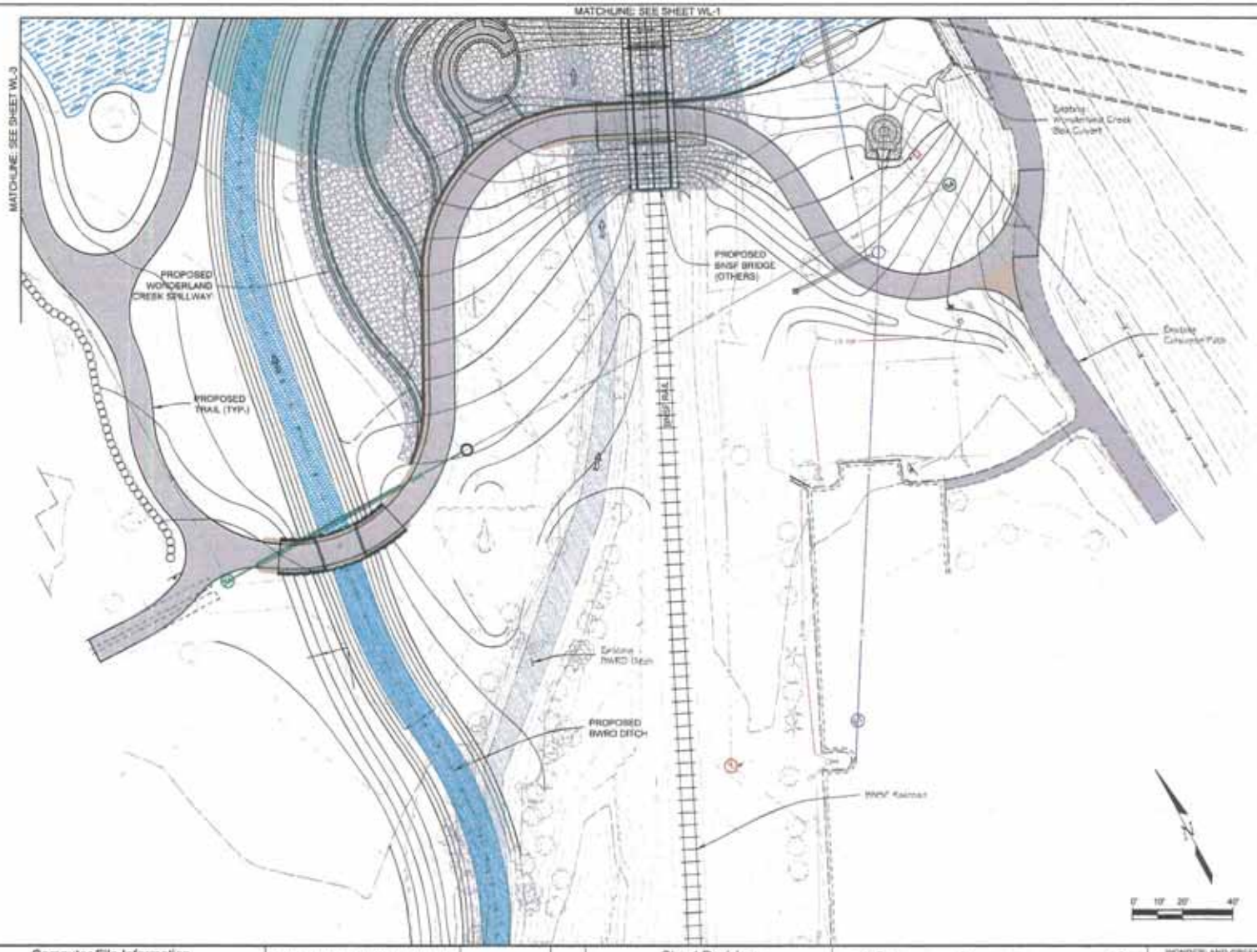
Region 4

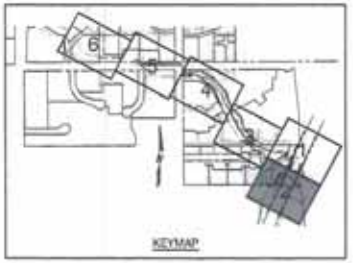
CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT
CITY OF BOULDER
WETLAND IMPACTS PLAN

Designer:	MKN	Structure Numbers	
Detailer:			
Sheet Subset:	WETLAND	Subset Sheets:	WL-1

Project No./Code
STA 04-XX
1xxx8
Sheet Number: 1





LEGEND

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- PERMANENT WETLAND IMPACTS (2:1 MITIGATION)
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- WETLAND MITIGATION

TOTAL PROJECT WETLAND IMPACTS / MITIGATION SUMMARY

TEMPORARY WETLAND IMPACTS	40,364 SF
PERMANENT WETLAND IMPACTS: REQUIRES (2:1 MITIGATION)	18,752 SF (ACTUAL = 9,376 SF)
PERMANENT WETLAND (STREAM) IMPACTS: REQUIRES (1:1 MITIGATION)	28,089 SF
TOTAL WETLAND IMPACTS	87,205 SF
WETLAND MITIGATION	87,205 SF

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Region 4

CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT

CITY OF BOULDER
WETLAND IMPACTS PLAN

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Detailer:			
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Project No./Code	STA 04-XX
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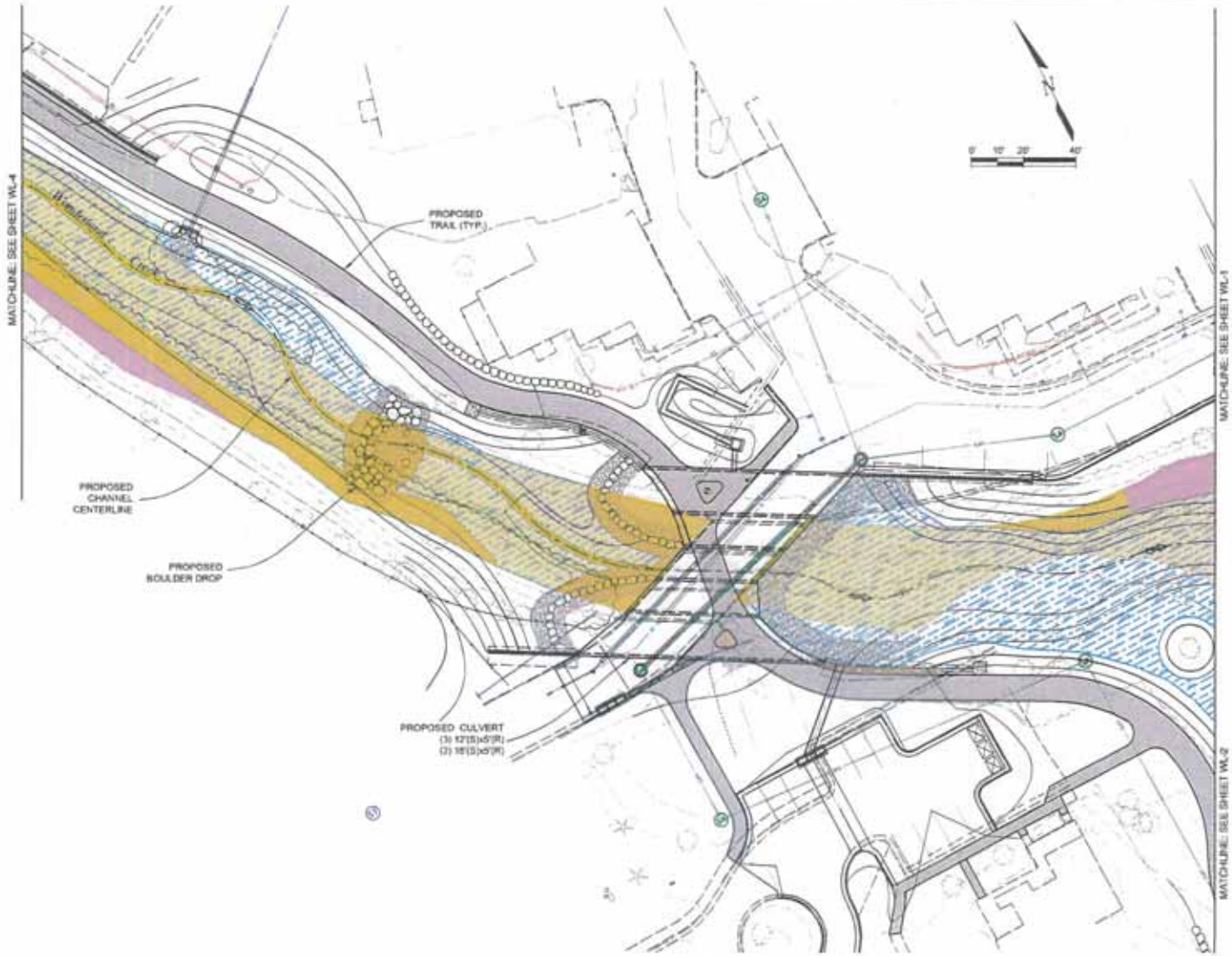

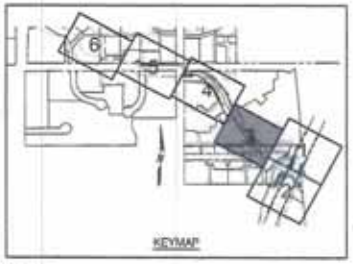

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Region 4

CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT
CITY OF BOULDER
WETLAND IMPACTS PLAN

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Project No./Code	STA 04-XX
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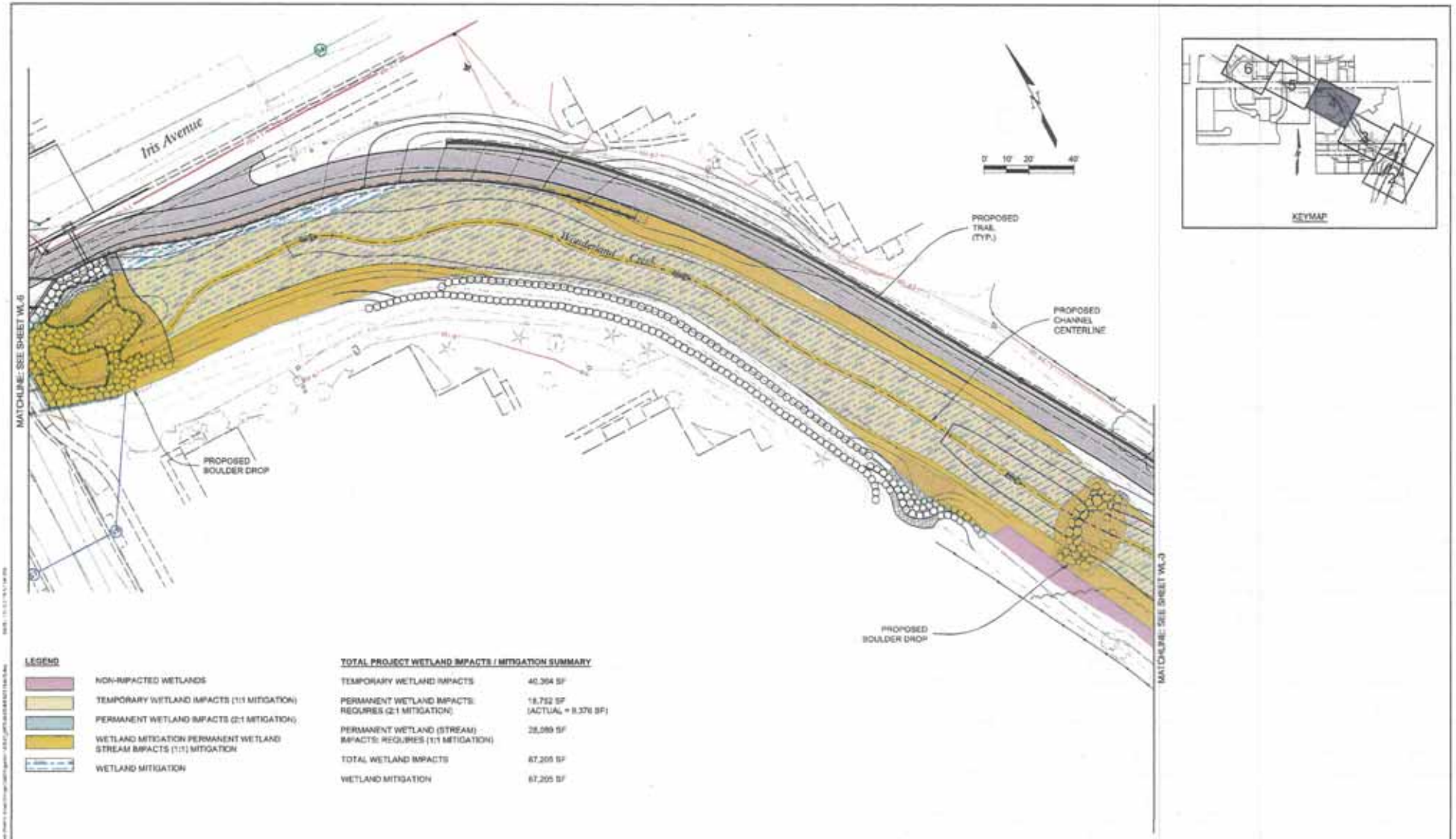

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Region 4

CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT

CITY OF BOULDER
WETLAND IMPACTS PLAN

Designer:	MKN	Structure Numbers	
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Project No./Code
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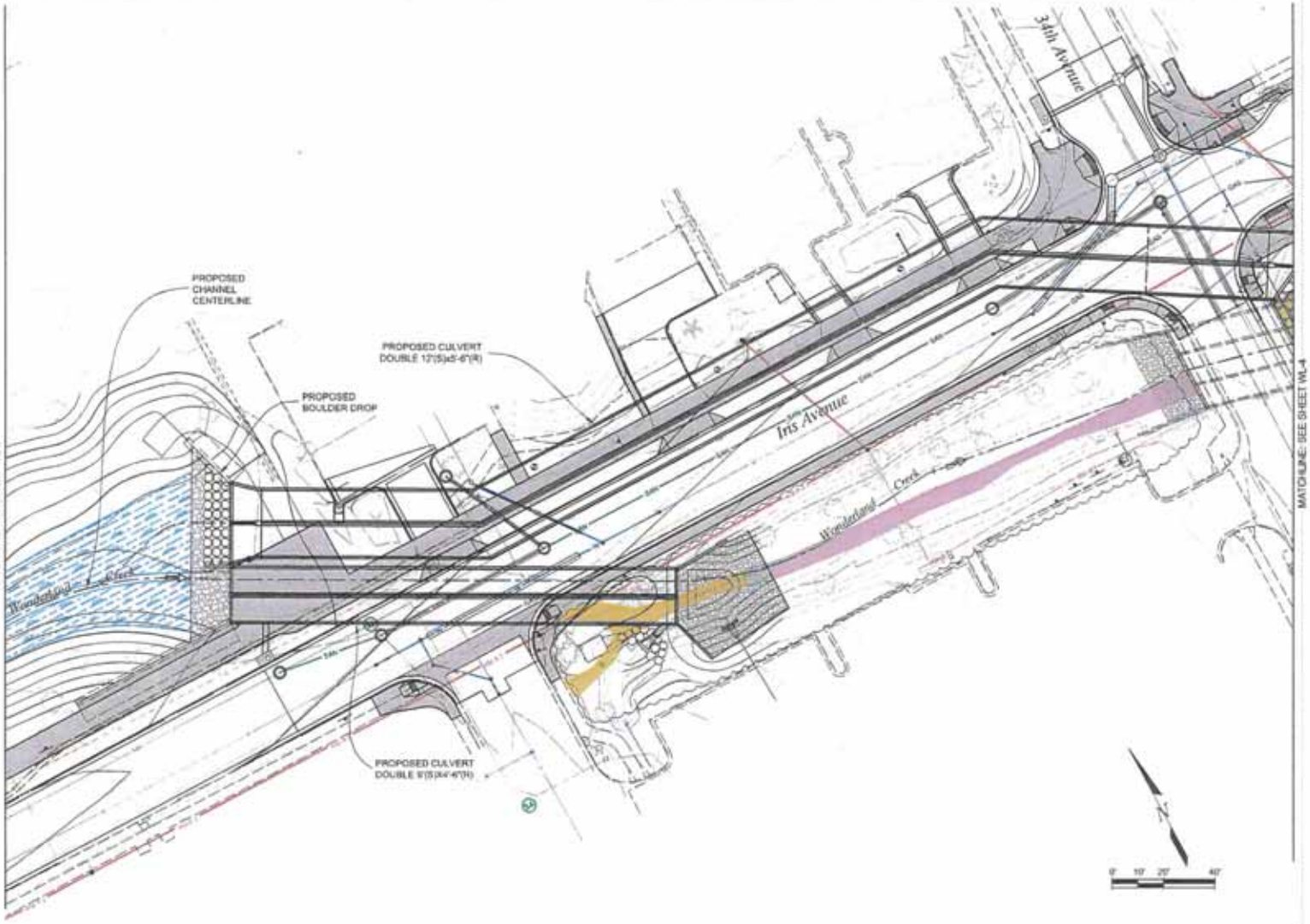

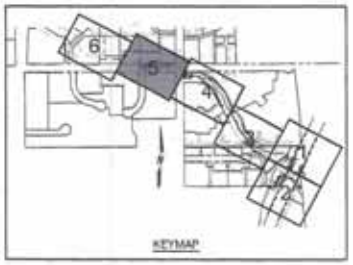

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Region 4

CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT

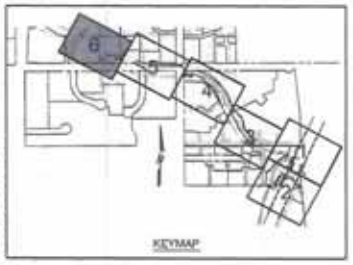
CITY OF BOULDER
WETLAND IMPACTS PLAN

Designer:	MKN	Structure Numbers	
Detailer:			
Sheet Subset:	WETLAND	Subset Sheets:	WL-5

Project No./Code: STA 04-XX

1xxx8

Sheet Number: 5



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TEMPORARY WETLAND IMPACTS	40,364 SF
PERMANENT WETLAND IMPACTS: REQUIRES (2:1 MITIGATION)	18,752 SF (ACTUAL = 9,376 SF)
PERMANENT WETLAND (STREAM) IMPACTS: REQUIRES (1:1 MITIGATION)	28,089 SF
TOTAL WETLAND IMPACTS	87,205 SF
WETLAND MITIGATION	87,205 SF

Computer File Information	
Creation Date:	Initials:
Last Modification Date:	Initials:
Full Path:	
Drawing File Name:	
Scale: AS SHOWN	

MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
7711 WADSWORTH BLVD. A-100
LAKEWOOD, COLORADO 80128
(303) 988-0100

MEC PROJECT NO. 11039.03

Sheet Revisions

Date	Comments	Init.

Region 4

CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT
CITY OF BOULDER
WETLAND IMPACTS PLAN

Designer:	MKN	Structure Numbers	
Detailer:			
Sheet Subset:	WETLAND	Subset Sheets:	WL-6

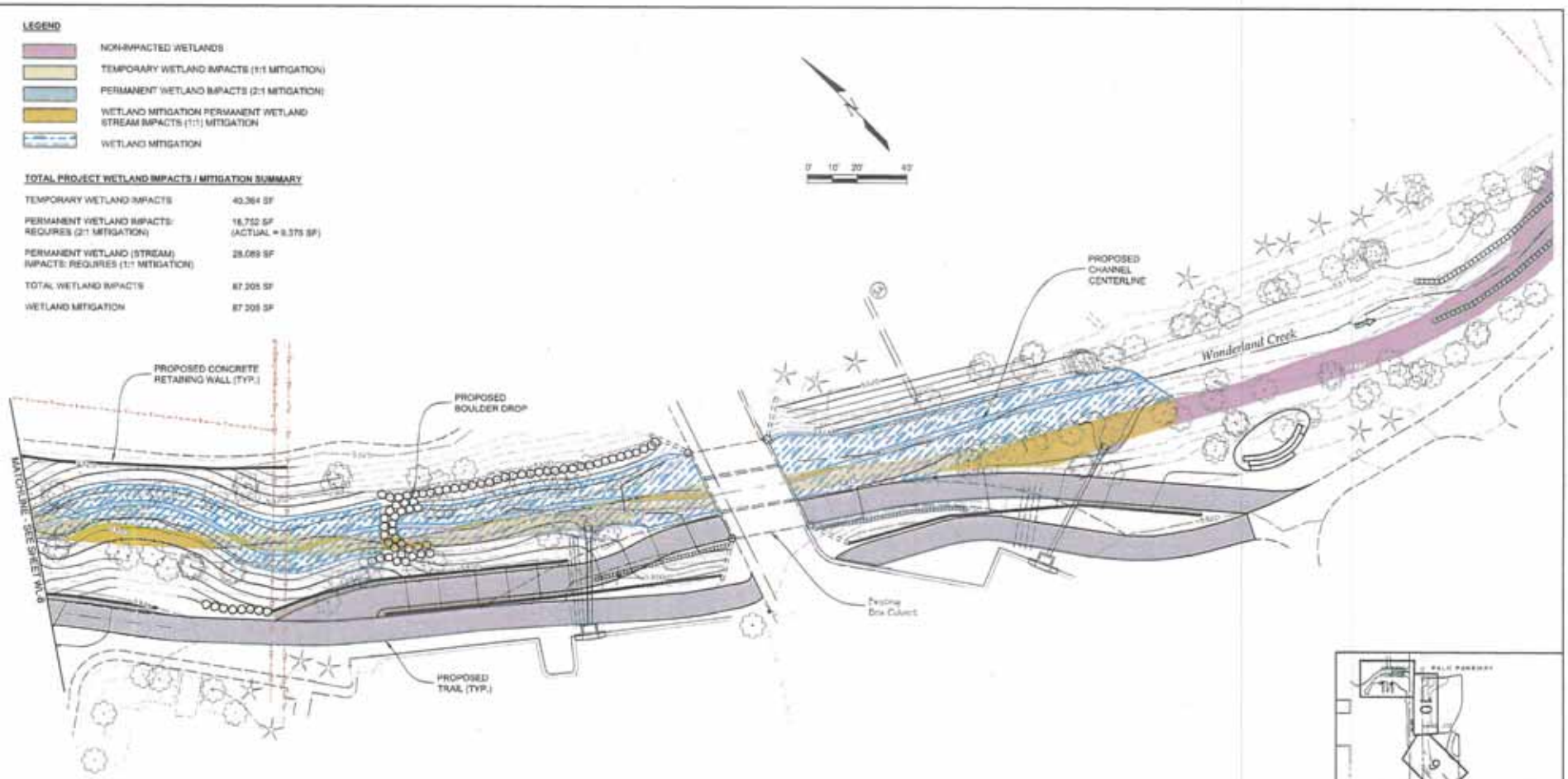
Project No./Code
STA 04-XX
1xxx8
Sheet Number: 6

LEGEND

- NON-IMPACTED WETLANDS
- TEMPORARY WETLAND IMPACTS (1:1 MITIGATION)
- PERMANENT WETLAND IMPACTS (2:1 MITIGATION)
- WETLAND MITIGATION PERMANENT WETLAND STREAM IMPACTS (1:1) MITIGATION
- WETLAND MITIGATION

TOTAL PROJECT WETLAND IMPACTS / MITIGATION SUMMARY

TEMPORARY WETLAND IMPACTS	40,364 SF
PERMANENT WETLAND IMPACTS: REQUIRES (2:1 MITIGATION)	18,752 SF (ACTUAL = 9,375 SF)
PERMANENT WETLAND (STREAM) IMPACTS: REQUIRES (1:1 MITIGATION)	28,089 SF
TOTAL WETLAND IMPACTS	87,205 SF
WETLAND MITIGATION	87,205 SF



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Drawing File Name:	
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CONSULTING ENGINEERS
777 S. WADSWORTH BLVD. #100
LAKEWOOD, COLORADO 80226
(303)986-1020

MEC PROJECT NO. 11039.03

Sheet Revisions

Date:	Comments	Init.

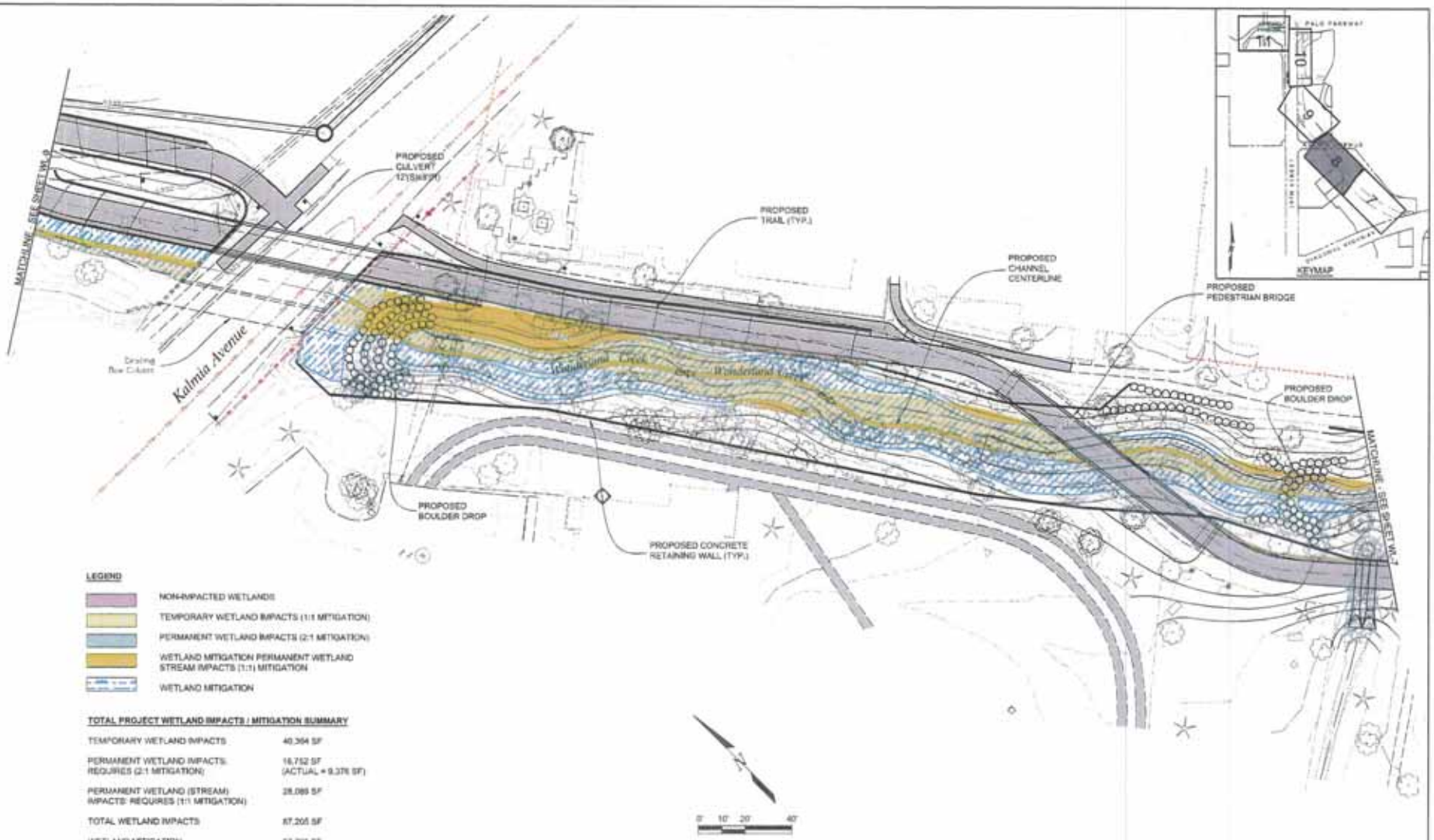
Region 4

CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT
CITY OF BOULDER
WETLAND IMPACTS PLAN

Designer:	MKN	Structure Numbers	
Detailer:			
Sheet Subset:	WETLAND	Subset Sheets:	WL-7

Project No./Code
STA 04-XX
1xxx8
Sheet Number: 7



TOTAL PROJECT WETLAND IMPACTS / MITIGATION SUMMARY

TEMPORARY WETLAND IMPACTS	40,364 SF
PERMANENT WETLAND IMPACTS: REQUIRES (2:1 MITIGATION)	18,752 SF (ACTUAL = 9,376 SF)
PERMANENT WETLAND (STREAM) IMPACTS: REQUIRES (1:1 MITIGATION)	28,089 SF
TOTAL WETLAND IMPACTS	87,205 SF
WETLAND MITIGATION	87,205 SF

Computer File Information	
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Last Modification Date:	Initials:
Full Path:	
Drawing File Name:	
Scale: AS SHOWN	

MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
777 S. WADSWORTH BLVD. #100
LAKEWOOD, COLORADO 80226
(303) 986-1629

MEC PROJECT NO. 11039.03

Sheet Revisions

Date:	Comments	Init.

Region 4

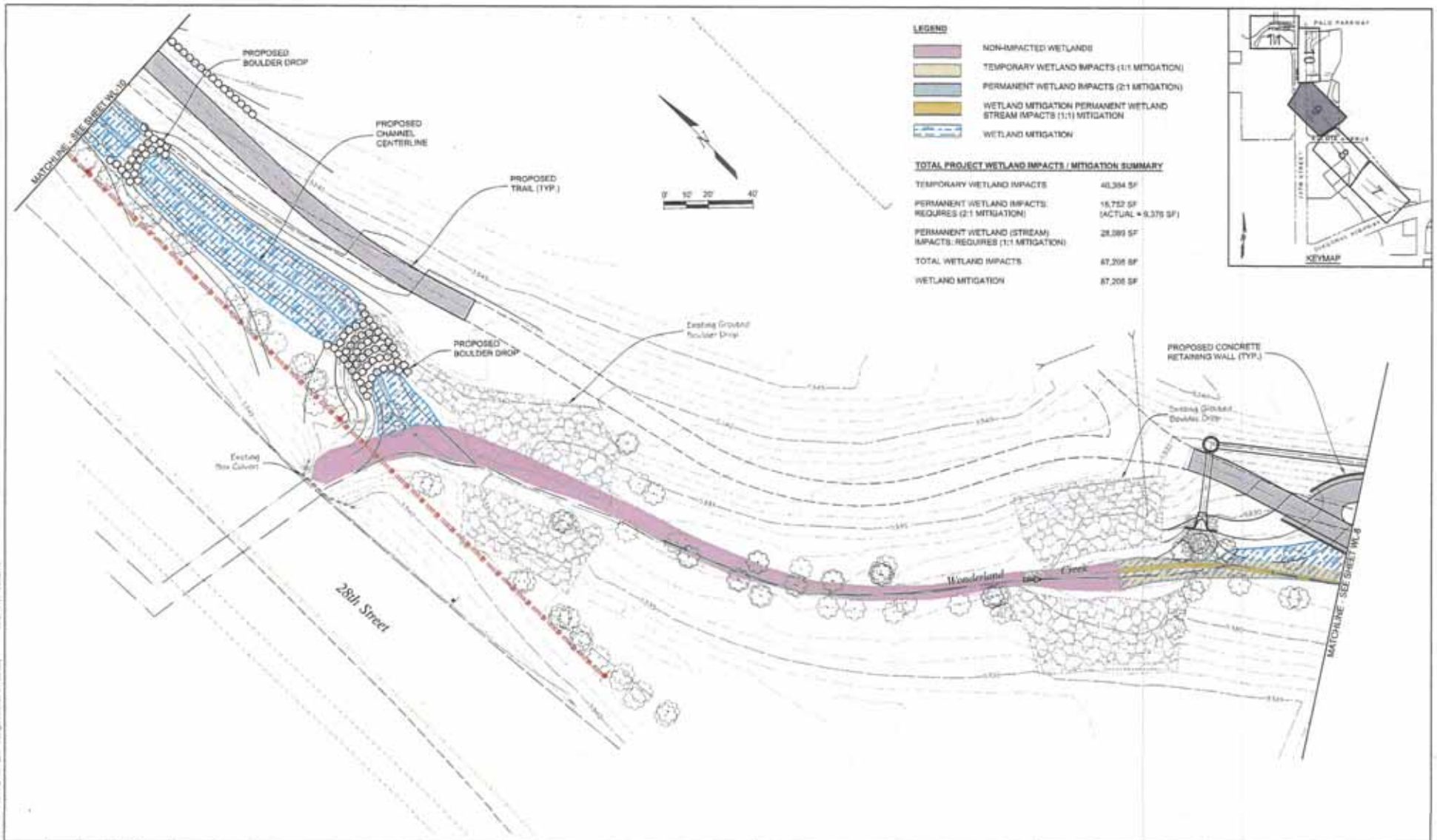
CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT

CITY OF BOULDER
WETLAND IMPACTS PLAN

Designer:	MKN	Structure Numbers:	
Detailer:			
Sheet Subset:	WETLAND	Subset Sheets:	WL-8

Project No./Code
STA 04-XX
1xxx8
Sheet Number: 8



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MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
777 S. WADSWORTH BLVD. 4-140
LAKEWOOD, COLORADO 80226
(303) 988-6320

MEC PROJECT NO. 11039.03

Sheet Revisions		
Date:	Comments	Init.

Region 4

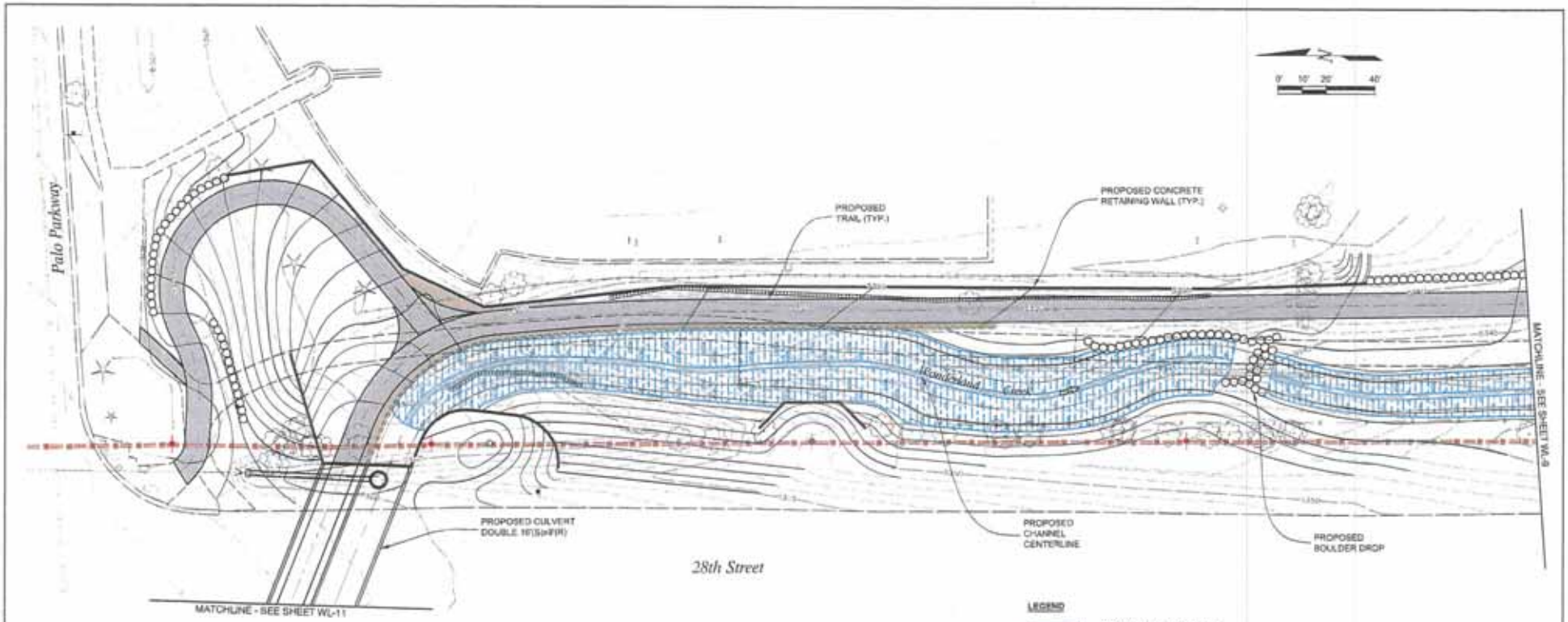
CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT

CITY OF BOULDER
WETLAND IMPACTS PLAN

Designer:	MKN	Structure Numbers	
Detailer:			
Sheet Subset:	WETLAND	Subset Sheets:	WL-9

Project No./Code
STA 04-XX
1xxx8
Sheet Number: 9



LEGEND

- NON-IMPACTED WETLANDS
- TEMPORARY WETLAND IMPACTS (1:1 MITIGATION)
- PERMANENT WETLAND IMPACTS (2:1 MITIGATION)
- WETLAND MITIGATION PERMANENT WETLAND STREAM IMPACTS (1:1) MITIGATION
- WETLAND MITIGATION

TOTAL PROJECT WETLAND IMPACTS / MITIGATION SUMMARY

TEMPORARY WETLAND IMPACTS	46,594 SF
PERMANENT WETLAND IMPACTS: REQUIRES (2:1 MITIGATION)	18,752 SF (ACTUAL = 9,376 SF)
PERMANENT WETLAND (STREAM) IMPACTS: REQUIRES (1:1 MITIGATION)	28,089 SF
TOTAL WETLAND IMPACTS	87,205 SF
WETLAND MITIGATION	87,200 SF

Computer File Information	
Creation Date:	Initials:
Last Modification Date:	Initials:
Full Path:	
Drawing File Name:	
Scale: AS SHOWN	

MULLER ENGINEERING CO., INC.
CONSULTING ENGINEERS
777 S. WADSWORTH BLVD. I-100
LAKEWOOD, COLORADO 80226
(303) 986-6120

MEC PROJECT NO. 11039.03

Sheet Revisions		
Date	Comments	Init.

Region 4

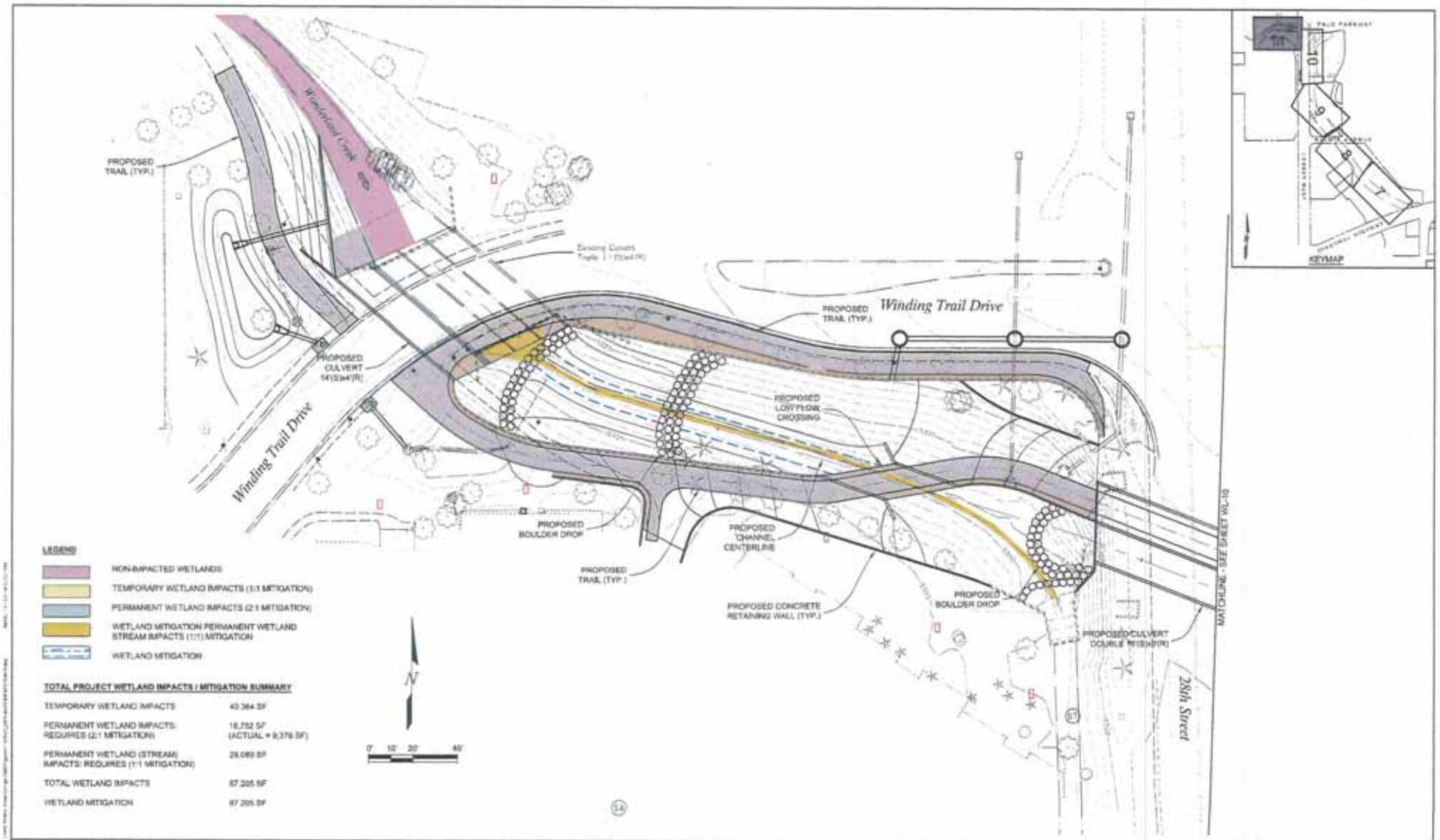
CITY OF BOULDER

WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT

CITY OF BOULDER
WETLAND IMPACTS PLAN

Designer:	MKN	Structure Numbers	
Detailer:			
Sheet Subset:	WETLAND	Subset Sheets:	WL-10

Project No./Code	STA 04-XX
	1xxx8
Sheet Number:	10



Computer File Information		MULLER ENGINEERING CO., INC.	Sheet Revisions			WONDERLAND CREEK - GREENWAYS IMPROVEMENT PROJECT	Project No./Code
Creation Date:	Initials:	CONSULTING ENGINEERS	Date:	Comments	Init.	CITY OF BOULDER	STA 04-XX
Last Modification Date:	Initials:	7775 WADSWORTH BLVD.				WETLAND IMPACTS PLAN	1xxx8
Full Path:		LAKEWOOD, COLORADO				Designer: MKN / Structure Numbers	
Drawing File Name:						Detailer:	
Scale: AS SHOWN		MEC PROJECT NO. 1102603				Sheet Subset: WETLAND / Subset Sheets: WL-11	Sheet Number: 11

Region 4 CITY OF BOULDER

Annual Monitoring Mitigation Report
Format Requirements
(From Regulatory Guidance Letter No. 08-03, established October 10, 2008)

Mail report to:

U. S. Army Corps of Engineers
Denver Regulatory Office
9307 S. Wadsworth Blvd
Littleton, CO 80128
(Phone: 303-979-4120)

Website: http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/Colorado.aspx

Annual monitoring reports must follow a **10-page maximum** report format for assessing mitigation sites, as follows:

A. Project Overview (1 page)

(1) Corps Permit Number.
(2) Name and contact information of permittee.
(3) Name of party responsible for conducting the monitoring and the date(s) the inspection was conducted.
(4) A summary paragraph defining the purpose of the approved project, acreage and type of aquatic resources impacted, and mitigation acreage and type of aquatic resources authorized to compensate for the aquatic impacts.
(5) Written description of the location and any identifiable landmarks of the compensatory mitigation project including information to locate the site perimeter(s).
(6) Directions to the mitigation site.
(7) Dates compensatory mitigation began and/or was completed.
(8) Short statement on whether the performance standards are being met.
(9) Dates of any recent corrective or maintenance activities conducted since the previous report submission.
(10) Specific recommendations for any additional corrective or remedial actions.

B. Requirements (1 page)

List the monitoring requirements and performance standards, as specified in the approved mitigation plan and special conditions of the permit, and evaluate whether the compensatory mitigation project site is successfully achieving the approved performance standards or trending towards success. A table is one option for comparing the performance standards to the conditions and status of the developing mitigation site.

C. Summary Data (maximum of 4 pages)

Summary data must be provided to substantiate the success and/or potential challenges associated with the compensatory mitigation project. Photo documentation may be provided to support the findings and recommendations referenced in the monitoring report and to assist the Corps in assessing whether the compensatory mitigation project is successful for the monitoring period. Submitted photos must fit on a standard 8.5" X 11" piece of paper, dated, and clearly labeled with the direction from which the photo was taken. The photo sites must also be identified on the appropriate maps.

D. Maps (maximum of 3 pages)

Maps must be provided to show the location of the compensatory mitigation site relative to other landscape features, habitat types, locations of photographic reference points, transects, sampling data points, and/or other features pertinent to the mitigation plan. In addition, the submitted maps must clearly delineate the mitigation site perimeter(s), which will assist the Corps in locating the mitigation area(s) during subsequent site inspections. Each map or diagram must fit on a standard 8½x11-inch paper and include a legend and the location of any photos submitted for review.

E. Conclusions (1 page)

A general statement must be included describing the conditions of the compensatory mitigation project. If performance standards are not being met, a brief explanation of the difficulties and potential remedial actions proposed by the permittee, including a timetable, must be provided. The Corps will ultimately determine if the mitigation site is successful for a given monitoring period.

U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: Legal Sufficiency Statement
Section 4(f) Evaluation
Wonderland Creek Greenways
Improvements Project

Date: March 20, 2015

From: Brent Allen
Attorney-Advisor
Lakewood, CO

In Reply Refer To:
HCC-WE

To: Stephanie Gibson
Environmental Program Manager
Lakewood, CO

I have reviewed the Section 4(f) Evaluation for the above project, which involves multiple floodplain / flood control and trail improvements along Wonderland Creek in the area between Foothills Parkway to Winding Trail Drive in Boulder, Colorado.

The evaluation, as revised following comments by this office, adequately demonstrates that the Preferred Alternative identified would result in the use of segments of two 4(f) properties —the Colorado & Southern Railroad and the Boulder and White Rock Ditch— that there are no prudent and feasible alternatives to avoid the use of these properties, and that all possible planning has been done to minimize harm resulting from the use. A least overall harm analysis is not required in this case because the evaluation demonstrates that there is only one prudent and feasible alternative available.

Accordingly, pursuant to the provisions of 23 C.F.R. §§774.7(d), I find the 4(f) Evaluation for this project legally sufficient.

CITY OF BOULDER
Planning and Development Services

1739 Broadway, Third Floor • P.O. Box 791, Boulder, CO 80306-0791
phone 303-441-1880 • fax 303-441-4241 • web boulderplandevelop.net

Wetland Permit

Date Issued: 5/15/2015

Expiration Date: May 14, 2018
(Pursuant to Subsection 9-3-9(k), B.R.C. 1981)

Permit Number: LUR2015-00013

Contact Information

KURT BAUER
P.O. BOX 791.
BOULDER, CO 80306

Project Information

Location: 3440 HAYDEN PL

Legal Description: LOT 16 MEADOW WOOD & REPLAT & 4/80 INT TRACT A MEADOW WOOD R EPLAT & OUTLOTS B & C

Description of Work: Standard Wetland Permit: Pavement, trail, stream channel, and flood improvements for Wonderland Creek. Project improvements extend from Winding Trail Village to Foothills Parkway.

Conditions of Approval

- The proposed project/activity is approved on the basis that it satisfies applicable requirements of Chapter 9-3-9, "Wetlands Protection," Boulder Revised Code 1981. Other wetland requirements as set forth in Chapter 9-3-9 which are not specifically outlined in the conditions of approval below remain applicable to this project/activity.
- The improvements shall be constructed to minimize and mitigate impacts to the existing wetlands in conformance with the conditions of the City of Boulder Wetland Permit issued for this project.
- The applicant shall obtain a site inspection and approval from the City of Boulder Floodplain and Wetlands Coordinator upon completion of the projects.
- Monitoring reports will be submitted yearly and the site will be reviewed per the performance standards in the accepted Wetland Permit Application.

Inspections

To schedule an inspection, call 303-441-3280 and refer to your permit number (LUR2015-00013).

- Wetland Mitigation Inspection
- Wetland Mitigation 2nd Year
- Wetland Mitigation 3rd Year
- Wetland Mitigation 4th Year
- Final Wetland Mitigation Insp

COLORADO
Department of Public Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

January 15, 2015

City of Boulder
Attn: Kurt Bauer
PO Box 791
Boulder, CO 80306

Re: Section 401 Water Quality Certification
Colorado 401 Certification No.: 4358
US Corps of Engineers 404 Permit No.: NWO-2011-2278-DEN
Description: Stream restoration and floodplain improvements
Location: Latitude 403037707 North, Longitude -105.253186 West in Boulder County, Colorado
Watercourse: Wonderland Creek, South Platte River Basin, Seg. COSPBO02b of Boulder Creek Sub-basin
Designation: Reviewable

Dear Mr. Bauer:

The Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Division (Division) has completed its review of the subject Clean Water Act (CWA) Section 404 Permit Application, and our preliminary determination with the issuance of the State of Colorado 401 Certification Public Notice (5 CCR 1002-82.5(B)). An antidegradation review has also been completed pursuant to Regulation No. 31, Basic Standards and Methodologies for Surface Water (5 CCR 1002-31). The Division's review concluded that only temporary impacts to water quality should occur as a result of this project.

This letter shall serve as official notification that the Division is issuing "Regular Certification" in accordance with 5 CCR 1002-82.5(A)(2).

The 401 Certification issued by the Division pursuant to 5 CCR 1002-82.3(C) shall apply to both the construction and operation of the project for which a federal license or permit is required, and shall apply to the water quality impacts associated with the project. This certification does not constitute a relinquishment of the Division's authority as defined in the Colorado Water Quality Control Act, nor does it fulfill or waive any other local, state, or federal regulations.

If you have any questions or need additional information, please contact me at (303) 692-2374.

Sincerely,

Scott Garncarz
Water Quality Assessor
Environmental Data Unit
Water Quality Control Division

Attachment

cc: US Army Corps of Engineers, Denver Regulatory Office
Applicant's Agent, Ms. Mary Powell, ERO Resources Corp.
File

Certification Requirements:

(A) The following requirements shall apply to all certifications:

(1) Authorized representatives from the Division shall be permitted to enter upon the site where the construction activity or operation of the project is taking place for purposes of inspection of compliance with BMPs and certification conditions.

(2) In the event of any changes in control or ownership of facilities where the construction activity or operation of the project is taking place, the successor shall be notified in writing by his predecessor of the existence of the BMPs and certification conditions. A copy of such notification shall be provided to the Division.

(3) If the permittee discovers that certification conditions are not being implemented as designed, or if there is an exceedance of water quality standards despite compliance with the certification conditions and there is reason to believe that the exceedance is caused, in whole or in part, by the project, the permittee shall verbally notify the Division of such failure or exceedance within two (2) working days of becoming aware of the same. Within ten (10) working days of such notification, the permittee shall provide to the Division, in writing, the following:

(a) In the case of the failure to comply with the certification conditions, a description of (i) the nature of such failure, (ii) any reasons for such failure, (iii) the period of non-compliance, and (iv) the measures to be taken to correct such failure to comply; and

(b) In the case of the exceedance of a water quality standard, (i) an explanation, to the extent known after reasonable investigation, of the relationship between the project and the exceedance, (ii) the identity of any other known contributions to the exceedance, and (iii) a proposal to modify the certification conditions so as to remedy the contribution of the project to the exceedance.

(4) Any anticipated change in discharge location and/or quantities associated with the project which may result in water quality impacts not considered in the original certification must be reported to the Division by submission of a written notice by the permittee prior to the change. If the change is determined to be significant, the permittee will be notified within ten days, and the change will be acknowledged and approved or disapproved.

(5) Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions herein is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with limitations and prohibitions herein. The Division shall be notified immediately in writing of each such diversion or bypass.

(12) The use of chemicals during construction and operation shall be in accordance with the manufacturers' specifications. There shall be no excess application and introduction of chemicals into state waters.

(13) All solids, sludges, dredged or stockpiled materials and all fuels, lubricants, or other toxic materials shall be controlled in a manner so as to prevent such materials from entering state waters.

(14) All seed, mulching material and straw used in the project shall be state-certified weed-free.

(15) Discharges of dredged or fill material in excess of that necessary to complete the project are not permitted.

(16) Discharges to state waters not identified in the license or permit and not certified in accordance therewith are not allowed, subject to the terms of any 401 certification.

(17) Except as otherwise provided pursuant to subsection 82.7(C), no discharge shall be allowed which causes non-attainment of a narrative water quality standard identified in the Basic Standards and Methodologies for Surface Waters, Regulation #31 (5 CCR 1002-31), including, but not limited to discharges of substances in amounts, concentrations or combinations which:

(a) Can settle to form bottom deposits detrimental to beneficial uses; or

(b) Form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or

(c) Produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species, or to the water; or

(d) Are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or

(e) Produce a predominance of undesirable aquatic life; or

(f) Cause a film on the surface or produce a deposit on shorelines.

(B) Best Management Practices:

(1) Best management practices are required for all projects for which Division certification is issued except for section 402 permits. Project applicants must select BMPs to be employed in their project. A listing and description of best management practices is located in Appendix I of Regulation No. 82: 401 Certification Regulation 5 CCR 1002-82.

(2) All requests for certifications which require BMPs shall include a map of project location, a site plan, and a listing of the selected BMPs chosen for the project. At a minimum, each project must provide for the following:

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT

COMMUNITY INFORMATION		PROPOSED PROJECT DESCRIPTION	BASIS OF CONDITIONAL REQUEST
COMMUNITY	Boulder County Colorado (Unincorporated Areas) COMMUNITY NO.: 080023	CULVERT BRIDGE CHANNEL RELOCATION EXCAVATION CHANNELIZATION FILL	HYDRAULIC ANALYSIS FLOODWAY UPDATED TOPOGRAPHIC DATA
IDENTIFIER	Wonderland Creek Greenways Project	**APPROXIMATE LATITUDE AND LONGITUDE:** 40.037, -105.252 **SOURCE:** Google Earth **DATUM:** NAD 83	

AFFECTED MAP PANELS

TYPE: FIRM* NO.: 08013C0392J DATE: December 18, 2012

* FIRM - Flood Insurance Rate Map

FLOODING SOURCE AND REACH DESCRIPTION See Page 2 for Additional Flooding Sources

Wonderland Creek – from approximately 140 feet downstream of 47th Street to approximately 670 feet upstream of Winding Trail Drive

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Wonderland Creek	Culvert Modification	At Winding Trail Drive
	New 2.5-foot by 16-foot Reinforced Concrete Box Culvert (RCBC)	Approximately 160 feet upstream of 28th Street
	New Twin 16-foot by 10-foot RCBCs	At 28th Street

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
Wonderland Creek	BFEs*	BFEs	None	Yes

* BFEs - Base (1-percent-annual-chance) Flood Elevations

COMMENT

This document provides the Federal Emergency Management Agency's (FEMA's) comment regarding a request for a CLOMR for the project described above. This document is not a final determination; it only provides our comment on the proposed project in relation to the flood hazard information shown on the effective National Flood Insurance Program (NFIP) map. We reviewed the submitted data and the data used to prepare the effective flood hazard information for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. Your community is responsible for approving all floodplain development and for ensuring that all permits required by Federal or State/Commonwealth law have been received. State/Commonwealth, county, and community officials, based on their knowledge of local conditions and in the interest of safety, may set higher standards for construction in the Special Flood Hazard Area (SFHA), the area subject to inundation by the base flood. If the State/Commonwealth, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

ADDITIONAL FLOODING SOURCES AFFECTED BY THIS CONDITIONAL REQUEST

FLOODING SOURCE AND REACH DESCRIPTION

Wonderland Creek – from approximately 140 feet downstream of 47th Street to approximately 670 feet upstream of Winding Trail Drive

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Wonderland Creek	Channel Relocation	From approximately 520 feet upstream of Kalmia Avenue to just upstream of 28th Street
	Channelization	From approximately 300 feet upstream of Spring Creek Place to approximately 100 feet upstream of Winding Trail Drive
	Culvert Modification	At Kalmia Avenue
	New Bridge	Approximately 340 feet downstream of Kalmia Avenue
	Culvert Modification	At Bridger Trail
	Culvert Modification	At Iris Avenue
	Culvert Modification	At Spring Creek Place
	New twin 5-foot by 4-foot RCBCs	Just upstream of the Boulder and White Rock Ditch
	Bridge Modification	At Burlington Northern and Santa Fe Railway
	Culvert Modification	At Foothills Parkway
	Grading	From just upstream of Foothills Parkway to approximately 160 feet upstream of Winding Trail Drive
	Fill Placement	From just upstream of Foothills Parkway to approximately 160 feet upstream of Winding Trail Drive

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS CONDITIONAL REQUEST

CID Number: 080024 **Name:** City of Boulder, Colorado

AFFECTED MAP PANELS

TYPE: FIRM*	NO.: 08013C0392J	DATE: December 18, 2012
TYPE: FIRM*	NO.: 08013C0411J	DATE: December 18, 2012

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

To determine the changes in flood hazards that will be caused by the proposed project, we compared the hydraulic modeling reflecting the proposed project (referred to as the proposed conditions model) to the hydraulic modeling used to prepare the Flood Insurance Study (FIS) (referred to as the effective model). If the effective model does not provide enough detail to evaluate the effects of the proposed project, an existing conditions model must be developed to provide this detail. This existing conditions model is then compared to the effective model and the proposed conditions model to differentiate the increases or decreases in flood hazards caused by more detailed modeling from the increases or decreases in flood hazards that will be caused by the proposed project.

The table below shows the changes in the BFEs:

BFE Comparison Table

Flooding Source: Wonderland Creek		BFE Change (feet)	Location of maximum change
Existing vs. Effective	Maximum increase	None	N/A
	Maximum decrease	0.3	Just upstream of Longmont Diagonal Highway
Proposed vs. Existing	Maximum increase	None	N/A
	Maximum decrease	None	N/A
Proposed vs. Effective	Maximum increase	None	N/A
	Maximum decrease	0.3	Just upstream of Longmont Diagonal Highway

Increases due to the proposed project that exceed those permitted under Paragraphs (c)(10) or (d)(3) of Section 60.3 of the NFIP regulations must adhere to Section 65.12 of the NFIP regulations. With this request, your community has complied with all requirements of Paragraph 65.12(a) of the NFIP regulations. Compliance with Paragraph 65.12(b) also is necessary before FEMA can issue a Letter of Map Revision when a community proposes to permit encroachments into the effective regulatory floodway that will cause BFE increases in excess of those permitted under Paragraph 60.3(d)(3).

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

Upon completion of the project, your community must submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report. If the project is built as proposed and the data below are received, a revision to the FIRM and FIS report would be warranted.

• Form 1, entitled "Overview and Concurrence Form". Detailed application and certification forms must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1 must be included. If as-built conditions differ from the proposed plans, please submit new forms, which may be accessed at http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/mt-2-application-forms-and-instructions, or annotated copies of the previously submitted forms showing the revised information.

• Hydraulic analyses, for as-built conditions, of the base (1-percent-annual-chance) flood; the 10-percent, 2-percent, and 0.2-percent-annual-chance floods; and the regulatory floodway, together with a topographic work map showing the revised floodplain and floodway boundaries. Please ensure that the revised information ties-in with the current effective information at the downstream and upstream ends of the revised reach.

• An annotated copy of the FIRM, at the scale of the effective FIRM, that shows the revised floodplain and floodway boundary delineations shown on the submitted work map and how they tie into the floodplain and floodway boundary delineations shown on the current effective FIRM at the downstream and upstream ends of the revised reach.

• As-built plans, certified by a registered professional engineer, of all proposed project elements.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/nfip.

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CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

• A copy of the public notice distributed by your community, stating its intent to revise the regulatory floodway, or a signed statement by your community that it has notified all affected property owners and affected adjacent jurisdictions.

• Documentation of the notification to property owners who will be affected by any widening/shifting of the base floodplain and/or any BFE increases along Wonderland Creek.

• Evidence that your community has, prior to approval of the proposed encroachment, adopted floodplain management ordinances that incorporate the increased BFEs and revised floodway boundary delineations to reflect the post-project conditions, as stated in Paragraph 65.12(b).

• FEMA's fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps may be accessed at http://www.fema.gov/flood-map-related-fees#2. The fee at the time of the map revision submittal must be received before we can begin processing the request. Payment of this fee can be made through a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card (Visa or MasterCard only). Please forward the payment, along with the revision application, to the following address:

Urban Drainage and Flood Control District
2480 West 26th Avenue, Suite 156-B
Denver, CO 80211

or submit the LOMR using theLOMC portal at https://hazards.fema.gov/femaportal/onlinelomc/signin.

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM and FIS report. Because the flood hazard information (i.e., base flood elevations, base flood depths, SFHAs, zone designations, and/or regulatory floodways) will change as a result of the project, a 90-day appeal period will be initiated for the revision, during which community officials and interested persons may appeal the revised flood hazard information based on scientific or technical data.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/nfip.

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CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Jeanine D. Petterson
Director, Mitigation Division
Federal Emergency Management Agency, Region VIII
Denver Federal Center, Building 710
P.O. Box 25267
Denver, CO 80225-0267
(303) 235-4830

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CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT

COMMUNITY INFORMATION		PROPOSED PROJECT DESCRIPTION	BASIS OF CONDITIONAL REQUEST
COMMUNITY	City of Boulder Boulder County Colorado	CULVERT BRIDGE CHANNEL RELOCATION EXCAVATION CHANNELIZATION FILL	HYDRAULIC ANALYSIS FLOODWAY UPDATED TOPOGRAPHIC DATA
	COMMUNITY NO.: 080024		
IDENTIFIER	Wonderland Creek Greenways Project	APPROXIMATE LATITUDE AND LONGITUDE: 40.037, -105.252 SOURCE: Google Earth DATUM: NAD 83	

AFFECTED MAP PANELS

TYPE: FIRM*	NO.: 08013C0392J	DATE: December 18, 2012	* FIRM - Flood Insurance Rate Map
TYPE: FIRM*	NO.: 08013C0411J	DATE: December 18, 2012	

FLOODING SOURCE AND REACH DESCRIPTION See Page 2 for Additional Flooding Sources

Wonderland Creek – from approximately 140 feet downstream of 47th Street to approximately 670 feet upstream of Winding Trail Drive

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Wonderland Creek	Culvert Modification	At Winding Trail Drive
	New 2.5-foot by 16-foot Reinforced Concrete Box Culvert (RCBC)	Approximately 160 feet upstream of 28th Street
	New twin 16-foot by 10-foot RCBCs	At 28th Street

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
Wonderland Creek	Zone AE	Zone AE	Yes	Yes
	Floodway	Floodway	Yes	Yes
	BFEs*	BFEs	Yes	Yes

* BFEs - Base (1-percent-annual-chance) Flood Elevations

COMMENT

This document provides the Federal Emergency Management Agency's (FEMA's) comment regarding a request for a CLOMR for the project described above. This document is not a final determination; it only provides our comment on the proposed project in relation to the flood hazard information shown on the effective National Flood Insurance Program (NFIP) map. We reviewed the submitted data and the data used to prepare the effective flood hazard information for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. Your community is responsible for approving all floodplain development and for ensuring that all permits required by Federal or State/Commonwealth law have been received. State/Commonwealth, county, and community officials, based on their knowledge of local conditions and in the interest of safety, may set higher standards for construction in the Special Flood Hazard Area (SFHA), the area subject to inundation by the base flood. If the State/Commonwealth, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/nfip.

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CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

ADDITIONAL FLOODING SOURCES AFFECTED BY THIS CONDITIONAL REQUEST

FLOODING SOURCE(S) AND REACH DESCRIPTION

Wonderland Creek – from approximately 140 feet downstream of 47th Street to approximately 670 feet upstream of Winding Trail Drive

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Wonderland Creek	Channel Relocation	From approximately 520 feet upstream of Kalmia Avenue to just upstream of 28th Street
	Channelization	From approximately 300 feet upstream of Spring Creek Place to just downstream of Winding Trail Drive
	Culvert Modification	At Kalmia Avenue
	New Bridge	Approximately 340 feet downstream of Kalmia Avenue
	Culvert Modification	At Bridger Trail
	Culvert Modification	At Iris Avenue
	Culvert Modification	At Spring Creek Place
	New twin 5-foot by 4-foot RCBCs	Just upstream of the Boulder and White Rock Ditch
	Bridge Modification	At Burlington Northern and Santa Fe Railway
	Culvert Modification	At Foothills Parkway
	Grading	From just upstream of Foothills Parkway to approximately 160 feet upstream of Winding Trail Drive
	Fill Placement	From just upstream of Foothills Parkway to approximately 160 feet upstream of Winding Trail Drive

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CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS CONDITIONAL REQUEST

CID Number: 080023 **Name:** Boulder County, Colorado

AFFECTED MAP PANELS

TYPE: FIRM* NO.: 08013C0392J DATE: December 18, 2012

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/nfip.

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CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

To determine the changes in flood hazards that will be caused by the proposed project, we compared the hydraulic modeling reflecting the proposed project (referred to as the proposed conditions model) to the hydraulic modeling used to prepare the Flood Insurance Study (FIS) (referred to as the effective model). If the effective model does not provide enough detail to evaluate the effects of the proposed project, an existing conditions model must be developed to provide this detail. This existing conditions model is then compared to the effective model and the proposed conditions model to differentiate the increases or decreases in flood hazards caused by more detailed modeling from the increases or decreases in flood hazards that will be caused by the proposed project.

The table below shows the changes in the BFEs:

BFE Comparison Table

Flooding Source: Wonderland Creek		BFE Change (feet)	Location of maximum change
Existing vs. Effective	Maximum increase	2.1	Approximately 420 feet upstream of 28th Street
	Maximum decrease	2.3	Approximately 530 feet upstream of Longmont Diagonal Highway
Proposed vs. Existing	Maximum increase	4.3	Just upstream of Foothills Parkway
	Maximum decrease	3.9	Approximately 530 feet upstream of Iris Avenue
Proposed vs. Effective	Maximum increase	2.3	Just upstream of Foothills Parkway
	Maximum decrease	5.0	Approximately 530 feet upstream of Longmont Diagonal Highway

Increases due to the proposed project that exceed those permitted under Paragraphs (c)(10) or (d)(3) of Section 60.3 of the NFIP regulations must adhere to Section 65.12 of the NFIP regulations. With this request, your community has complied with all requirements of Paragraph 65.12(a) of the NFIP regulations. Compliance with Paragraph 65.12(b) also is necessary before FEMA can issue a Letter of Map Revision when a community proposes to permit encroachments into the effective regulatory floodway that will cause BFE increases in excess of those permitted under Paragraph 60.3(d)(3).

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

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CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

Upon completion of the project, your community must submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report. If the project is built as proposed and the data below are received, a revision to the FIRM and FIS report would be warranted.

• Form 1, entitled "Overview and Concurrence Form." Detailed application and certification forms must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1 must be included. If as-built conditions differ from the proposed plans, please submit new forms, which may be accessed at http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/mt-2-application-forms-and-instructions, or annotated copies of the previously submitted forms showing the revised information.

• Hydraulic analyses, for as-built conditions, of the base (1-percent-annual-chance) flood; the 10-percent, 2-percent, and 0.2-percent-annual-chance floods; and the regulatory floodway, together with a topographic work map showing the revised floodplain and floodway boundaries. Please ensure that the revised information ties-in with the current effective information at the downstream and upstream ends of the revised reach.

• An annotated copy of the FIRM, at the scale of the effective FIRM, that shows the revised floodplain and floodway boundary delineations shown on the submitted work map and how they tie-in to the floodplain and floodway boundary delineations shown on the current effective FIRM at the downstream and upstream ends of the revised reach.

• As-built plans, certified by a registered professional engineer, of all proposed project elements.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/nfip.

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CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

• A copy of the public notice distributed by your community, stating its intent to revise the regulatory floodway, or a signed statement by your community that it has notified all affected property owners and affected adjacent jurisdictions.

• Documentation of the notification to property owners who will be affected by any widening/shifting of the base floodplain and/or any BFE increases along Wonderland Creek.

• Evidence that your community has, prior to approval of the proposed encroachment, adopted floodplain management ordinances that incorporate the increased BFEs and revised floodway boundary delineations to reflect the post-project conditions, as stated in Paragraph 65.12(b).

• FEMA's fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps may be accessed at http://www.fema.gov/flood-map-related-fees#2. The fee at the time of the map revision submittal must be received before we can begin processing the request. Payment of this fee can be made through a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card (Visa or MasterCard only). Please forward the payment, along with the revision application, to the following address:

Urban Drainage and Flood Control District
2480 West 26th Avenue, Suite 156-B
Denver, CO 80211

or submit the LOMR using the LOMC portal at https://hazards.fema.gov/femaportal/onlinelomc/signin.

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM and FIS report. Because the flood hazard information (i.e., base flood elevations, base flood depths, SFHAs, zone designations, and/or regulatory floodways) will change as a result of the project, a 90-day appeal period will be initiated for the revision, during which community officials and interested persons may appeal the revised flood hazard information based on scientific or technical data.

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CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Jeanine D. Petterson
Director, Mitigation Division
Federal Emergency Management Agency, Region VIII
Denver Federal Center, Building 710
P.O. Box 25267
Denver, CO 80225-0267
(303) 235-4830

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

BID TAB

Wonderland Creek Greenways Improvement Project - Winding Trail Drive to Foothills Parkway
June, 2015

REF NO.	CDOT BID CODE	DESCRIPTION OF BID ITEM	QUANTITY	PAY UNIT	UNIT PRICE	TOTAL COST OF BID ITEM
1	201-00000	Clearing and Grubbing	1	L S		
2	202	Removal of Abandoned Utility	3,802	LF		
3	202-00001	Removal of Structure	2	EACH		
4	202-00010	Removal of Tree	463	EACH		
5	202-00019	Removal of Inlet	7	EACH		
6	202-00020	Removal of Concrete Box Culvert	4	EACH		
7	202-00021	Removal of Manhole	9	EACH		
8	202-00027	Removal of Riprap	49	SY		
9	202-00031	Removal of Fire Hydrant	1	EACH		
10	202-00035	Removal of Pipe	3,542	LF		
11	202-00155	Removal of Wall	810	LF		
12	202-00203	Removal of Curb and Gutter	3,570	LF		
13	202-00210	Removal of Concrete Pavement	4,966	SY		
14	202-00220	Removal of Asphalt Mat	11,093	SY		
15	202-00240	Removal of Asphalt Mat (Planing)	1,468	SY		
16	202-00420	Removal of Pedestrian Rail	68	LF		
17	202-00700	Removal of Light Standard	2	EACH		
18	202-00810	Removal of Ground Sign	28	EACH		
19	202-00815	Removal of Sign (Special)	1	EACH		
20	202-01000	Removal of Fence	1,256	LF		
21	202-04001	Plug Culvert	1	EACH		
22	203-00000	Unclassified Excavation	46,649	CY		
23	203-00062	Embankment Material (Complete In Place) (Special)	854	CY		
24	203-00100	Muck Excavation	1,000	CY		
25	203-01597	Potholing	40	HOUR		
26	206-00100	Structure Backfill (Class 1)	16,539	CY		
27	206-00510	Filter Material (Class A)	1,208	CY		
28	206-00520	Filter Material (Class B)	785	CY		
29	206-00530	Filter Material (Class C)	28	CY		
30	207-00210	Stockpile Topsoil	7,350	CY		
31	207-00310	Stockpile Wetland Topsoil	1,200	CY		
32	207-00405	Topsoil (Special)	57	CY		
33	208-00002	Erosion Log (12 Inch)	451	LF		
34	208-00020	Silt Fence	13,065	LF		
35	208-00041	Rock Check Dam	5	EACH		
36	208-00045	Concrete Washout Structure	3	EACH		
37	208-00051	Storm Drain Inlet Protection (Type 1)	693	LF		
38	208-00070	Vehicle Tracking Pad	3	EACH		
39	208-00103	Removal and Disposal of Sediment (Labor)	200	HOUR		
40	208-00105	Removal and Disposal of Sediment (Equipment)	200	HOUR		
41	210	Remove and Reset Miscellaneous	4	EACH		
42	210-00007	Reset Wheel Stop	8	EACH		
43	210-00010	Reset Mailbox Structure	1	EACH		
44	210-00035	Reset Water Meter	3	EACH		
45	210-00473	Reset TV Cameras	1	EACH		
46	210-00750	Reset Light Standard	3	EACH		
47	210-00840	Reset Traffic Signal Pole	1	EACH		
48	210-00861	Reset Wiring	1	L S		
49	210-01000	Reset Fence	105	LF		
50	210-01011	Reset Gate	1	EACH		
51	210-04010	Adjust Manhole	2	EACH		
52	211-03005	Dewatering	1	L S		
53	212-00006	Seeding (Native)	5	ACRE		
54	212-00022	Seeding (Riparian)	1	ACRE		
55	212-00028	Seeding (Wetlands)	2	ACRE		
56	212-00032	Soil Conditioning	7	ACRE		
57	212-00050	Sod	66,500	SF		
58	212-00100	Tree Retention and Protection	1	L S		
59	213	Salvage and Reinstall Existing Rock Mulch	2,560	SF		
60	213-00005	Mulching (Decorative)	1,310	CF		
61	213-00067	Rock Mulch (Weed Free)	5,550	SF		
62	213-00460	Metal Landscape Border (3/16x4 Inch)	300	LF		
63	214-00225	Deciduous Tree (2.5 Inch Caliper)	170	EACH		
64	214-00260	Deciduous Tree (6 Foot)	35	EACH		
65	214-00280	Deciduous Tree (8 Foot)	33	EACH		
66	214-00301	Deciduous Shrub (Tubeling)	15	EACH		
67	214-00350	Deciduous Shrub (5 Gallon Container)	1,907	EACH		
68	214-00506	Evergreen Tree (6 Foot) (Ball and Burlap)	15	EACH		
69	214-00508	Evergreen Tree (8 Foot) (Ball and Burlap)	12	EACH		
70	214-00750	Broadleaf Evergreen Shrub (5 Gallon Container)	11	EACH		
71	214-00805	Ground Cover Vines (2.25 Inch Pots)	120	EACH		

BID TAB

Wonderland Creek Greenways Improvement Project - Winding Trail Drive to Foothills Parkway
June, 2015

REF NO.	CDOT BID CODE	DESCRIPTION OF BID ITEM	QUANTITY	PAY UNIT	UNIT PRICE	TOTAL COST OF BID ITEM
72	214-00910	Perennials (1 Gallon Container)	100	EACH		
73	214-01200	Plant (Tubeling)	70,456	EACH		
74	216	Erosion Control Blanket	10,074	SY		
75	216-00201	Soil Retention Blanket (Straw-Coconut)	1,272	SY		
76	304-06007	Aggregate Base Course (Class 6)	3,044	CY		
77	403-33741	Hot Mix Asphalt (Grading S) (75) (PG 64-22)	1,751	TON		
78	403-34741	Hot Mix Asphalt (Grading SX) (75) (PG 64-22)	1,269	TON		
79	412-00801	Concrete Pavement (8 Inch) (Special)	152	SY		
80	420-00113	Geotextile (Drainage) (Class 2)	5,003	SY		
81	420-00133	Geotextile (Separator) (Class 2)	469	SY		
82	503-00042	Drilled Caisson (42 Inch)	978	LF		
83	504-05000	Wire Mesh Facing	2,110	SF		
84	504-08255	Masonry Landscape Wall (Dry Stack)	55	SF		
85	506-00036	Grouted Riprap (36 Inch) (Special)	435	CY		
86	506-00206	Riprap (6 Inch)	200	CY		
87	506-00212	Riprap (12 Inch)	1,627	CY		
88	506-00218	Riprap (18 Inch)	1,609	CY		
89	506-00224	Riprap (24 Inch)	306	CY		
90	506-00236	Riprap (36 Inch)	1,100	CY		
91	506-00412	Soil Riprap (12 Inch)	13	CY		
92	509	Restrictor Plate	1	LS		
93	514-00100	Hand Rail	349	LF		
94	514-00201	Pedestrian Railing (Steel)(Special)	4,890	LF		
95	515-00120	Waterproofing (Membrane)	37	SY		
96	601-03000	Concrete Class D	359	CY		
97	601-03027	Concrete Class D (Special)	335	CY		
98	601-03030	Concrete Class D (Box Culvert)	1,473	CY		
99	601-03050	Concrete Class D (Wall)	4,390	CY		
100	601-40300	Structural Concrete Coating	5,249	SY		
101	603-01125	12 Inch Reinforced Concrete Pipe (Complete In Place)	128	LF		
102	603-01185	18 Inch Reinforced Concrete Pipe (Complete In Place)	416	LF		
103	603-01245	24 Inch Reinforced Concrete Pipe (Complete In Place)	388	LF		
104	603-01305	30 Inch Reinforced Concrete Pipe (Complete In Place)	140	LF		
105	603-01365	36 Inch Reinforced Concrete Pipe (Complete In Place)	330	LF		
106	603-02185	23x14 Inch Reinforced Concrete Pipe (Complete In Place)	14	LF		
107	603-05015	15 Inch Reinforced Concrete End Section	1	EACH		
108	603-05018	18 Inch Reinforced Concrete End Section	5	EACH		
109	603-05024	24 Inch Reinforced Concrete End Section	1	EACH		
110	603-05030	30 Inch Reinforced Concrete End Section	1	EACH		
111	603-05036	36 Inch Reinforced Concrete End Section	2	EACH		
112	603-50004	4 Inch Plastic Pipe	399	LF		
113	603-50006	6 Inch Plastic Pipe	132	LF		
114	603-50008	8 Inch Plastic Pipe	388	LF		
115	603-50010	10 Inch Plastic Pipe	423	LF		
116	603-50012	12 Inch Plastic Pipe	60	LF		
117	603-1	9x4.5 Foot Concrete Box Culvert (Precast)	344	LF		
118	603-2	12x5.5 Foot Concrete Box Culvert (Precast)	836	LF		
119	603-71610	16x10 Foot Concrete Box Culvert (Precast)	176	LF		
120	604-00305	Inlet Type C (5 Foot)	3	EACH		
121	604-00310	Inlet Type C (10 Foot)	2	EACH		
122	604-00315	Inlet Type C (15 Foot)	1	EACH		
123	604-00350	Inlet Type C (Special)	3	EACH		
124	604-00550	Inlet Type D (Special)	1	EACH		
125	604-16005	Inlet Type 16 (5 Foot)	3	EACH		
126	604-16010	Inlet Type 16 (10 Foot)	2	EACH		
127	604-16605	Inlet Type 16 (Triple) (5 Foot)	2	EACH		
128	604-19105	Inlet Type R L 5 (5 Foot)	1	EACH		
129	604-19110	Inlet Type R L 5 (10 Foot)	1	EACH		
130	604-19205	Inlet Type R L 10 (5 Foot)	3	EACH		
131	604-19305	Inlet Type R L 15 (5 Foot)	1	EACH		
132	604-19310	Inlet Type R L 15 (10 Foot)	2	EACH		
133	604-30005	Manhole Slab Base (5 Foot)	4	EACH		
134	604-30010	Manhole Slab Base (10 Foot)	14	EACH		
135	604-30015	Manhole Slab Base (15 Foot)	10	EACH		
136	605-00041	4 Inch Perforated Pipe Underdrain (Special)	4,180	LF		
137	605-00061	6 Inch Perforated Pipe Underdrain (Special)	261	LF		
138	607-11400	Fence Picket	48	LF		
139	606-11005	Bridge Rail Type 10 (Special)	69	LF		
140	607-11460	Fence Wood Railing	214	LF		
141	607-11455	Fence Wood	296	LF		
142	607-11525	Fence (Plastic)	10,281	LF		

BID TAB

Wonderland Creek Greenways Improvement Project - Winding Trail Drive to Foothills Parkway
June, 2015

REF NO.	CDOT BID CODE	DESCRIPTION OF BID ITEM	QUANTITY	PAY UNIT	UNIT PRICE	TOTAL COST OF BID ITEM
143	607-53142	Fence Chain Link (42 Inch)	197	LF		
144	608-00000	Concrete Sidewalk	9,598	SY		
145	608-00010	Concrete Curb Ramp	256	SY		
146	608-00060	Stone Pavers	160	SF		
147	608-00350	Concrete Sidewalk (Colored)	803	SY		
148	609-20010	Curb Type 2 (Section B)	108	LF		
149	609-21010	Curb and Gutter Type 2 (Section I-B)	537	LF		
150	609-21023	Curb and Gutter Type 2 (Section II-B) (Special)	2,970	LF		
151	609-24003	Gutter Type 2 (3 Foot)	159	LF		
152	609-24004	Gutter Type 2 (4 Foot)	5	LF		
153	609-24005	Gutter Type 2 (5 Foot)	6	LF		
154	609-24008	Gutter Type 2 (8 Foot)	73	LF		
155	609-70040	Curb (Composite Material)	80	LF		
156	612-00039	Delineator (Flexible) (Surface Mounted)	6	EACH		
157	613-00050	1/2 Inch Electrical Conduit	40	LF		
158	613-00206	2 Inch Electrical Conduit (Bored)	120	LF		
159	613-00306	3 Inch Electrical Conduit (Bored)	340	LF		
160	613-01050	1/2 Inch Electrical Conduit (Plastic)	530	LF		
161	613-01100	1 Inch Electrical Conduit (Plastic)	2,340	LF		
162	613-01200	2 Inch Electrical Conduit (Plastic)	725	LF		
163	613-01300	3 Inch Electrical Conduit (Plastic)	100	LF		
164	613-10000	Wiring	1	L S		
165	613-13000	Luminaire (LED)	16	EACH		
166	613-13001	Luminaire (Special)(LED)(12 Watt)	2	EACH		
167	613-50010	Photoelectric Cell	1	EACH		
168	613-50100	Lighting Control Center	5	EACH		
169	613-50130	4-Plex Receptacle (With Back Box and Cover)	6	EACH		
170	615-65005	Irrigation Diversion Structure	1	L S		
171	619	16" Epoxy Lined Steel Pipe	281	LF		
172	619-00000	Water Meter and Vault	3	EACH		
173	619-10060	6 Inch Welded Steel Pipe	30	LF		
174	619-10180	18 Inch Welded Steel Pipe	461	LF		
175	619-10200	20 Inch Welded Steel Pipe	176	LF		
176	619-10280	28 Inch Welded Steel Pipe	191	LF		
177	619-40060	3/4 Inch Copper Pipe	84	LF		
178	619-50640	8 Inch Plastic Pipe	407	LF		
179	619-50960	12 Inch Plastic Pipe	175	LF		
180	619-51280	16 Inch Plastic Pipe	139	LF		
181	619-71516	2 Inch Air and Vacuum Valve	2	EACH		
182	619-75064	8 Inch Gate Valve	8	EACH		
183	619-75096	12 Inch Gate Valve	2	EACH		
184	619-75116	16 Inch Gate Valve	1	EACH		
185	619-78048	6 Inch Fire Hydrant	1	EACH		
186	620-00001	Field Office (Class 1)	1	EACH		
187	622	BNSF Canopy	1	LS		
188	622-00010	Bicycle Rack	20	EACH		
189	623	Existing Irrigation System Modification	1	LS		
190	623-04003	Controller Communication Cable	100	LF		
191	623-09900	Sprinkler System	1	L S		
192	623-09905	Irrigation Assembly	1	EACH		
193	625-00000	Construction Surveying	1	L S		
194	626-00000	Mobilization	1	L S		
195	627-00011	Pavement Marking Paint (Waterborne)	30	GAL		
196	628-00085	Bridge Girder and Deck Unit (85 Feet to 90 Feet)	1	EACH		
197	630-00000	Flagging	250	HOUR		
198	630-00003	Uniformed Traffic Control	8	HOUR		
199	630-00007	Traffic Control Inspection	94	DAY		
200	630-00012	Traffic Control Management	238	DAY		
201	630-80336	Barricade (Type 3 M-B) (Temporary)	6	EACH		
202	630-80341	Construction Traffic Sign (Panel Size A)	80	EACH		
203	630-80342	Construction Traffic Sign (Panel Size B)	6	EACH		
204	630-80355	Portable Message Sign Panel	4	EACH		
205	630-80360	Drum Channelizing Device	70	EACH		
206	630-80370	Concrete Barrier (Temporary)	440	LF		
207	630-80380	Traffic Cone	40	EACH		
208	630-86810	Traffic Signal (Temporary)	1	EACH		
209	700-70021	F/A On-The-Job Trainee	1	F A		
210	700-70042	F/A Railroad Flagging	1	F A		
211	700-70370	F/A Signing	1	F A		
					TOTAL =	

ACCEPTANCE OF FUEL COST ADJUSTMENTS:

Bidders have the option to accept Fuel Cost Adjustments in accordance with the Revision of Section 109 - Fuel Cost Adjustment. To accept this standard special provision, the bidder must fill in an "X" next to "YES" below. No Fuel Cost Adjustment will be made due to fuel cost changes for bidders who answer "NO". If neither line is marked, the Department will assume the bidder rejects Fuel Cost Adjustments for this project. After bids are submitted, bidders will not be given any other opportunity to accept or reject this adjustment.

(Mark only one line with an "X"):
____ YES, I choose to accept Fuel Cost Adjustments for this project

____ NO, I choose NOT to accept Fuel Cost Adjustments for this project (if neither line is marked, the default is "NO", I choose NOT to accept Fuel Cost Adjustments for this project

COLORADO DEPARTMENT OF TRANSPORTATION

ANTI-COLLUSION AFFIDAVIT

PROJECT NO.
LOCATION

I hereby attest that I am the person responsible within my firm for the final decision as to the price(s) and amount of this bid or, if not, that I have written authorization, enclosed herewith, from that person to make the statements set out below on his or her behalf and on behalf of my firm.

I further attest that:

1. The price(s) and amount of this bid have been arrived at independently, without consultation, communication or agreement for the purpose or with the effect of restricting competition with any other firm or person who is a bidder or potential prime bidder.

2A. Neither the price(s) nor the amount of this bid have been disclosed to any other firm or person who is a bidder or potential prime bidder on this project, and will not be so disclosed prior to bid opening.

2B. Neither the prices nor the amount of the bid of any other firm or person who is a bidder or potential prime bidder on this project have been disclosed to me or my firm.

3A. No attempt has been made to solicit, cause or induce any firm or person who is a bidder or potential prime bidder to refrain from bidding on this project, or to submit a bid higher than the bid of this firm, or any intentionally high or non-competitive bid or other form of complementary bid.

3B. No agreement has been promised or solicited for any other firm or person who is a bidder or potential prime bidder on this project to submit an intentionally high, noncompetitive or other form of complementary bid on this project.

4. The bid of my firm is made in good faith and not pursuant to any consultation, communication, agreement or discussion with, or inducement or solicitation by or from any firm or person to submit any intentionally high, noncompetitive or other form of complementary bid.

5. My firm has not offered or entered into a subcontract or agreement regarding the purchase or sale of materials or services from any firm or person, or offered, promised or paid cash or anything of value to any firm or person, whether in connection with this or any other project, in consideration for an agreement or promise by any firm or person to refrain from bidding or to submit any intentionally high, noncompetitive or other form of complementary bid or agreeing or promising to do so on this project.

6. My firm has not accepted or been promised any subcontract or agreement regarding the sale of materials or services to any firm or person, and has not been promised or paid cash or anything of value by any firm or person, whether in connection with this or any other project, in consideration for my firm's submitting any intentionally high, noncompetitive or other form of complementary bid, or agreeing or promising to do so, on this project.

7. I have made a diligent inquiry of all members, officers, employees, and agents of my firm with responsibilities relating to the preparation, approval or submission of my firm's bid on this project and have been advised by each of them that he or she has not participated in any communication, consultation, discussion, agreement, collusion, or other conduct inconsistent with any of the statements and representations made in this affidavit.

8. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as a fraudulent concealment from the Colorado Department of Transportation, of the true facts relating to submission of bids for this contract.

I DECLARE UNDER PENALTY OF PERJURY IN THE SECOND DEGREE, AND ANY OTHER APPLICABLE STATE OR FEDERAL LAWS, THAT THE STATEMENTS MADE ON THIS DOCUMENT ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

Contractor's firm or company name	By	Date
	Title	
2nd contractor's firm or company name. (If joint venture.)	By	Date
	Title	

Sworn to before me this day of, 20

Notary Public	
My commission expires	
NOTE: This document must be signed in ink.	

COLORADO DEPARTMENT OF TRANSPORTATION

BIDDERS LIST

Project Name and Number	Project Code	Proposal Date	Contractor	Region

Subcontractors/Suppliers/Vendors: The bidder must list all firms seeking to participate on the contract. This information is used by the Colorado Department of Transportation (CDOT) to determine overall goals for the Disadvantaged Business Enterprise Program. Failure to submit this form may result in the proposal being rejected.

Firm Name	Email	Work Proposed (Select all that apply)	DBE (Y/N)	Selected (Y/N)

I certify that the information provided herein is true and correct to the best of my knowledge.

Name	Signature/Initials	Title	Date

Work Proposed Categories:

1. *Materials and Supplies*
2. *Flagging and Traffic Control*
3. *Trucking and Hauling*
4. *Precast Concrete, Foundations, and Footings*
5. *Concrete Paving, Flatwork and Repair*
6. *Lighting and Electrical*
7. *Signs, Signal Installation, and Guardrail*
8. *Fencing*
9. *Buildings and Vertical Structures*
10. *Utility, Water and Sewer Lines*
11. *Structural Steel and Steel Reinforcement*
12. *Riprap and Anchored Retaining Walls*
13. *Landscape and Erosion Control*
14. *Bridge and Bridge Deck Construction*
15. *Asphalt Paving*
16. *Road and Parking Lot Marking*
17. *Chip Seal, Crack Seal, Joint Seal and Crack Fill*
18. *Bridge Painting and Coating*
19. *Stairway and Ornamental Metal*
20. *Parking Lots and Commercial Sidewalks*
21. *Clearing, Demolition, Excavation and Earthwork*
22. *Engineering and Surveying Services*
23. *Public Relations and Involvement*
24. *Piles and Deep Foundations*
25. *Waste Management and Recycling*
26. *Site Clean Up*
27. *Mechanical and HVAC*
28. *Tunnel Construction*
29. *Profiling and Grinding*
30. *Environmental Health and Safety*

This form must be submitted by the proposal deadline. For CDOT projects, submit to cdot_hq_dbeforms@state.co.us.

COLORADO DEPARTMENT OF TRANSPORTATION

ANTICIPATED DBE PARTICIPATION PLAN

Bidder:		Project:	
Contact:		Project Code:	
Phone:		Date of Proposal:	
Email:		Contract Goal:	
Preferred Contact Method:		Region:	

DBE Commitments

DBE Firm Name	Work to Be Performed	Commitment Amount	Eligible Participation
		Total Eligible Participation	
		Total Bid Amount	
		Total Eligible Participation Percentage	

Bidder Signature

This section must be signed by an individual with the authority to bind the Bidder. By signing this form, as an authorized representative of the Bidder, you declare under penalty of perjury in the second degree and any other applicable state or federal laws that the statements made in this document are true and complete to the best your knowledge. Further, you attest that you have read the Standard Special Provision Disadvantaged Business Enterprise Requirements and understand the following:

CDOT shall not award a contract until it has been determined that the contract goal has been met or that you have otherwise demonstrated good cause. Once your proposal has been submitted, commitments may not be modified or terminated without the approval of CDOT. If selected as the lowest apparent bidder, you shall submit a Form 1415 for each commitment listed above. If you have not met the contract goal, you will also be required to submit documentation of all good faith efforts to meet the contract goal.

It is your responsibility to ensure that the selected DBEs are certified for the work to be performed and that their eligible participation has been properly counted. For additional information and instructions on calculating eligible participation, see the Standard Special Provision Disadvantaged Business Enterprise Requirements.

Name	Title	Signature	Date

This form must be submitted by the proposal deadline. For CDOT projects, submit to cdot_hq_dbeforms@state.co.us.

APPENDIX 2: CONSTRUCTION FORMS

Form 1	Bid Bond
Form 2	Contractor/Subcontractor Qualification Form
Form 3	Contractor/Subcontractor Verification Form
Form 4	Notice of Award
Form 5	Contract for Construction in the City of Boulder, Colorado
Form 6	Performance Bond
Form 7	Labor and Material Bond
Form 8	Work Directive
Form 9	Change Order
Form 10	Field Order
Form 11	Application for Payment
Form 12	Certificate of Substantial Completion
Form 13	Certificate of Occupancy
Form 14	Final Inspection Report
Form 15	Payment of Boulder Sales and Use Tax
Form 16	Claim Release
Form 17	Affidavit that All Claims are Satisfied
Form 18	Surety's Consent to Final Payment
Form 19	Guarantee Period Inspection Report
Form 20	Proposed Subcontractors
Form 21	Schedule of Manufacturers and Suppliers

[Form 1]

BID BOND

Witness:

_____, as principal, hereinafter called the "bidding contractor," and _____, as "surety," a corporation properly organized under the laws of Colorado or authorized to do business in Colorado, hereby obligate themselves to the City of Boulder, as obligee, hereinafter called the "city," in the penal sum of _____ dollars ($_____), which penal sum shall secure the obligation of the bidding contractor to enter into contract with the city for the work associated with

_____

_____

_____,

Project Number _____, if the bidding contractor is so selected by the city.

If the city accepts the bid of the bidding contractor, and if the bidding contractor properly executes a contract with the city to perform the work covered by the award, then this obligation shall be null and void.

In the alternative, if the bidding contractor refuses to enter into contract with the city for work described in the bid, but rather pays to the city the difference between the bidding contractor's stated bid amount and the actual amount bid by an alternate bidding contractor, who is accepted by the city, then this obligation shall be null and void.

EXECUTED on this _____ day of _____, 20___.

_____
(Contractor)

By: _____
(President)

_____
(Surety Company)

By: _____
(Attorney-in-Fact)

[Form 2]

CONTRACTOR/SUBCONTRACTOR QUALIFICATION FORM

I. General Information

Your Company:

Name: _____

Address: _____

How long have you been in business? _____

How long have you been in business under the present business name? _____

What former name(s), if any, has your company operated under in the past five (5) years?

_____

What is the largest contract you have been awarded in the past twelve (12) months?

_____

II. Information: Previous Construction Contract

Provide the following information for three 3) contracts you have performed, or are currently performing, within the past five (5) years. At least two (2) contracts must be completed. If you have performed any contract with the City of Boulder, or County of Boulder, or State of Colorado, include information about the least one (1) such contract.

Contract 1

Owner _____
Name

_____ _____
Address Phone

Date Begun _____ Date Completed _____ Dollar Amount _____

Description of Work _____

Architect _____
Name

_____ _____
Address Phone

Surety for Performance Bond: _____

_____ _____
Address Phone

Surety for Labor and Material Bond: _____

_____ _____
Address Phone

Insurance Company: _____
Name

_____ _____
Address Phone

Major Subcontractor: _____
Name

_____ _____
Address Phone

Major Supplier: _____
Name

_____ _____
Address Phone

Are there any lawsuits, claims, or disputes resulting from this project? If so, please describe:

_____

* * * * *

Contract 2

Owner _____
Name

_____ _____
Address Phone

Date Begun _____ Date Completed _____ Dollar Amount _____

Description of Work _____

Architect _____
Name

_____ _____
Address Phone

Surety for Performance Bond: _____

_____ _____
Address Phone

Surety for Labor and Material Bond: _____

_____ _____
Address Phone

Insurance Company: _____
Name

_____ _____
Address Phone

Major Subcontractor: _____
Name

_____ _____
Address Phone

Major Supplier: _____
Name

_____ _____
Address Phone

Are there any lawsuits, claims, or disputes resulting from this project? If so, please describe:

_____

* * * * *

Contract 3

Owner _____
Name

_____ _____
Address Phone

Date Begun _____ Date Completed _____ Dollar Amount _____

Description of Work _____

Architect _____
Name

_____ _____
Address Phone

Surety for Performance Bond: _____

_____ _____
Address Phone

Surety for Labor and Material Bond: _____

_____ _____
Address Phone

Insurance Company: _____
Name

_____ _____
Address Phone

Major Subcontractor: _____
Name

_____ _____
Address Phone

Major Supplier: _____
Name

_____ _____
Address Phone

Are there any lawsuits, claims, or disputes resulting from this project? If so, please describe:

_____

III. Describe the work you normally perform with your own forces:

_____

_____

_____

_____

IV. Have you, or any officer or partner of your organization, when working for another organization, failed to complete any work awarded to you or such officer or partner? If so, attach a separate sheet of explanation.

V. Are there any claims or law suits against your organization, against predecessor organizations of your organization, or against any officer or partner who currently works for your organization which have been brought during the previous five years? If so, attach a separate sheet of explanation.

VI. Resumes

Provide resumes for at least two (2) persons with your company. One resume should be for an officer of the company: president, vice-president, etc. The second resume should be for an operations manager of the company who has had experience directing a job as a contractor or superintendent. An operations manager may also be an officer of the company.

Officer: _____
Name

Operations Manager: _____
Name

VII. Trade References:

1.

2.

3.

4.

5.

VIII. Bank References:

1.

2.

3.

4.

5.

IX. Name of Bonding Company and name and address of agent:

X. Attach a financial statement, audited if available, (consolidated if the contractor is part of an affiliated group), including contractor's latest balance sheet and income statement showing the following items:

A. Current Assets (*e.g.*, cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory, and prepaid expenses):

B. Net Fixed Assets:

C. Other Assets:

D. Current Liabilities (*e.g.*, accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries, and accrued payroll taxes):

E. Other Liabilities (*e.g.*, capital, capital stock, authorized and outstanding shares par values, earned surplus, and retained earnings):

Name of firm preparing financial statement and date thereof:

Is this financial statement for the identical organization named in Part I on page one?_____

If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (*e.g.*, parent-subsidiary).

Will this organization act as guarantor of the contract for construction?

[Form 3]

CONTRACTOR/SUBCONTRACTOR VERIFICATION FORM
(For Internal Use Only)

Name of Contractor

_____

Name of Owner of Project

_____

I. Project History

Contact the following parties to determine their evaluation of the contractor or subcontractor (hereinafter referred as "contractor").

1. Owner _____ Date Contacted _____

Are you satisfied with the work? yes_____ no_____

Would you contract with this contractor again? yes_____ no_____

_____

_____

2. Architect _____ Date Contacted _____

Are you satisfied with the contractor's performance of the work? yes_____ no_____

Are there any lawsuits, claims, or disputes which have resulted from this contract, or which are now pending, or from any other contract with the contractor on which you were the architect?

_____

_____

Would you work with this contractor again in the future? yes_____ no_____

3. Surety: Performance Bond

Are there any outstanding lawsuits, claims, or disputes which resulted from this contract, or which are now pending, or from any other contract on which you were a surety for this contractor?

_____

_____

Would you bond this contractor again on a future project? yes_____ no_____

Comments: _____

_____

_____

4. Surety: Labor and Material Bond

_____ _____

Name Date Contacted

Are there any outstanding lawsuits, claims, or disputes which resulted from this contract, or which are now pending, or from any other contract on which you were a surety for this contractor?

_____

_____

Would you bond this contractor again on a future project? yes_____ no_____

Comments: _____

_____

_____

5. Insurance Company

_____ _____

Name Date Contacted

Are there any outstanding lawsuits, claims, or disputes which resulted from this contract, or which are now pending, or from any other contract on which you provided insurance for this contractor?

_____

_____

Would you insure this contractor again on a future project? yes_____ no_____

At higher insurance rates? yes_____ no_____

Explain: _____

_____

_____

6. Subcontractor

_____ _____

Name Date Contacted

Have you been completely paid? yes_____ no_____

Are there any outstanding lawsuits, claims, or disputes which resulted from this project, or which are now pending, or from any other work performed for this contractor?

_____

_____

Would you work for this contractor again on a future project? yes_____ no_____

7. Supplier

_____ _____

Name Date Contacted

Describe the materials you supplied to the contractor:

_____

_____

Were you paid promptly? yes_____ no_____

Are there any outstanding lawsuits, claims, or disputes which resulted from this or any other project on which you have provided materials for this contractor?

_____

_____

II. Evaluation

Contractor is Approved: yes _____ yes, but with reservation _____ no _____

Need Further Information:_____

_____

_____

_____

_____

[Form 4]

NOTICE OF AWARD

DATE: _____

FROM: _____

TO: _____

_____

_____

Project Number: _____

This notice certifies that the contractor listed above has been selected to perform the work. The beginning date of the contract shall be the date the purchase order is issued, which shall be the official notice to proceed.

Signed:

_____ _____

Project Manager Date

_____ _____

Contractor Date

[Form 5]

CONTRACT AGREEMENT FOR CONSTRUCTION IN THE CITY OF BOULDER, COLORADO

This Agreement, made and entered into this _____ day of _____, 20___, between the City of Boulder, Colorado, hereinafter called the "city," and _____, hereinafter called the "contractor." The city and the contractor, for the consideration hereinafter named, agree as follows:

Part One: The Contract Documents

The contract documents consist of this contract agreement, the general conditions, the special conditions, the bid proposal, the drawings and specifications, and change orders, addenda and other documents which may be required or specified.

Part Two: The Work

The contractor shall perform all the work required by the contract documents as specified by Bid No. _____ and Addenda No. _____, attached hereto.

Part Three: Liquidated Damages for Failure to Complete Work on Time

The contractor hereby agrees to be liable for liquidated damages in the sum of _____ DOLLARS ($ _____) per day for each and every day that substantial completion of the work is delayed past the established time limit or limits, including due allowance for any extension of time agreed to by the city. The liquidated damages herein specified shall only apply to the contractor's delay in performance, and shall not include litigation or attorneys' fees incurred by the city, or other incidental or consequential damages suffered by the city due to the contractor's performance. If the city charges liquidated damages to the contractor, this shall not preclude the city from commencing an action against the contractor for other actual harm resulting from the contractor's performance which is not due to the contractor's delay in performance.

Part Four: Contract Price

The city shall pay the contractor in current funds for the performance of the work, subject to additions and deductions by change order as provided in the contract documents, the contract price of _____ DOLLARS ($_____), as set forth in the bid proposal of the contractor dated _____, as amended by _____, dated _____.

Part Five: Appropriations

[mark the clause or clauses which apply]

[ ] The city has appropriated funds to pay the contractor for its work under this contract that are equal to or greater than the contract price stated above. (To be used for construction projects that are scheduled to be completed within one fiscal year.)

[ ] The amount of funds appropriated to pay the contractor for its work under this contract is $_____. Before the contractor commences any work for which the city has agreed to pay a sum in excess of the appropriated amount stated above, the city shall provide the contractor with a written assurance that funds equal to or in excess of the additional sum have been lawfully appropriated. (To be used for phased construction projects occurring over more than one fiscal year where funds sufficient to pay the full contract price are expected to be appropriated by the city for fiscal years subsequent to the one in which the work commenced.)

[ ] The funds to be used to pay the contractor for its work under this contract have been raised by issuing bonds. Appropriations by the city to pay the debt on those bonds may occur subsequent to the date of this contract. The city shall provide the contractor with a written assurance that each such appropriation has been lawfully made shortly after it occurs. (To be used for construction projects funded by bonded indebtedness.)

Part Six: Affidavit of Compliance with Affirmative Action Requirement

The contractor has read a copy of Section 12-1-3, B.R.C. 1981, which relates to nondiscrimination, and agrees to comply with its terms so long as the contractor is under contract with the city.

Part Seven: Warranty of NonCollusion

By executing this contract, the undersigned warrants that:

1) The contractor has not allowed any competing bidder or employee or agent thereof to see the contractor's bid or to know of its contents.
2) The contractor has not discussed the contents of its bid with any competing bidder, or any other person who a reasonably prudent person would believe would be likely to transmit information to a competing bidder.
3) The contractor has drafted its bid independently of any competing bidder.

Failure to abide by the above provisions relating to collusion shall render the contractor liable to the city for damages including, without limitation, payment of the bid bond as liquidated damages. In addition, the city may void any contract entered into with a bidder guilty of collusion. If the bidder has engaged in any practice which might be suspected to be collusive, please explain below:

_____

_____

_____

Part Eight: Addresses of Contracting Parties

Correspondence may be sent to the following addresses:

City/Project Manager: _____,

P.O. Box 791, Boulder, Colorado, 80306. Telephone: _____

Contractor: _____,

_____

[address], Telephone: _____

This agreement shall be binding upon the heirs, executors, administrators, successors, and assigns of each of the parties hereto.

In witness whereof, the contractor hereunder places its signature in agreement, and the city has caused this agreement to be signed by the city manager and countersigned by the director of finance and record, purchasing agent, and city attorney.

CONTRACTOR:

By: _____ Date: _____

President

ATTEST:

By: _____

Secretary

STATE OF COLORADO)
) SS
COUNTY OF BOULDER)

Before me, _____, a notary public in and for the County of Boulder, State of Colorado, personally appeared _____, known to me personally to be the person(s) whose signatures(s) appear hereon and who subscribed their signature(s) in my presence this _____ day of _____, 20___.

Witness my hand and official seal.

_____

(SEAL) Notary Public

My commission expires:_____

THE CITY OF BOULDER, COLORADO

By: _____ Date: _____
City Manager

ATTEST:

_____ Date: _____
City Clerk

By: _____ Date: _____
Purchasing Agent

Approved as to form:

By: _____ Date:_____
City Attorney

[Form 6]

PERFORMANCE BOND

_____, as principal, hereinafter called the contractor, and _____, as surety, with general offices in _____, a corporation organized under the laws of the State of _____, and authorized to transact business in the State of Colorado, are hereby bound unto the City of Boulder, Colorado, as obligee, hereinafter called the city, in the penal sum of_____ DOLLARS ($_____) in United States currency, for the payment of which sum the contractor and surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally.

The condition of the obligation is that the principal and the City of Boulder, Colorado have entered into a certain Contract, dated _____, for the construction of a project described as

_____

_____

_____

located in Boulder County in the State of Colorado. Said work of construction to be done according to the requirements of said contract;

NOW THEREFORE**,** if the said principal shall at all times duly and faithfully discharge its, his or their duties under said contract, and shall duly and faithfully perform all the obligations thereof, and shall and will indemnify and save harmless the City of Boulder, Colorado, and all persons as provided by the Statutes of the State of Colorado, from any and all damages or loss which the said City of Boulder, Colorado or any persons as provided by the Statutes of the State of Colorado may or shall suffer by reason of the default of the principal or anyone acting for him as subcontractor or otherwise in the performance of this contract, or by reason of any failure on the part of said principal, his agents, servants or employees, his subcontractor or subcontractors, or any of them, in the performance of said contract or any portion thereof, these presents shall become void, otherwise to be and remain in full force and effect.

The City of Boulder, Colorado shall be under no obligation, except as expressly provided by statute, to withhold any sums due the said principal under the terms of this contract, or to protect in any other way the surety or sureties, claimants or others.

No representation or statement of the principal made to the surety or sureties in application for this bond, or otherwise, shall be read into or be a part of this bond or binding in any way on the obligee herein.

No assignment by principal to surety of the proceeds of such contract shall be binding, except as to any net surplus after paying all claims chargeable by law or by said contract, against the proceeds thereof.

No extension of time of performance of said contract or delay in the completion of the work thereunder shall invalidate this bond or release the liability of the surety thereunder.

EXECUTED on this _____ day of _____, 20___.

_____

Attest: (Contractor)

_____

By: _____
(President)

_____
(Surety Company)

By: _____
(Attorney-in-Fact)

[Form 7]

LABOR AND MATERIAL BOND

_____, as principal, hereinafter called contractor, and _____, as surety, with general offices in _____, a corporation organized under the laws of the State of_____, and authorized to transact business in the State of Colorado, are hereby bound unto the City of_____ _____, Colorado, as obligee, hereinafter called city, in the penal sum of _____ DOLLARS ($_____) in United States currency, for the payment of which sum the contractor and surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally.

The condition of the obligation is that the principal and the City of Boulder, Colorado have entered into a certain Contract, dated _____, for the construction of a project described as _____

_____

_____

located in Boulder County in the State of Colorado. Said work of construction to be done according to the requirements of said.

NOW, THEREFORE, if the said principal, his sub-contractor or sub-contractors, and each and all of them, shall duly pay for all labor, materials, and other supplies used or consumed in the performance of the work contracted to be done or any part thereof, and if the said principal shall also fully indemnify and save harmless the City of Boulder, and all persons as provided by the Statutes of the State of Colorado, from any and all damages or loss which the said City of Boulder or any persons as provided by the Statutes of the State of Colorado, may or shall suffer by reason of the default of the principal or anyone acting for him as sub-contractor in connection with such payments, these presents shall become void, otherwise to be and remain in full force and effect.

The City of Boulder shall be under no obligation, except as expressly provided by statute, to withhold any sums due the said principal under the terms of this contract, or to protect in any other way the surety or sureties, claimants or others.

No representation or statement of the principal made to the surety or sureties in application for this bond, or otherwise, shall be read into or be a part of this bond or binding in any way on the obligee herein.

No assignment by principal to surety of the proceeds of such contract shall be binding, except as to any net surplus after paying all claims chargeable by law or by said contract, against the proceeds thereof.

No extension of time of performance of said contract or delay in the completion of the work thereunder shall invalidate this bond or release the liability of the surety thereunder.

EXECUTED on this _____ day of _____, 20___.

Attest: _____
(Contractor)

_____

By: _____
(President)

_____
(Surety Company)

By: _____
(Attorney-in-Fact)

[Form 8]

WORK DIRECTIVE

Work Directive No. _____

Date _____ Project Name _____

Project Number _____ P.O. Number _____

CITY: CITY OF BOULDER, COLORADO

CONTRACTOR: _____

The CONTRACTOR is directed to proceed promptly with the following change(s):

Description: _____

Attachments: _____

If a claim is made that the above change(s) have affected the Contract Price or Contract Time, any claim for a Change Order based thereon will involve one of the following methods of determining the effect of the change(s).

Method of determining change in Contract Price:

Time and Materials

Unit Prices

Cost plus fixed fee

Other _____

Method of determining change in Contract Time:

CONTRACTOR's records

ENGINEER's records

Other_____

Estimated (increase) (decrease) in Contract Price: $_____. If the change involves an increase, the estimated amount is not to be exceeded without further authorization .

Estimated (increase) (decrease) Contract Time: _____ days. If the change involves an increase, the estimated time is not to be not to be exceeded without further authorization.

APPROVED: _____
CONTRACTOR

_____
PROJECT MANAGER

[Form 9]

CHANGE ORDER #

Project Number _____ P.O. Number _____

Date: _____

FROM: CITY OF BOULDER, COLORADO

TO: _____
_____
_____

Quantity	Item	Unit Cost	Total
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The above items of construction shall be (added) (subtracted) at the unit costs as agreed.

(Increase) (Decrease) $ _____

Original contract amount _____
Previous contract amount _____
Amount this change order _____
Revised contract amount _____

Original substantial completion date _____
Previous substantial completion date _____
Contract period increase/decrease
by this change over _____
Revised substantial completion _____

Original final completion date _____
Previous final completion date _____
Contract period increase/decrease
by this change over _____
Revised final completion date_____

If this modification causes an increase in the contract price, it constitutes compensation in full to the contractor and its subcontractors and suppliers for all costs and mark-ups directly and indirectly attributable to the charges ordered herein, for all delays, impacts and disruptions related thereof, and for the performance of the changes within the stated time.

If this change order causes the aggregate amount due the contractor under the contract to exceed the original contract price, the city hereby assures the contractor that funds sufficient to cover the cost of the change have been lawfully appropriated.

Change Order Prepared By _____ Date: _____

Change Order Approved By _____ Date: _____
Contractor

Order Approved By _____ Date: _____
Project Manager

Change Order Approved By _____ Date: _____
Department Head

[Form 10]

FIELD ORDER

Project No. _____ Date _____

To: _____, Contractor

From: _____, Project Manager

_____, Authorized City Representative

The work shall be prosecuted as follows:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Signed:

_____ _____
Project Manager Date

[Form 11]

APPLICATION FOR PAYMENT

Number _____ Date _____

Munis Contract #: _____

OWNER: CITY OF BOULDER
PROJECT: _____
CONTRACTOR: _____

FOR WORK ACCOMPLISHED THROUGH THE DATE OF: _____

Work Completed

Item	Amount
Original Contract Amount	$_____
Net Change by Work Directives or Change Orders	$_____
Revised Contract Amount	$_____
Amount Earned to Date	$_____
Total Retainage (5%)	$_____
Amount Earned Since Previous Pay Application*	$_____
Retainage This Payment	$_____
Previous Payments	$_____
Amount due this payment	$_____

CONTRACTOR'S CERTIFICATION

The undersigned CONTRACTOR certifies that all previous progress payments received from the OWNER in connection with this contract have been applied to discharge obligations incurred as a result of this work and that title to materials and equipment incorporated in the work or otherwise listed in or covered by this APPLICATION FOR PAYMENT will pass to the OWNER free of all liens, claims, security interests, and encumbrances (except as covered by a BOND acceptable to the OWNER) at the time of payment.

REQUESTED: _____ _____
CONTRACTOR DATE

RECOMMENDED _____ _____
OWNER'S REPRESENTATIVE DATE

APPROVED: _____ _____
OWNER DATE

*Enter this line in Munis when paying invoice against contract. Munis will deduct 5% from this amount for retainage.

[Form 12]

CERTIFICATE OF SUBSTANTIAL COMPLETION

This certifies that the building or structure known as _____, project no. _____:

1. has been inspected by the project manager or another duly authorized official of the City of Boulder, and

2. the work or portion thereof is substantially complete as defined in Appendix I (45) and section 713 of the general conditions.

Description of work or portion thereof which is substantially complete:

_____

_____

_____

Address or Location: _____

Contractor: _____

Address of Contractor: _____

The following items still need to be completed:

Item	Expected Completion Date
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

The Contractor's guarantee (*see* section 716) shall begin on _____.

Responsibility for payment of the following items shall be placed upon:

Security: _____

Maintenance: _____

Heat: _____

Utilities: _____

_____

_____

Damage to the Work: _____

_____

Insurance: _____

Comments: _____

_____

_____

_____

Date of Substantial Completion: _____.

Signed:

_____	_____
Project Manager	Date
_____	_____
Contractor	Date

[Form 13]

CERTIFICATE OF OCCUPANCY

This certifies that the building or structure known as _____, project no. _____:

1. Has been inspected by the project manager or another duly authorized official of the City of Boulder; and

2. That it complies with the provisions of the City Building Code for the Fire Zone and the Occupancy Group on which it is located.

Description of Building or Structure: _____

_____

_____

Address or Location: _____

Contractor: _____

Address:

_____

Building Permit No.: _____

Fire Zone: _____

Occupancy Group: _____

Construction Type: _____

Witness my hand and seal this _____ day of _____, 20___.

_____
Project Manager

[Form 14]

FINAL INSPECTION REPORT

Project No. _____ Date: _____

To: _____, Contractor

From: _____, Project Manager

The City of Boulder has performed its final inspection of the work, and accepts the work subject to the contractor's performance of the following repairs or replacements:

_____
_____
_____
_____
_____
_____
_____
_____
_____

The city does/does not [circle] hereby finally accept the work.

The contractor agrees that the performance bond shall remain in effect during the guarantee period through _____, 20_____. The contractor further agrees to maintain in effect all insurance required under article 3, except for builder's risk, and to procure additional bonds, as required by the city, to cover any extension in the guarantee period necessitated by defects in the work which are discovered during the guarantee period.

The project manager does/does not [circle] hereby certify that the contractor is eligible to receive final payment for the work.

Signed:

_____ _____
Project Manager Date

_____ _____
Contractor Date

[Form 15]

PAYMENT OF BOULDER SALES AND USE TAX

I. Pursuant to section 907 of the general conditions of the City of Boulder construction contract, the contractor has elected to pay Boulder sales and use taxes according to the following method:

Check One

_____ Estimated Percentage Basis (contracts over $50,000)

_____ Estimated Percentage Basis (contracts under $50,000)

_____ Actual Basis on Monthly Return Sales. Tax License Number _____

II. Sales and Use Tax Due

Original Contract Price $_____

(+) or (-) Change Orders (+) _____ (-) _____

Equals Total Contract Amount (=) _____

Boulder Sales and Use
Tax Due on Contract (*see* section 907
General Conditions.) _____

Less Boulder Sales and Use
Tax Paid by Contractor on permit
or to vendors. (-) _____

Equals Net Sales and Use Taxes
due by Contractor (=) _____

Sales and Use Taxes Paid
by Contractor on this date _____

III. The Boulder Sales and Use Tax Division hereby certifies that, _____ (the contractor) for _____ (project number) has paid in full all Boulder Sales and Uses Taxes due under this contract.

Signed: _____ _____
Contractor Date

_____ _____
Sales and Use Tax Division Date

[Form 16]

CLAIM RELEASE

For valuable consideration, the sufficiency of which is hereby acknowledged, the undersigned hereby releases the City of Boulder and waives all right to file a claim for labor, services, machinery, tools, equipment, or materials furnished prior to _____, 20___, to _____, the contractor, for the work performed on the City of Boulder project no. _____, located at _____, in the City of Boulder, Boulder County, Colorado.

In the event an employee or agent or other person hired by the undersigned to perform the work under the contract brings a claim against the city for payment of labor or materials, or both, the undersigned agrees to indemnify the city and to satisfy fully any such claim brought against the city unless such claim is due to an act of the city or an A/E hired by the city to design or oversee the work, or any agent or employee thereof.

This release is valid only if check no. _____, drawn by _____ on the _____ bank, for $_____, dated _____, 20__, is paid.

_____
Supplier or Subcontractor

By: _____
President

Date: _____

_____
Contractor

By: _____
President

Date: _____

[Form 17]

AFFIDAVIT THAT ALL CLAIMS ARE SATISFIED

We, _____, as contractor, and _____, as surety, do hereby state that all subcontractors, vendors, persons, or firms who have furnished labor, materials, apparatus, fixtures, rental machinery, supplies, tools, or equipment for the City of Boulder project no. _____, located at _____, have been fully paid or satisfactorily secured, and that all city taxes have been paid. If any claims previously known or unknown to the contractor or surety are brought against the contractor, surety, or the City of Boulder for work performed on project no. _____, the surety hereby agrees to pay such claims, or to defend any action brought to satisfy such claims, and to indemnify fully the City of Boulder against liability for any such claims, unless such claims are due to an act or omission of the city or A/E hired by the city to design or oversee the work, or any agent or employee thereof.

_____	_____
Contractor	Surety
_____	By: _____
Signature	Attorney-in-Fact
_____	_____
Date	Date

STATE OF COLORADO)
) SS
COUNTY OF BOULDER)

Before me, _____, a notary public in and for the County of Boulder, State of Colorado, personally appeared _____, known to me personally to be the person(s) whose signature(s) appear hereon and who subscribed their signatures(s) in my presence this _____ day of _____, 20___.

Witness my hand and official seal.

My commission expires:

(SEAL)

_____
Notary Public
Address:

[Form 18]

SURETY'S CONSENT TO FINAL PAYMENT

The undersigned surety agrees to release the City of Boulder for liability for claims filed against the contractor pursuant to Section 38-26-107 C.R.S. by any supplier within ninety (90) days of the final settlement as set forth in section 912 of the general conditions.

The undersigned surety further agrees to release the city for liability for claims filed against the contractor pursuant to Sections 38-26-105 and 106 C.R.S. by any person who supplied equipment or materials or performed labor for the work within six (6) months following the date of substantial completion.

The undersigned surety further agrees to release the city for liability for claims filed against the city within six months of the date of substantial completion by third persons because of personal or property damage suffered by such claimants pursuant to section 913.

In consideration therefor, the city agrees to make final payment to the contractor of all amounts which have been retained by the city, except such amounts which are the subject of a dispute between the city and the contractor.

Signed:

_____	_____
City Manager	Date
_____	_____
City Attorney	Date
_____	_____
Surety	Date

By: _____
Attorney-in-Fact

[Form 19]

GUARANTEE PERIOD INSPECTION REPORT

The project manager performed the guarantee period inspection on _____, 20___, for Project Number _____, which guarantee was originally due to expire on _____, 20___.

The project manager hereby determines that the project has/has not [circle] satisfactorily met the conditions required to pass the guarantee period inspection.

The project manager has identified the following items of work which are defective and must be repaired or replaced:

_____

_____

_____

_____

_____

_____

_____

_____

_____

The guarantee period shall be extended [circle] for only the items listed above until the following date: _____, 20___.

Signed:

_____	_____
Project Manager	Date
_____	_____
Contractor	Date

[Form 20]

PROPOSED SUBCONTRACTORS

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

[Form 21]

SCHEDULE OF MANUFACTURERS AND SUPPLIERS

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____

Name _____Phone No. _____
Address _____
City _____State _____Zip Code _____